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contact sure@sunderland.ac.uk.

THE SIGNIFICANCE OF AFFECTIVE ISSUES IN SUCCESSFUL LEARNING WITH ICT FOR YEAR ONE AND TWO PUPILS AND THEIR TEACHERS: THE FINAL OUTCOMES OF THE ICT AND THE WHOLE CHILD PROJECT

Bridget Cooper
Leeds University
e-mail B.L.Cooper@education.leeds.ac.uk
Tel 0113 3434640

Paul Brna
Northumbria University
e-mail P.Brna@unn.ac.uk

Abstract

This paper considers for the first time the final results of the ICT and the Whole child project sponsored by the Nuffield Foundation. Two classrooms of the future with high quality, ICT equipment and software chosen from a child-centred perspective were installed in a primary school near Leeds and the effects evaluated over two years with a special focus on self esteem. The year one and year two classrooms were designed to increase positive interaction and affect between teachers and children and to improve and equalise teacher/pupil relationships. A range of qualitative and quantitative data was collected and analysed including interviews with teachers and children, lesson observations on video, year 2 SATs data and self-esteem data which was compared with another class group with more usual facilities. As well as showing the establishment of highly successful interactive classrooms in which ICT is integrated into teaching and learning across the curriculum every day, the outcomes also reveal the conversion of anxious, sceptical teachers into ICT enthusiasts. The final assessment data (due in June/July) is expected to show improvements for achievement in literacy, numeracy and ICT skills for the year one and two pupils over the two years of the project and a preliminary interpretation of the data in relation to self esteem and other affective issues.

Key words: ICT, early years achievement, affective issues.

Introduction

For some children school can be unendurable and so difficult to contemplate they opt out. It is no accident that the torturer in Orwell's 1984 (p226) sounds distant and authoritative like an old-fashioned school master, dispassionately addressing an imaginary group rather than being aware of the feelings of the individual before him. Schools have been likened often enough to prisons. In large classes, within a time-scarce, competitive system, when care for the individual is extremely limited it is easy in such circumstances for teachers to slip into controlling rather than motivating. When teachers dominate the class too much, emphasising the negative, permitting only minimal interaction, then we hear echoes from the literature on alienating environments, power and control typified by Foucault (1977) and Goffman, (1961), Illich (1971), Hargreaves (1982). This more traditional teaching and a competitive approach in schools and a shift towards a strong emphasis on curriculum has been encouraged in recent years (Ball, 1990). However the dominating teacher of a large class is considered unempathic and generates fear. Fear causes us to limit our exploration and hone our survival skills. We would argue that there are better ways of learning (Cooper, 2002).

Our concept of the learning process is continually in flux. We revisit old ideas, extend current thinking and integrate new research. Criticism of the mechanistic and relentlessly busy curriculum, bureaucracy, managerialism, transmissive education and the whole context of the current education system is widespread. A recent shift towards enjoyment and creativity (Robinson, 1999; DFES, 2003) suggests the time has come again for examining what our concepts of education could or might be and a deep understanding of the learning process needs to be at the heart of this discussion. The rapidly developing and transformative nature of ICT in learning generates new questions and new understanding and facilitates new ways of working, in radically changing learning contexts, affording opportunities to re-examine more closely what it is to learn.

As researchers, teachers or students we are interacting and learning continuously, with each interaction influencing and impacting on others. The significance of context is increasingly discussed and though much has previously been made of the difference between different age groups there is increasingly some consensus that there are common factors in learning whatever the age group. This paper tries to explain some of these common factors and proposes that by addressing these factors in all our stages of interaction through design, implementation and evaluation and in the classroom itself we can ensure more effective and particularly more motivated learning, motivation being at the heart of attitudes towards life long learning. The paper builds chiefly but not exclusively of the findings from the ICT and the Whole Child project sponsored by Nuffield.

Background
The ICT and whole child project sees effective ICT in primary schools being closely linked with high quality human relationships and interaction. The project considers the effects of embedding intuitive hardware and a raft of appropriate early years software in infant classrooms over a two year period. The project aims to see the effects of the classroom on relationships, learning and achievement. This research builds on some aspects of the NIMIS project, (Networked Interactive Media in Schools), which designed a classroom of the future in three European Schools and sought to enhance interaction of both and electronic and human kind. This paper which reflects on some of the data from the project reveals the powerful hidden curriculum of emotions and feelings which

govern many of the teacher's interactions with pupils but also the researchers' interactions with teachers and pupils.

The success of the NIMIS project (Cooper & Brna, 2002) in which a classroom with carefully designed ICT facilities embedded in a year one class enabled teachers and children to work very naturally with ICT all across the curriculum each day led us to believe that we needed to assess the impact of such facilities over a longer term. The Nuffield foundation sponsored a new two year project which has enabled us to create a second computer integrated classroom in year two in the same school. This has enabled us to evaluate these classrooms over two years, following two classes of children one with ordinary computing facilities and one with enhanced facilities.

The new classroom is an updated version of the NIMIS classroom and contains more wireless technology and even higher quality equipment. The classroom was designed through participant design as in the NIMIS project with the help of the teachers, through meetings and classroom observations and discussion, with the aim of meeting the needs of teacher and children within the classroom as closely as possible.

Both classrooms incorporate a large touch screen, usable by both teachers and children and back-projected so children and teachers cast no shadow. Both classrooms have a cluster of child-friendly computers around a table to support collaborative working and to maximise human as well as electronic interaction. They are meant to support the culture of group work found in primary classrooms. Good relationships with the staff in the school and detailed evaluation from the previous project enabled us to improve on the NIMIS design. The teachers had felt the table for the networked cluster of computers was a little too large in the original project so for the new classroom the table was purpose-built to fit more snugly into the classroom. The teacher, children, head and deputy were very pleased with the results.(see Fig. 1 and Fig. 2 below).

Fig.1. Year one classroom

Fig. 2 Year 2 Classroom

Theoretical framework

Although affective education has been largely neglected in British education in recent years (Best, 1998) it is returning to prominence. Recent keynote speeches at the BERA conference (Hargreaves, 2001; Broadfoot, 2000), have called for research into values and learning issues raised by research into neuroscience. The importance of emotions in learning is increasingly recognised and has its roots in psychological theory on affect and esteem (Aspy 1972, Rogers, 1975, Purkey, 1970). The role of emotional interaction in relationships is also important and recent work in neuroscience tends to affirm older psychological theory on the significance of affect in both relationships and learning (Goleman,1995; Damasio,1994;1999;2003). Attendance to affect and relationships is also the foundation of good citizenship and promotes moral interaction (Kozeki, B. & Berghammer, R.,1992; Hoffman,1970; Cooper, 2002). Leal advocated that the search for world peace through greater understanding of others was directly related to the sense of self generated by the caring relationship formed between parents and children from birth. Research in schools shows the significance of the hidden curriculum of human relationships in creating a positive, co-operative atmosphere (DES, 1989, Rutter et al 1979). Heathcote stresses the importance of empathy in relationships and its powerful effect often through dramatic activities in the classroom (Hesten,1995). The ICT and whole child project sees such theory as central to its framework of understanding the use of ICT in classrooms. The NIMIS classroom sought to enhance positive interaction in classrooms through increased collaboration and interaction and had some success (Cooper & Brna, 2002) and the new project adheres to similar belief and seeks to explore further the role of emotions and relationships in learning with ICT.

In addition we believe that the same concept of learning, through intense interaction, supported by the natural affective and cognitive interchange in human relationships applies to staff within schools as well as to children within classrooms. This is reinforced by literature on teacher learning (Hoban, 2002). We believe that staff working closely together in positive relationships, caring for and supporting each other on a daily basis are more likely to support each others learning. If the learning can be highly interactive and frequent and can be seen to be immediately and practically useful they are likely to adopt and internalise it more rapidly. This has been confirmed to some extent by the findings of the Ripple Project on staff learning with ICT sponsored by BECTA (Cooper, 2003). The significance of emotion and caring attitudes in learning may perhaps be just as important in the field of learning and research in Higher education but is the least acknowledged and practiced in that phase. In tertiary institutions a culture of alienation, competition and self-preservation may be more visible than a culture of care (Pocklington, 2002).

Multi-sensory interaction increases focus, engagement and learning according to Damasio (1999). There is growing research to show that in learning environments emotional interchange increases engagement (Cooper and Brna, 2002) and understanding (Cooper, 2002). Emotional interchange is a key facet of profound empathy (Cooper, 2002) which provides precisely the most supportive climate for effective learning (Cooper, 2002, 2003). A key aim for interchange between high quality teachers and pupils is an increased positive sense of self (Cooper, 2002). Frequency of positive

interaction also supports learning. This project aimed therefore to support positive interaction in the classroom both between teacher and pupils and between pupils. The NIMIS project had shown that tendency of pupils to both enjoy ICT and frequently to be as skilled if not more so than their teachers. In conjunction with the one to one interactivity computers offer in a collaborative, supportive setting with the normal teacher /pupils relationships, pupils quickly became independent, to grow in esteem around the computers and released teachers to have more time and opportunity to work individually with pupils and relate to them more empathically and equally. This close interaction has its roots in the pyschological understanding of child development and allows us to have a sense of self and increasingly of others. Close interaction forms the roots of empathy according to (Goleman., 1995, Leal, 2002, Klein, 1987). Leal argued that the sharing, turn-taking dialogue between mothers and children after birth and then through life is the foundation of selfhood.

