A Creative Approach to Educational Computing
Key incidents in a typical life cycle

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Abstract: This auto-ethnographical narrative traces the history of an educational computing professional. Christina Preston describes her experience of computers began in the 1950s as her father was a computer professional. After graduating, she developed her skills as a journalist and short story writer for women's magazines at the same time as teaching English, Drama and Media studies in London secondary school. Her late introduction to computers through her own children was typical of UK teachers in the early nineteen eighties who suddenly found that they were expected to train in Information Technology and to teach the subject as part of the curriculum although this had not been included in their teacher training. Christina Preston is now the chair of the international industrial and government funded MirandaNet Fellowship, which is a community of practice for teachers, advisors, teacher educators, software designers and ICT policy makers. In this ethnographical study she uses her women's magazine writing skills to recreate her own experiences in a way that will help advisers and teacher educators to understand how the history of many teachers who are middle aged in 2006 has affected their attitude to computers and their willingness to use them in classrooms. Critical incidents include her introduction to mainframes as a child, her own children's experiences, her first ICT training, the first lesson she give and her authorship of educational software. The unexpected death of her daughter opens her mind to the potential of computers in democratic participation and active citizenship between local, regional and national community.

1. Computers and Revolution

I will introduce myself as the narrator of this story about an educational computing and world wide web (www) professional which now spans three decades and two centuries. As Ms. Average Classroom Teacher, I shall trace the pattern of computers in my life, experiences of teaching, thoughts about effective educational

software and some ideas about where computing might go in the future in the future. But most of all I want to warn you not to be complacent because computers have had so little effect on the average teacher's practice in the last fifty years. Exponential advances in the nineties will take you by surprise.

My story is about creative educational computing. Some academics still argue the case that computers, the Silicon Idols[1], encourage mechanistic thinking. This view is based on lack of knowledge about the best use of computers in learning and teaching today.

> "This potential of computers for interactivity or participation in a
> work of art or reference is giving writers what artists and musicians
> have enjoyed for some time - a new creative medium."[2]

In my opinion, those teachers who refuse to understand the potential, run the risk of disenfranchising their students from important liberties of expression.

The exponential growth of educational computing and the internet in the twentieth century has to be acknowledged. In his preface to my book on computers and literacy,[3] Professor Gunther Kress warns us that it is impossible to overstate the enormity of changes in literacy and literacy practices wrought by developments in electronic technologies. This revolution, he maintains is more far-reaching, and more