All along it has been clear to educators that the experience of 'selfhood' is not a purely 'instinctual' or 'cognitive' affair' but is an early construction, contextualised in a primitive matrix of desires motives and intentions involving 'selves' and 'others' in a continuum of successful instances of social-emotional integration (Leal 2002 pg. 3)

Most importantly these interactions are profoundly emotional in nature,
Back and forth exchange reactions produce intense pleasure in the young infant when well succeeded and produce evidence of anger and fearfulness when frustrated (pg4/5)

In schools more equal, dialogic relationships are more empathic and increased time with individuals is a key factor for increasing teacher empathy and improving classroom climate (Cooper, 2002). The traditional dominating role of the classroom teacher is ameliorated to a more facilitative role, with the inclusion of rich opportunities for ICT use in the classroom. When peers can also offer support and show interest in the work of their fellows, children can also feel positive and have their emotional and cognitive needs addressed in a more equal situation (Cooper and Brna, 2002). Thus the scaffolding for pupils comes from varied sources, teacher, peers and computer. It is both emotional and cognitive in nature and this as Vygotsky (1986) would have argued, overcomes the key weakness of much psychological analysis which stresses only cognitive scaffolding and separates the affective and cognitive. If as Damasio argues (1999) interactions are stored as a feeling then our memory and learning are at base affective in nature.

Equally teachers themselves do not learn quickly in detached fragmented learning, for example on short courses where the ability to practice new skills is subsequently denied. They prefer active situations in the company of others where their skills can be tried out and reflected on in practice in an ongoing way. Computer suites visited once a week without practice are unlikely to encourage rapid learning either for pupils or teachers. The installation of a large screen and several small computers in the classroom for daily uses encourages rapid learning both by all and goes along way to overcoming the problems of staff training and integration of ICT into the primary curriculum. The teacher in the NIMIS project made clear her beliefs about the effectiveness of the classroom quote;

The computers in the classroom, yes because you can have a scenario like I have got, a perfect world, then you can see that it makes huge changes in the development of the children, it's another learning tool

Research goals and questions

We were interested to see if this degree of satisfaction on the part of an ICT novice would recur in the ICT and the Whole child project and whether over two years relationships, esteem and achievement were improved in the classroom designed to support them. Both our own and other research suggests that positive emotions and relationships can enhance learning and a sense of self and confidence in both teachers and pupils and in this project we sought to explore this in more detail.

In addition to the empathic design of the classroom is the building and supporting of regular trusting relationships between teachers/managers and researchers. Over almost five years the relationships built up with the school are relaxed and flexible with continual adaptation of times, activities and venues in order to best meet needs. Naturally teachers have to be less flexible because they are subject to the National Curriculum, the school timetable and their interactions are closely intertwined with large numbers of small children and other staff who depend on their cooperation and attendance. However to be videoed and interviewed, to have your lessons interrupted for photographs and testing, to have to answer questions and work with high levels of ICT coming from a novice status also demands flexibility and the teachers have always been professional and supportive throughout these projects despite the massive pressures on their time. We were also interested to understand if supportive relationships played a part in the effectiveness of this project.

In Cooper's thesis (2002) the reciprocity of relationships as well as the need to take responsibility for others is stressed. Relationships involve give and take and reproduce themselves. Capra (1997) explains how the living, adaptive world we inhabit reproduces itself on a variety of levels. In terms of human interaction a similar effect can be seen. Researchers, managers, teachers, parents and children need to mutually build esteem. Positive interaction tends to reproduce itself. In order for esteem to grow the emotions need to be generally positive between people and the negative feelings need to be overcome and dissipated. Anxiety and fear over ICT needs to be allayed in order for positive emotion to dominate and new learning to ensue. David Winkley (1997) argued that our brains grow when we feel cared for and this is how care links to learning. We might substitute the term 'love' for care since inevitably it seems that the heart of caring for people and even subjects or objects deeply involves the concept of love and love involves deep, intense and mainly positive interaction which can overcome times of negative experience and emotion.

A six year old Portuguese student I once taught English said to me, 'Zee compooter - I lerrv eem!' This comment has often recurred to me since I have observed children's interactions with computers and undoubtedly the keen motivation, excitement and desire to talk and interact which children display around computers have often confirmed for me that the feelings they promote. An overwhelming desire to interact with them is not

unlike our concept of romantic love when we think of people whom we love. The rapid responses that a working computer usually gives to interaction is a key part of this process and for children the games, music, colour and sound and often continual challenge to their thinking and curiosity offer an intensely emotional experience, even though the computer itself has no emotions. Their emotions are similarly negative when the object of their pleasure does not respond adequately. Failing equipment is highly frustrating.

For fear of embarrassment and I suspect due to the highly cognitive and detached historical approach of academics the term love is not so often used in universities in relation to learning, though doubtless academics 'love' of subject must be the key reason for their pursuit of it in such intensity. However in some areas of the philosophy of education the concept of love has a long history. Our sense of self is confirmed and expanded through the unconditional love of others. Though Rogers calls it 'unconditional regard' others specifically describe love. Even Marx attests the power of romantic relationships which make him what he is (Fischer, 1973). In a recent keynote speech (2003) Prof. Ron Best explained that spirituality at the heart of education is in effect 'love' and that if in our interactions we 'love' each other then we support mutually respecting interaction, learning and development. Damasio, as the neuroscientist exploring these ideas in relation to Spinoza's writings would concur with this view linking spirituality to a sense of harmony and serene joy (2003). He argues that positive emotion makes us function better and feel more generously disposed towards others. In this sense then when we build highly interactive, supportive classrooms we are promoting positive emotions, a sense of self-esteem and worth and dare I say it 'love' of learning and people. These children and teachers can perhaps lose themselves on the computer as they can in their relationships with others. Sometimes children and teachers really want to focus on their subject and need to work alone, other times they need support, contingent teaching and human interest and interaction. This paper argues the emotions involved in the ICT and the whole child project are often strongly positive and these can relate closely to 'love' and 'happiness'. Once their narcotic effect is experienced we want more of them (Damasio, 2003). If something makes us feel good our sense of pleasure which seems to be related to our sense of self grows. Negative emotions are associated with withdrawal of love and often self-blame. In relation to computers this is typically when they go wrong and the desired interaction and outcome are not achieved. This can make us reluctant to explore further. Lots of positive experience can act like an immunising injection against occasional bad experience helping us to weather emotional storms.

Positive interaction and feedback can be of many kinds: verbal, non-verbal, symbolic i.e. material, aesthetic. It aims to increase pleasure, positive feelings and development of self ultimately if not immediately. Deferring gratification can sometimes increase intensity of pleasure because excitement builds up with anticipation in the imagination. Extreme emotions are remembered strongly and relived rapidly in memory (Damasio, 2003). Some pain before pleasure perhaps heightens the emotional contrast e.g. we enjoy a cold drink a lot more after a hot thirsty walk, even dogs drool before receiving a tit-bit. However too much delayed pleasure can create resentment especially if not self-directed since it can involve the retention or even the abuse of power.

When something or someone has always been associated with pain or negative emotion for example school, it can be very hard to enable people to overcome their fear of more pain. In fact the brain can be damaged even by verbal abuse (Maclean Hospital, 2000). However if we can't get pleasure, pain is better than nothing at all – ie negative response at least confirms you exist and have had some impact, being ignored makes you feel as if you don't exist at all (Aspy, 1972). In large classes being ignored or hearing messages which don't really apply to you is the norm (Cooper, 2002). Our quest then is to find ways of finding more pleasure in school classrooms.

Methodology for project
As in the NIMIS project we chose to use a participant design methodology (Carroll and Rosson, 1992) to create the classroom and pedagogic claims analysis to formulate and analyse claims about the classrooms which we believe have been substantiated by the data gathered. The many claims generated in this process represent many mini hypotheses which are then tested against the data. In the early stages of the process new claims can be generated and old ones reformulated as new hypotheses emerge about the classroom and its inhabitants and interactions. Classrooms are complex dynamic places where the interplay of relationships, objects and tasks is difficult to evaluate. The claims method enables researchers to gain handle on the complexity and allows claims to be formulated and evidence to be weighed about both complex or quite simple issues. This is a typical claim.

1.3 the provision of a touch sensitive screen
Supports self-esteem
Because empowers children by dint of its sheer size both for creating, viewing and manipulating picture, sound, and text, child can take 'teacher' rather than pupil role - equalises relationships
Check-rule monitor response to the screen **via** observation, interviews **issues** some children may dislike or fear the 'touch' element of the screen or find sharing too difficult

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1.5 the provision of a number both large and small interactive screens
Supports motivation and self-esteem
Because the children are absorbed and empowered, with numerous opportunities for interactivity of different kinds
Check-rule monitor **via** observation video teachers diaries interviews **issues** children may feel lack of confidence in this way of learning , prefer more bodily active learning

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1.9 the provision of input devices in the form of tablets and mouse pens
Supports easy input to and use of complex software therefore competency self- esteem
Because it builds on existing skills of writing with pen and paper
Check-rule evaluate use of new devices and compare with traditional pen and paper and mouse and keyboard **via** observations, story assessment, pupil interviews, teacher log
issues problems with holding and working mouse pens and writing on new surface

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Increasingly research into ICT focuses both through design and evaluation on the specific context in which ICT is used, given that each context is unique, although common features can occur across contexts. For this reason we tried to design the classroom uniquely suited to its needs with the support of the school, whilst also trying to integrate theoretical concepts to support collaboration and interaction. Teachers teach and pupils learn in many different ways in classrooms, so the classrooms were also designed with flexibility in mind to enable discussion and interaction around different workspaces in different numbers and groups, or for children to work individually, which both teachers and children also preferred at times. The participant design methodology is empathic in nature because it seeks to understand and address the needs of all participants through dialogue and relationships. The collection of different kinds of data also enables us to see the same classroom from different perspectives and meetings with staff allow us to reflect in some detail on that data. This produces a rich understanding of the issues in the classroom.

The project considers achievement data, as well as interview and videoed observation data in its final analysis. A class of children has been monitored, observed and interviewed through two years of the use of these facilities and we have compared them with a similar parallel class which has more usual ICT facilities over the same two years. The teachers share curriculum planning and resources so their materials and approach are fairly similar though the media are at times different, the classroom is different and clearly the teachers are different.

Data collection and analysis
Both of the year one and year two teachers and all the children in two classes (over 50) were interviewed in a relaxed, semi-structured style about their feelings and beliefs about various classrooms issues, including ICT at the start, middle and end of the projects (see appendix 1 for guides). Interviews were transcribed and then analysed. The teachers answers tended to be long, complex and elaborate requiring detailed thought and consideration during the analysis and many interesting issues emerged. Children's interviews were shorter and simpler but also continued many interesting issues. In addition we collected achievement data three times, (national curriculum assessments, reading ages and ICT skills), self esteem data three times and gathered 20 hours of videotape from lessons in the classrooms as well as photographs. Fieldnotes were also made when relevant.

Findings and discussion from the teachers' interviews

The two teachers of both the year one classes first interviewed, revealed interesting insights into emotions and relationships in the classroom, revealing the hidden curriculum of interpersonal interaction and understanding, which is rarely discussed in these hectic days of assessment, standards, targets and subject knowledge. This is described in detail in a paper (Cooper and Brna, 2002) and will be discussed more briefly here. Year two interviews have since confirmed and elaborated these findings. Teachers assessed, targeted and planned interaction for their pupils in a personal and emotional sense, both as groups and as individuals, on top of all the curriculum planning required for the National Curriculum. Moreover they saw the personal, social and emotional aspects as central to learning and development for their pupils. They read about relevant issues in their spare time and reflected on methods to engage and support needy children. Ensuring children experienced positive emotions in school was an important aim and was central to developing their academic ability, the two went together.

Jennifer says:

I'm very aware that I want each child to be happy at school - I want each child to learn something every day and I want them all to know why they're here and that I'm there to help and I just want them to do well

Creating those positive emotions was seen as the teachers' responsibility,

*I would think most children think differently about different subjects but it's up to me to get them enthusiastic about **all** the different subjects - I take it as me - it's me whose got to do that ... it's my job to instil that into them . They've got to want to do that and if they don't want to do it then it's something I've done wrong as well - I haven't got to them.*

Making classroom activities into a game and fun and *child friendly* by arousing curiosity, excitement and imagination were an important element in Jennifer's account. Getting children enthusiastic and creating pleasure and positive emotion were a vital part of learning:

I think - they enjoy it, they enjoy it then - they've got to enjoy it - they're at school - so many years ..so many years   .. and I sometimes say to them (secretively) ,' You know when the government have got all this work ready for us to do and we've got to do this and we've got to do that .. ' I said ... ' They don't think that we're having fun while we're doing it ' - and they're all sat there beaming you know and I say ' we are having fun aren't we?' 'Yes'

They've got to have some fun - (pleading) things are too serious for them I think in a lot of the world. I think they've got to. School's a lot of their life and if we get it wrong and they don't enjoy it, they don't want to stay - they don't want to learn any more.

This wasn't just positive for the children it was positive for the teacher too:

yes mm but I want to enjoy it , I want to have fun, I want to have a laugh with them..

She described several role-plays where children were asked to imagine situations or take on different characters or characteristics and how it was both fun, engaging and made

them feel special. Giving children another viewpoint or perspective through role-play could transform their confidence and sense of self. She used puppets to support communication and wrote letters to fairies. Even normal classroom situations were turned into imaginary ones to make children laugh. Reading books together with different voices for the characters made it more fun and triggered memory:

*It's just the fun, its just getting them to have some fun while they're doing it - and they'll remember it and they'll say can we read in that funny voice, rather than just going pan faced... through everything - put some **life** into it .. (My emphasis)*

Jennifer was deeply involved with her pupils and was concerned for them as people rather than just as pupils. She was acutely aware of their feelings and mirrored them. This made her do her best to ensure the children were developing to their utmost.

I'm involved in them - they're part of me, they're my class, I want the best for them - I want them to learn and do well and not forget-

-yes I'm emotionally involved with them - what they feel, I feel

The significance of self-esteem
Teachers in both classrooms assessed their pupils' sense of esteem which they saw as crucial to their learning and happiness in the classroom and attempted to raise this esteem when and where they could. Learning and emotions were considered to be interlinked and an ability to interact and participate were seen as crucial to learning and happiness in classrooms. Children with low-esteem often had experienced little positive parental interaction,

just not valuing children's achievements and not spending time with their children and ...you see situations where children are well cared for materially - and have all sorts but are time poor. They haven't had the interaction with their parents - they haven't had, 'Oh lets go out (instead its) - I'll pay for you to go off and do the football course – it's being valued as a person

-it's being valued as a person - it's the what makes them tick - it's the being prepared to listen, being prepared to take on board what they say - acknowledging feelings

They felt children with low esteem were not able to interact in a positive way with others. Jennifer:
-they need to have self-esteem and I think if they do have self -esteem that it gives them more confidence at school. I think it makes a difference to how they feel - if they're happy, excited they're going to learn because they want to do, if they've got low self-esteem its the...' not bothered, not listening, couldn't care less ' -so it makes a difference.. [] they're not as interested - they're not as keen .. I think they don't give their best because they haven't - the excitement's not there. So they don't get the best that they could   - they get more out of it if they put more effort in and feeling -if they give of

themselves, they get more back...let themselves enjoy it and let themselves go - and enjoy it

Jennifer felt low self-esteem could make children aggressive but that their esteem was not always related to their current attainment. Her aim was to get children involved and raise esteem:

If you have a whole class of children who are enthusiastic and laughing and involved you've got them and this sulky little thing in the corner who's well out of it - who isn't bothered. And you think, what more can I do to get you involved, excited..

Such children were often deep in their own thoughts and anxieties and she tried to anticipate anxiety and distract them by finding ways to get them involved:

you've got to be almost to be one step ahead of the children and step in ..if you think here's something that's just not right and build this up ...so they forget what they've been thinking and you've taken them out of this worry or feeling that they've had -- to doing something and they get something back, ' You've enjoyed that didn't you... you've done it yourself ....they've got to want to do it from inside'

Maggie felt behaviour and achievement were closely linked to self-esteem so raising self-esteem was always on her agenda. However she also explained how the classroom persona, the pressures of managing many children and delivering the curriculum reduced empathy for teachers.

You're playing a role - its about control I think - I think you've got to be focussed because of the curriculum -you get very …'I'm sorry I haven't got time to talk about that' - you can't give them the time

Jennifer explained how she tried to make all her children feel special and to develop them socially as well as academically. She was highly aware of each child and also her own potency in their development.

you're a parent and educator all at the same time - we have a big influence, I think we have a big influence on children ...so I am aware of involving everybody - especially on carpet sessions and working with everybody to let them feel really special, they're special and although we're in the same class we're working individually but we're also helping each other... and to try and build up their confidence and self-esteem

She felt you had to know and cater individually for each child and this understanding goes beyond the school gates. This is precisely the nature of profound empathy explained in Coopers thesis (Op.cit).
so you've got to really know your children as to what you can give them -and make it work … knowing their likes and dislikes and what they can (do) at home... and their families

Knowing children individually and their preferences made them special and the teaching specific and building up a positive atmosphere of support in the whole class increased a child's esteem.

The role of ICT in creating positive emotions and esteem
Teachers were aware of the grind of the curriculum, and sought to make school work fun and exciting. In their interactions with children teachers tried to engage children's emotions and turn learning into a game. They felt computers echoed their own attempts to make learning fun and varied and was one of their key benefits. They could reinforce skills and support learning in a fun and interactive way

Another important ability of computers (like teachers) was to engage children deeply in an activity. They were able to focus their attention and engagement both actively and emotionally in a multi-sensory way. This meant children were in another world when they were on the computer and their imagination and mental faculties were keenly absorbed. Fantasy type games which captured and utilised the imagination were particularly enjoyable and even older children remembered these from their infant days.

Jennifer:
It's like being in a little world of their own - they're in front of a screen and I think that children when they're working on the computer they're half oblivious to everything else that's going on - they're contained and there's this sort of impact of colour and shape

She also felt the limited area of the screen supported the focus:
if you put your head behind a screen. The children would focus on that and there'd be a limit as to where they had to look - they'd know what they were looking at there ...

Maggie:

when they are working on the computer generally -they're focussed - it's hard to get them off - when you tell the class to stop -they don't think they are part of the class

The pleasures of the computer were also compared favourably with the way the National Curriculum had to be taught and amount of teacher talk and information young children had to absorb.

Jennifer; *they get so much information crammed down them. They have to sit on the carpet and listen to the teacher for this, - you come back to the plenary sit down on the carpet and listen to the teacher for that - when they go on the computer you don't get the teacher babbling on. Its away from the teacher as well, they don't have to listen, but they can't use the program if they don't listen so the computer's got them really.. if they want to work on it they've got to do what it says , what it instructs..*

The absorption in work meant children would work together discussing activities and yet be very absorbed in the task on screen. They worked side by side usually in a very positive way accepting the need to take turns and share in a non- confrontational way and

helping each other with the activities and the manipulation of the software. This helping could give children positive emotions

Jennifer:

And that's good for children, teaching somebody else -if they know how to use it working together - and they enjoy that...

This was again was contrasted with more traditional ways of working.

I suppose because we don't encourage them. If they're doing work at the table -unless they're working in pairs we encourage to do it yourself - do it yourself but they're not actually encouraged to work together in those situations, where they're doing Maths and English

They believed children using computers were then able to accomplish higher level mental tasks, which because of early poor co-ordination skills or information overload they could not otherwise accomplish. Computers enabled them to redraft and make mistakes which could be easily corrected minimising the negative and emphasising the positive aspects of their work.

Maggie:

and one of the big things - because we've got all of those - children whose handwriting is a problem - pencil control skills - it frees them up from that -- I used them last year - they were able to do a piece of written work

Jennifer

- also addition and subtraction to get their mental work going. If children have to write them down they're not getting as much mental work going –it's being stopped because they're having to write and record on paper whereas if they haven't to do that and they can just work on the computer they just press buttons - its easier for them.

Maggie: used the same expression 'frees them up' to describe how worries about learning are dissipated because they think they are playing on the computers which offer variety:

programs for numeracy-they're learning without realising they're learning-it frees them up -they're getting exposure in different ways

Jennifer talking about a special needs child:

I think the doing something   - I think it would help him with his language and his writing – it's too much for him to take in to take down a letter and write things - I think if he could just tap it in he could do it

Computers were also particularly beneficial for fantasy games, which capture the imagination and give children the decision-making power -again similar to the attention grabbing, role-plays of the teachers. Children remembered these programs with pleasure years later. In the process of using the program children might be learning to read or do maths. This learning was enjoyable but sometimes peripheral in nature.

Jennifer:

that fantasy one where they've got to make things happen and they can sort of decide what happens - you can't replace that because its can't be done in a lesson - you can't

replace pictures and words so fast - that's got to be done on the computer. I could do with more of those where they have to read to understand but they have to do it to follow instructions (there's a lot of reading) but the children don't realise they're doing it. It's just happening and they're going along with this story they don't realise what's involved.

Maggie also noted the fact that children were learning numeracy skills without realising:
the other thing with the numeracy - they don't always recognise when they're doing numeracy
It's the whole thing about exploring number - In a different way -It's that breadth
- their minds free and its much more open isn't it -they're free
Jennifer felt computers engaged the imagination in a way that traditional methods did not:
you can't do that on paper - it doesn't have the same impact. When they're using that (the computer) - it's real to them - they're there - the children feel as though they're there

Work on the computer gave both power and success and an increased sense of self through positive emotions. Again the idea of play and active learning is prominent but also this idea of focus and absorption which for SEN pupils who are easily distracted is very helpful. Jennifer felt it took children out of the world of the classroom and she could relate it to her own experience on the computer:

I think they see it as - it's away from the classroom -they're blinkered to this box and what's going on there - it's taking them into another world.. ..I mean I know from myself when I'm on the computer at home and somebody comes in and says something - I'm still in this program and I'm aware that's somebody's said something and that I've answered something but I don't know what -I've given the right answer or not but I've said it - I'm involved in what I'm doing - so it's obviously like that for them

Maggie felt that the practical interaction and engagement on the computer offered another way for children to gain esteem,
The computer can give children opportunity to shine and you can free them up from constraints.
And it made relationships more human, more equal, more positive and mutually rewarding - less teacher/pupil
it shows you teacher/ pupil relationships a different light - you're not seen as the teacher in the classroom - you spend more time with each other

Computers meant staff shared their strengths and vulnerabilities with children. However she felt the entire staff were very good at valuing children, using this more human interaction which meant sharing personal aspects of their lives with children as well as listening to children's personal stories.
here the staff are prepared to give of themselves - it's like I'll put in some things about David (her son) - I think it just helps to place you as being human --- a person who has value, can do things

Effects of the large interactive screen and round table cluster
The large screen in the NIMIS classroom had physical and sensual properties when children used their fingers both to draw and work the software: Maggie explained its impact: *they like to chose the big screen and particularly when they are using their finger. I think its free - they can make a big sweep with their hands - I think its the magic finger .*
They use their imagination
It feel s like your whole body's involved -
and for children who have struggled with control of the mouse or whatever - I would want to target those children who are having difficulty with control with motor skills
She is suggesting here both physical and imaginative satisfaction. However working on the big screen had an impact on both children and adults and children gained esteem because adults were impressed that they could use it;
it does have a big impact.
the status of the children - they feel we can use this - they can use the big screen .
If another adult comes in they can be really impressed and you can see the children glowing and growing   -it does boost their image of themselves as being computer literate

Implicit in here are the positive emotions of success, and pride in being able to operate the large screen and the status it has in the eyes of adults.

The teacher also had positive attitudes to the big screen because it enabled her to do her job more effectively:
Maggie:
It's a fantastic resource -the instant nature - you can do a word-bank and then print it off and all the children can have a copy - you can introduce to everyone at once -saves time

Maggie who had the classroom with the table of five computers felt that sitting around the table did promote peer interaction she spoke of :
the domino effect around the table and they talk across to each other as well as.

Asked if she thought computers had any effect on self-esteem Maggie replied:

it does have an impact but I do think it's only when they've got enough computers -for it to raise its profile and to use it in a way like we do at the moment- to have six screens and effectively you can have 12 children working together. I think that's when you can begin to have an impact. I think one computer in the corner of the classroom is not going to do that - I don't think in any way really

Jennifer also felt the computer could encouraged interaction and through that raise esteem;
yes because- it's working together, it's working with each other -they're helping each other, so I think it does and I think as well -one thing about the computer they don't always look at each other.. so I think it works - the language is there but they don't always... they 're not always looking .... so it isn't confrontational if you will ..there's no

sort of threat - if they're helping each other   or they're working together they're working to achieve something together

Even the process of printing off offered that emotional completion and success which was part of the process of learning and achievement. Failure to print could be very upsetting. Having the work in your hand, immaculately presented and taking it home to mum or dad was also considered significant.

Both teachers were aware of the problems with faulty equipment and how this could turn benefits into disadvantages. This produced frustration for both themselves and children when it was not available. Jennifer felt it took time away from teaching if the computers broke down : *that's the thing I've found the most frustrating thing is having to break off teaching to go and sort out problems on the computer - because of the computer not because of the children*
As the teacher with the more usual standard of equipment she was more aware of the problems and limitations of using computers. The children were more dependent on her for logging on and off and for rebuilding their esteem if work had been lost -which it frequently was with her old equipment. For some their distress was so great that the Jennifer would try to recreate their work from scratch for them after school.
I have been known when we've lost work to try and print it back up or get it back up as near as it was with out them knowing and pretend I've found it

Similar concerns were found the following year with the teacher with just two standard machines in the class of 20. Computers were seen more negatively and as more peripheral because they were inadequate to meet needs and engendered competition. Children and teachers were less skilled and more frustrated.
That's it – it's just a token gesture. 'Done it! Had it switched on. They've had a play with it – and that's it, they've been on it'

Cos there's only two. And anyone who's on it is a distraction for everyone else, because they're all going 'ooh, I don't wanna do that, wanna go on the computer'. Whereas in (the other class) they're at the back of the classroom, they're facing this way, towards the board. So they're not really looking to see what's on the computers, but they also have their turn on the computer more frequently than in mine

Children's emotions in relation to ICT.
The many children's interviews reveal on the whole very positive responses to ICT. Asked how it makes them feel the most typical responses were 'happy or 'its fun'. One little boy who loved playing grannies garden on the old BBC in his room said, *oooh - fun!!* He laughed with delight on his face he was very animated and gesticulated. *cos there's loads of fun on it and I play on it and play on it and ooh I'm crying when it ended -- not really* (jokes). Although teachers frequently identify the benefits of ICT for SEN (Cooper, 2003) most children seemed to experience immense pleasure including high attainers. ICT often crops up as a favourite activity even in general feelings about school,

ranking alongside lego, playing with friends and even chocolate cake! Now there's pleasure for you!

Negative responses are almost always in relation to failure of machine or printers, or not getting enough time on the machine.

sometimes when it's not on or not working I get a bit cross with myself; but people go - woosh (shows rush to machines with his hand) to the computer before I get there[]it's not fair

Typically in the normal class without the good equipment such negative experiences are more common since they have to compete for a turn on the computer. Though taking turns at times can be a good learning experience the type of rationing in many classrooms of computer equipment tends to promote more negative emotion. If as researchers we had to share one computer between twenty people we would probably express feelings of disgust, anger or frustration just like waiting in a long queue at the supermarket. Interestingly a number of children said that the computer made them feel like they are at home, recognising perhaps a more comfortable, secure feeling where they are more in control. Several gave the impression that they mentally got inside the computer:
I feel like I'm in the computer.
Most children felt they learned things when using the computer:
I learn to share, you learn to write, to play.

Moreover they were motivated to learn more challenging things
god but I just hate my brother pushing me off the chair when I'm working and then I press the wrong buttons to get percentages and stuff -when I'm six my mum's going to put it on hard level on the computer and she's going to show me which level (and) how you do it because it's going to be hard (clearly looking forward to this)

Only one child felt negatively about his esteem on the computer and this was a boy with very negative esteem generally and no computer at home. Around 80% of children in this year group have use of a computer at home though one or two were broken and awaiting repair. Some had used digital cameras and scanners at home also.

Though there is not time to go into this here the parents questionnaires (50% response rate) echoed this positive emotion regarding their children's response to computers and were very aware of how it supported their learning. 100% of parents who replied were very positive about their children's use of and reaction to computers and the challenge as well as the fun they offered.

my child is very clever for his age and loves to learn. The computer has gone down well with him. He is always very eager to show me any computer work - he enjoys it

Children enjoy: *the interaction in the programs and the child-based characters*
If appropriate, good software used (it) can be educational for children, they enjoy it and allows access to material their own skills not 'developed' enough for

Nice machine; challenging tasks (comment on school equipment)

Videos of the project classrooms show the rush to the computers when given half an opportunity, excitement and delight at learning how to do new activities and pleasure at showing others how to use different aspects of the software. In the picture below the teachers was engaged with a visitor for quite a few minutes and the children flocked to the table with the machines.

Doing science with the help of the big screen generates a very positive response.

Note the lack of the dominant teacher in these pictures.

Teacher's response to ICT in the project classrooms

Of the two teachers who share the year one project classroom one had had two years experience in it already and the other was fairly new to it when the project began. They were both very positive about the room and the equipment and how it helped themselves and the children. They were able to use it all across the curriculum and the large screen and table with small computers were used every day unless there were problems. Both the design of the classroom, its flexibility and the fact that the equipment is there, set up every day teachers and children interact with it on a daily basis and soon become familiar and competent. The amount of access allows it to be used across the curriculum,
because there's enough to integrate it

Their self-esteem around ICT rose rapidly though they always expressed a desire to know more:
developing my skills - an enhancement for me both personally and professionally
I don't feel as if I'm using the network to its full effect anyway - haven't used it all - because there hasn't been time

The greatest negative emotions were around the failure of the large screen after the projector developed an intermittent failure due to dust the collapse of a ceiling in the next door classroom and then it was frustrating because the screen couldn't be used at times.

The new year two classroom was set up at Easter during the first year of this project and was ready for the year one children from the previous class to move into to move into in September. It was designed again with the teacher through observing the classroom at work. We had the little table especially made so that it would be smaller than the last one to fit more comfortably into the room. The screen was set up to be used in front of the tables rather than the carpet because the teacher felt that the children, now older would use the tables more than the carpet. However I was particularly concerned in this classroom because the teacher was close to retirement and seemed very computer phobic. In a sense investing time and energy learning to use the new classroom was a bit of a waste for her in terms of teaching and I think she felt this and moreover was frightened of the equipment she would be getting. However to my great surprise with some support in the classroom at the outset she took to it avidly and again the phenomenon of novice teachers rapidly gaining confidence and familiarity occurred as it had before. I think she surprised herself by how quickly she learned it all.

For example I spent one afternoon showing a group of children how to use the digital camera and download the pictures onto the computer. We went out into the wild garden and took lots of adventure' photos to write a mystery story. This involved children hiding and creeping through the grass etc. We brought them up on the big screen and immediately the children began to suggest all kinds of lovely language associated with the pictures. The teachers eyes lit up and I could see she was immediately taken by what she might do with them. Though she was still a little unsure at this stage after another few attempts I came into school one day to find her taking photographs of all her class for the following year. She then brought them up on the big screen in textease, manipulated

them, printed them off, mounted them and lined the wall with them as a welcome for her next class -she was quite thrilled with her own progress. Her praise for the classroom was full of superlatives and she rapidly saw how useful all the equipment and software was for learning. She became a very rapid convert and began to love using ICT. Here are some of her comments, *it's fantastic,   those talking stories are just brilliant*

yes it's the touch-screen that's the – I would still say it's really, really, very, very valuable. I wouldn't have said so last year at this time …

She used the big and small screens, the wireless key board, and a wide range of software between Easter and the summer became really quite familiar so much so that when she moved into the first project classroom the following year she was still very confident.

The touch-screen in the Year 2 class - I became very confident and could see it's great value in class teaching,

She also described how she felt before we put the equipment in:

Well you know me I tend to – lack confidence, I might be a bit older - but I do lack confidence and I have always had to work really hard because I don't have a computer at home, and therefore when you said they was coming in to me, I though – oh! (worried) And (now) I feel sad that I had to leave it because I certainly gained in confidence and felt I could have pursued it more but that is at it is. And so I've definitely felt more confident in the other – with the other set.

Suddenly she has a strong opinion about how computers should be deployed in school:
But I do think there's great great value in having them in the class, rather than having a suite.…

Because if they are in the classroom it's hands-on they can go to it. You can have it in – because it covers everything, so you can use it in every subject and therefore when it's in the classroom it's there, if it's in a suite they are going to do it for half an hour.

…..And I've changed my mind over that.

She felt it was important for SEN children, it increased their concentration span and focus gave them a sense of positive emotion through excitement and raised self-esteem.

And I have a special needs child in my class who's very, very small concentration span but on the computer he'd be there all – well not all the time but as much as possible.

Int: *Why is that?*

It's visual I think.

Int: *Visual?*

………His speaking is very poor and I think it's satisfying for him. He's achieving isn't he?

I think which is important… for David to achieve and I think -it could be used more if the child had more of my time or more of somebody's time to help him to make more progress because you have to home in on something they find exciting in order for them to feel good about themselves and I think the computer has a lot to offer there.

but particularly for your low achievers it's absolutely … it seems to stimulate them.

And its infectious
And I find that with the low achievers the other achievers will gain as well.

She considered self-esteem to be very important as the other teachers in the previous year had

Definitely. The most important thing is your self-esteem.

Now I put that as a priority and if you're given – and you say 'well done' and they can achieve on that it dovetails together and I'm not bothered about how fast they go but the progress that the child or adult makes.
She also commented on the fact that I had turned up and praised her progress and it raised her self-esteem

You come and say – look at me – you said to me – 'Oh look at your whizzing!'. I obviously wasn't doing very much - but that boosted my golden centre! You said that and I – you know we all need it.

I'm coming at it from the inside, the golden centre of the child, this thing inside us. when we're coming into school and the thing we … we do – they do know where they are. They do - they have a good idea the bright ones even at my stage, they do have a bit … they know which box they are sort of in and the children, if it helps them which it does help them overcome it, let's use the tool, use it and obviously we are using it.

She thought the computers promoted positive emotions but her own sudden positive attitude took her by surprise.

As a tool you know I would just use it more because they enjoy it, you know, it's all about being – enjoying the thing. And I find it frustrating, well not – I have a job to teach 24 children and I can't. David is an example, Steven's another one, another boy who's come in to me; there's Sam poor child. I have got a surprising number of children who have poor hand control and obviously you know they need to practice that. But I mean if they get on here and they get the word banks you know they can do it "Look at me Mrs Jennings - I've done the draw … look at this picture". "Fine". I find myself, I am quite surprised I am talking like this!

Like the children she was aware of ranking in the competence hierarchy but had gained esteem in this regard.

I knew where I was in the competence ---but I have been made to feel better.

She felt the big screen was very supportive for literacy and used role-play to make the children the expert in front of the screen

Shared work, get the shared work, talking, writing, 'Look at it – right - does it sound right?' Obviously make a mistake, do something on purpose – no - they correct it for you, you're in role; you put something up , they (say) ' no, no'. 'Right what's wrong with it?' - you know?

They are the teacher.

The children are the teacher, you are the one who's – you're the child.
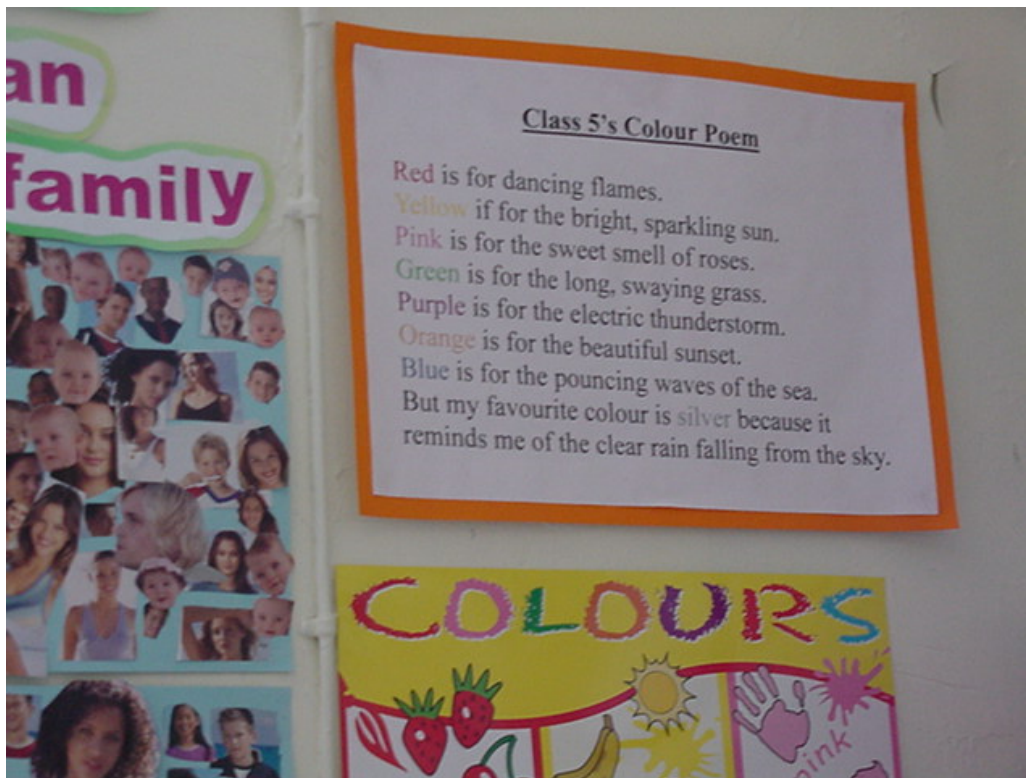
Why am I doing it? Because I think it makes the children think and --I need their help and I think the children- it makes them feel good and they remember it more. There again it's more hands-on because they are in charge - [] and there's rapport and yes I think they are learning the skills more.

She explained how she overcame the barrier of feeling incompetent.

Well I couldn't, you know, (I believed) that was way beyond (me) – because I was never taught that – that was way beyond me. It was somebody, in my opinion, was up there and you don't have to be, you don't have to be. It's just practice and then you can do it and that is what – it's taken a long time to learn that. Because I'm one of the people who've never felt competent at it but I know that it's not difficult, you've just got to learn and just practice it.

Growing skills
In the classroom by the end of the project the teachers own use of ICT is highly visible on the walls of the new classroom and in fact this poem was written together using the wireless keyboard around the large interactive screen.

Class 5's Colour Poem

Red is for dancing flames.
Yellow if for the bright, sparkling sun.
Pink is for the sweet smell of roses.
Green is for the long, swaying grass.
Purple is for the electric thunderstorm.
Orange is for the beautiful sunset.
Blue is for the pouncing waves of the sea.
But my favourite colour is silver because it
reminds me of the clear rain falling from the sky.

COLOURS

Where are these patterns in our classroom?

Discussion of qualitative data

Much of this data echoes the findings from Coopers submitted PhD thesis (Cooper, 2002) which offers an elaborated analysis of empathy in teacher/pupil relationships, and gives a typology of the factors involved in interactions which teachers felt supported relationships and learning as well as those which did not. In order to develop profound empathy, which promotes moral concern for each other teachers and pupils have to interact intensively and positively both emotionally and academically. This most intense empathy develops most keenly in one-to-one time with pupils, which is not easy to find in the busy classroom. However primary teachers who interact with their pupils for most of the day for a whole year, the closeness grows over time. Empathic teachers are highly aware of each individual child and take a very caring and sensitive approach to them, spending time both planning for and interacting with specific individuals in specific ways. Getting at hidden worries and anxieties requires more individual time.

Teachers grow to know aspects of their children's lives both at home and school, both personally and academically and the two are continually interlinked. Empathy involves creating a rich mental model of the other person which supports further interaction and development. This interaction provides the focus and engagement which Damasio (1999) explains engages the brain deeply at an emotional level. Our interactions are logged in our brain and body as feelings. At each interaction we are obliged to be aware of ourselves and this reinforces our sense of self. Here we see teachers deliberately seeking positive feelings which according to Damasio encourage learning and more interaction. As teachers interact with and grow close to their children, forming positive relationships, the emotional feelings are as one. Jennifer says: *I feel what they feel.* This closeness promotes moral responsibility for doing the best for children. If a teacher feels as the children feel, she will want them to succeed and be happy otherwise she will suffer too. The pleasure found in enjoying activities is also shared: *I want to enjoy it, I want to have fun, I want to have a laugh with them.* The boundaries between teaching and parenting blur: *You're a parent and educator all at the same time.* This concurs with the concept of the familial relationships in Cooper's thesis. The dominating role of the teacher is reduced to a more sharing role where the child can become the expert (Heathcote in Hesten,1995).

Knowing children closely through constant interaction means the teachers can give much more individualised support, more pertinent to specific needs. Creating excitement and enthusiasm through shared activities engages children in their learning. Through collaborative activities other children also support the individual's sense of self.

However the demands of the curriculum and the lack of time in the classroom can reduce the quality of interaction. When teachers have not time to listen and interact, when the interaction becomes a one-way conversation about a set curriculum and children's voices are unheard their sense of self may well diminish. When children compete for interaction classroom emotions can be negative. We hear Jean explain how she just can't teach so many children with so many needs. When children work too individually, they may lose the sense of value they receive through interaction. These findings strongly echo

Cooper's thesis work and the difference between the value some children experience in primary and secondary school is vast.

Some of the problems of time for interaction and one to one responses are addressed by what computers can offer. Though children were limited in their ability to explain in detail why they enjoyed using computers the teachers have articulated views which start to illuminate their effects. They breed positive emotions through multi-sensory interaction. They give children greater success and therefore esteem at tasks which they struggle with. They take the child away from the teacher's voice and the classroom into another world of fantasy or fun. They also support interaction between children in a less confrontational way and support helping behaviours. They support concentration and focus through intensive interaction and return the control of the classroom to children. Teachers interact more on a one to one basis as a result and relationships can be more equal and human, less teacher dominant. Computers can add to the positive interaction that supports empathy.

However the impact of the support computers offer is nevertheless limited by the quality and appropriateness of the software and the numbers of machines in the classroom. One in a corner will not have the same impact on interaction and self-esteem. In the same way that the lack of adults in the classroom can create competition for the human resources – less computers can also create competition this was revealed in the interview with the teacher and the children with less equipment. Faulty equipment can create negative emotions such as anger and frustration which teachers and children felt and this echoes Leal's (2002) comment about the need for successful interactions and Coopers (2002) emphasis on positive emotions and interactions for development. The teacher in the less equipped classroom was much more aware of the frustrations.

Much of the teachers thinking about computers correlate with the findings from the NIMIS project but this project looks more closely at the emotional aspects of classroom life and how it contributes to engagement and learning and how computers can support teachers by also engaging children in positive interaction both with the activity on the machine and in their interactions with their peers. Pupil engagement and independence also releases time and encourages teachers to support more children in a one to one fashion. However teachers need several computers in the classroom to achieve any real impact.

Quantitative data in two real classes

It is perhaps important to briefly discuss the nature of the two real and relatively small classes we have evaluated over the two years in the light of the quantitative data. These are not laboratory conditions and comparisons between classes with and without the project equipment have to be tentative. We were reasonably pleased that the two classes were fairly well matched in terms of assessment at the outset. However because the children were so young many of the special needs were only identified during year one and inevitably children left and arrived which considerably changed both the number and the make-up of the groups. All the figures have to be understood in the light of these
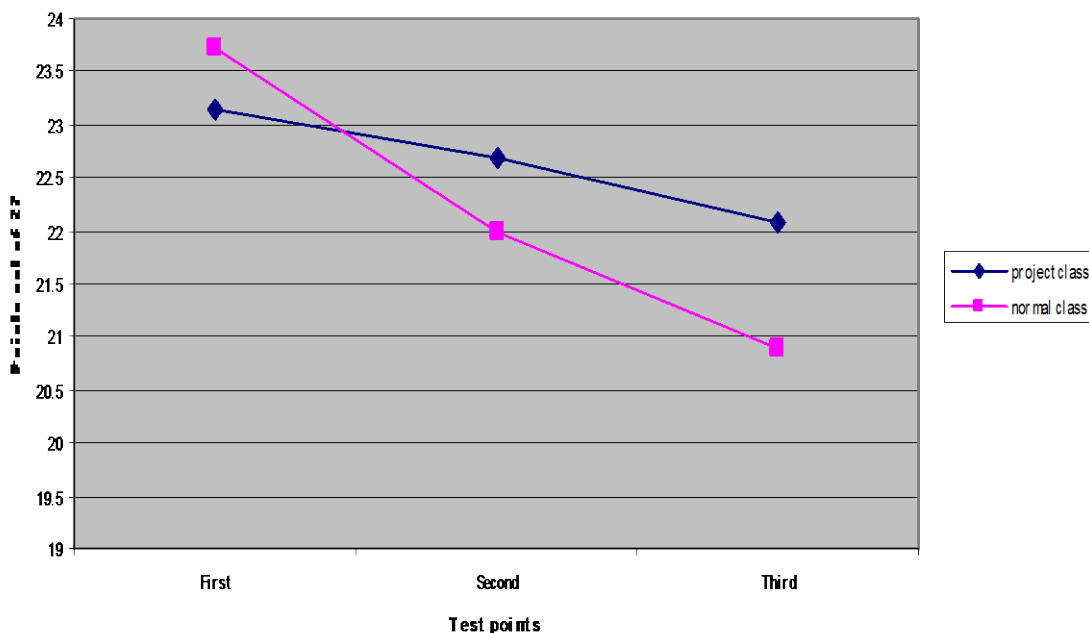
changes over two years. For example the project class reduced from 24 -21 children and the normal class increased from 19-20 children. The project class eventually had five children listed on the SEN register who needed extra support but have no additional support beyond the schools existing resources. In addition the class lost two average and one higher attaining pupil during the two year period. The normal class by contrast lost two children with special needs and gained two average/to good children also the only special needs child in the normal class has had 20 hours extra personal support in addition to normal school resources for the full two years.

These changes are significant in that the normal class has substantial amounts of extra adult support beyond the normal resources of the school and the project class has had more children with additional needs without extra resources and has had an attainment profile which has shifted downwards on balance compared with the other class. The project class also had more children for the whole of the two years than the normal class. The quantitative data must be seen therefore in this light and one might rightly have expected the project class to be disadvantaged given the additional needs it was trying to meet with less resources.

Self esteem tests – locus of control.
The final self-esteem tests have just been analysed and these tend to confirm the qualitative data we have already discussed. Though self-esteem tends to reduce with age in school the project class has lost less esteem on average than the normal class despite starting at a lower point.

The interim figures in the mid-term showed self-esteem holding up much better in the project classroom and this has been born out to the end of the project. The figures for the project class show only a 5.3% drop whereas the figures for the control class show a 10.28 % drop -nearly twice as much. Interestingly most of the SEN children bucked the trend in the project classroom with four staying the same or increasing their score and only two boys reducing their score. One of these is a little boy who really struggles with literacy and in a year of SATs testing this must have been really hard. His SE score dropped by 13%. The other little boy's self-esteem dropped dramatically by 32.6 % in the second year when his mum died of cancer after a long illness. It's hard to know the precise nature of his grief but he is likely to have lost his usual source of one to one interaction which may account for his loss of sense of self. His sense of control over his life is also very low compared with how it was at the start of the project.
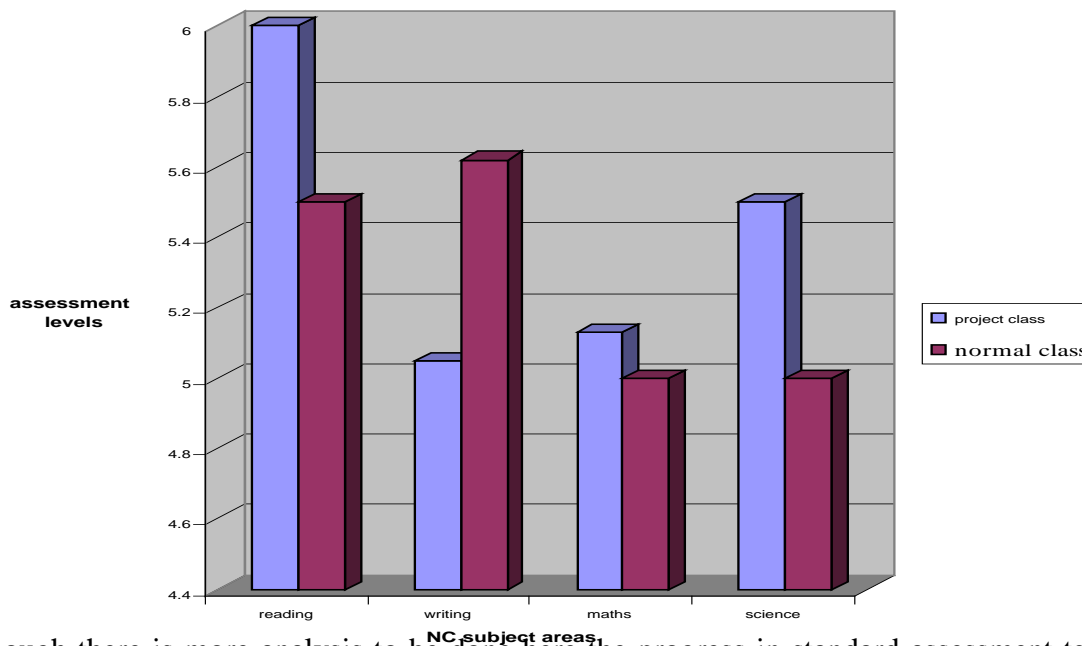
If we take out the SEN children from both groups the figures show a 4.6% drop in the project classroom compared with 11.7% drop in the control classroom. However you look at them these figures they show a much better holding up of self-esteem in the project classroom which backs our theoretical position on the classroom supporting a sense of self. This is despite the fact that there are several children designated as having special needs in this class with none of them allocated special individual help unlike the normal classroom.

Interestingly in the other classroom the one little boy designated as special needs who has 20 hours support per week mainly for anti-social behaviour. His esteem has grown over the two years of the project by 15.7% while every other child in his class but one has gone down. This would also back up our theory of positive one to one interaction building self-esteem as he has much more individual support in his class. If we take his exceptional case out of the figures the esteem in that class has dropped by 11.7%. If we take out the little boy whose mum died from the project class figures they have a drop on average of only 3.5% in esteem which leaves an even bigger gap in the figures. Our project classrooms do seem to have supported self esteem more strongly for the whole class.

In addition to the standardised self-esteem test I posed an extra question - did the children think they were good at using computers. It is important to note the class relative nature of self-esteem this reveals ie most children in the control class believe their ICT skills are good and interestingly the teacher also believes their skills are good. This is despite the vast gap between the two classes that the figures on ICT skills further below reveal and contrasts with the children's comments in their final interview about the lack of opportunity they have had to use the computers in their second year.
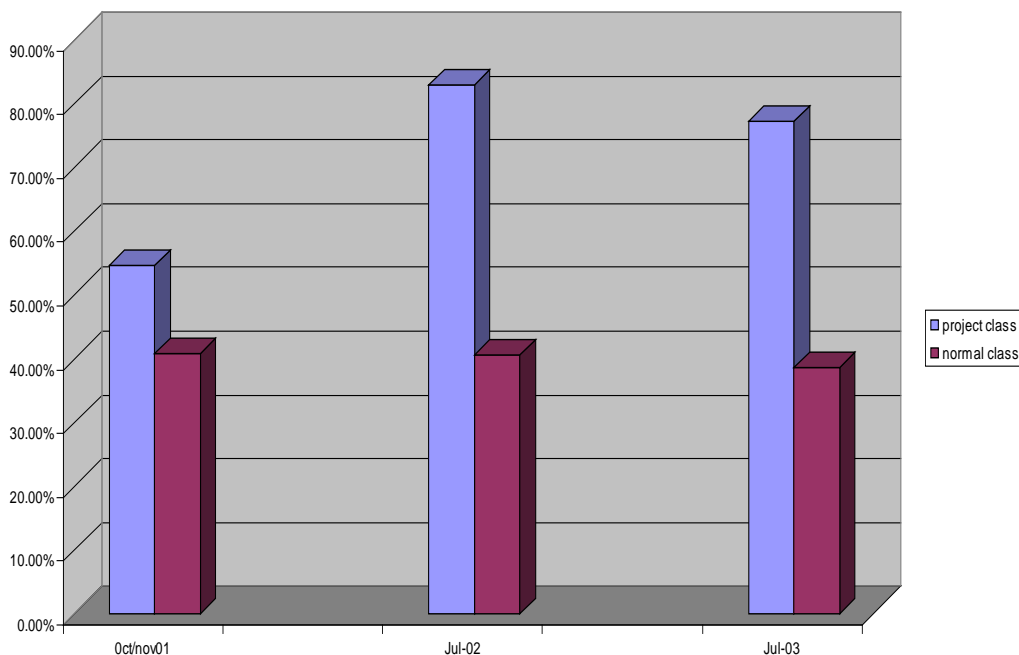
Achievement data

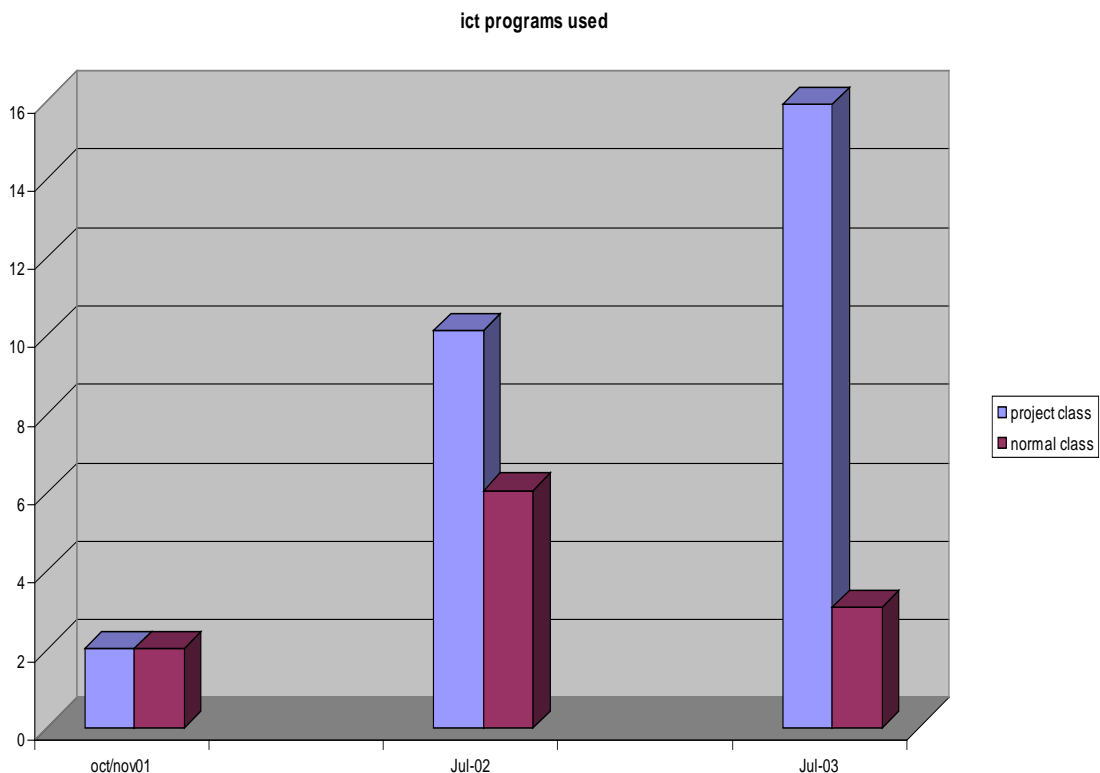**Progress in standardised assessments 2003**

Though there is more analysis to be done here the progress in standard assessment tests also shows our project class progressing more highly in everything but writing. This may be due to the heavy SEN quota in the class or perhaps less time is spent on writing. Writing tends to lag behind reading so it may be that our project class are simply weighted towards the lower end and will catch up later. Nevertheless they have made better progress in reading, maths and science and most obviously if less unexpectedly in ICT. This is however despite the more disadvantageous make up and resources of the class generally.

Average ICT test scores

The ICT tests which looked at simple skills on a word-processing and drawing program show the project class rapidly gaining advantage and consolidating it over the two years, The third test was different and had to include more activities because the children in the project classroom had developed so rapidly after the first year. Though it showed them still having double the scores of the normal class it does not show factors like the sheer speed and transferability of skills which was patent whilst observing their interactions on the computer. In a sense the development of their skills was too great to measure as we had envisaged it and these scores do not really do their fluency and confidence justice. In contrast the children in the normal classroom still struggled to perform basic skills and could not transfer their learning from one program to another. I was very surprised to see that opening and closing these two basic programs was still a problem as was saving and reopening files they had created. They had used little other software. They lacked autonomy and ease of use which was highly apparent in the other classroom. The transferable skills of the project classroom is revealed in the number of programs they could use and their keenly voiced desire to use more. They had used five times as many programs and were very, very proficient in some of these in addition to their skills on the word-processor and drawing program. They had used programs all across the curriculum and were becoming at ease with using the internet and the wide range of programs available though the web since the fairly recent arrival of broadband access to the school. They had composed music, used databases, used story software, maths software, geography and history software, languages software in addition to more usual programs. They had taken digital photographs and could load them into word-processors along with other pictures and clip-art. They shared skills and information at a rapid pace around the table of computers and could happily use the large as well as small screens. All of this was way beyond the capabilities of other class.

ict programs used

Conclusions

The project has confirmed that teachers try to engage children and focus their attention in a multi-sensory and varied way allowing them to be absorbed and emotionally involved in the learning process. This could be seen in observations and teachers articulate this in interviews. Self-esteem was considered to be vital to positive emotion and interaction and considerable thought and effort goes into raising esteem. Much of this echoes the literature on affect in education and teacher/pupil relationships. Teachers see this engagement and interaction as vital to learning. Children with low esteem are targeted for interaction and positive affirmation (Cooper, 2002). Heathcote's emphasis on empathy and drama in learning can be seen in the teacher's dramatisation of events and activities in the classroom and their aim to put children in positions of power and support imbuing them with the mantle of the expert. Imaginative and exciting scenarios engage children's minds and curiosity. They try to draw quiet children with low esteem into the interaction by engaging their attention and imagination. Imagining the other is a key facet of empathy.

The project also shows that teachers believed that computers have a similar effect on engagement. They absorb the child, take them into another world and provide positive emotions and constant interaction in a multi-sensory way. Children's esteem improves around computers and they explained how they could support mental tasks for children with limited co-ordination skills. When children are able to work in the company of other children and adults around computers they also benefit from human interaction which supports them emotionally and academically. Children and teachers share the learning. Parents are also aware of the positive effects of computers on motivation and learning. The quantitative assessment data analysed to date generally supports the qualitative data from parents, teachers and children. Well-designed classrooms with high quality ICT designed to meet learning needs do appear to support self-esteem and learning relationships.

The findings suggest that the second computer integrated classroom is having very similar effects to the first one and that teachers enjoy the facilities and learn to use them quickly as do the children. It is significant that teachers with poorer quality facilities were less enthusiastic about computers and this was confirmed by the Ripple project findings (Cooper, 2003). Perhaps the low level of provision to support ICT integration within the curriculum is a key reason for the slow take-up and lack of enthusiasm of some teachers for ICT. If a computer frequently breaks down, frustrates children and cannot be used sufficiently to ensure everyone has use of it, then both teachers and children will have less opportunity to learn and be absorbed in the multi-sensory interaction they provide. The teachers felt that computers which were unreliable stole their time and did not free them up to teach and along with lack of access generated negative emotion and competitiveness. Teachers with good facilities felt they enhanced their teaching and children's learning and made it easier for them to do their job. This suggests that the quality and quantity of ICT provision and its embeddedness in classrooms with all the attendant human support that it provides for both staff and children is vital to its optimum

use and adoption. High quality ICT, designed to meet needs which provides us with continually reliable responses adds to the positive atmosphere and engagement in the classroom and both teachers and children, novice and expert alike can learn to love ICT in learning because they engage positively and frequently with it, and rapidly become successful with it. The technology supports them and gives them pleasure, mathematically compounding their positive sense of self. Moreover teachers felt that teacher/pupil relationships were enhanced by work on and around computers with teachers and children enjoying closer more familiar relationships with more positive attitudes to their work. When the teacher dominates and has to control their class with threats and fear, children learn to 'love' them like Winston learns to love big brother in Orwell's 1984, through their overwhelming desire to avoid pain of reprimand (at one time physical pain). When the children take enormous pleasure in the positive interaction in their learning they learn to love school for better and more motivating reasons than simply avoiding pain but through positively gaining pleasure and success.

Acknowledgements

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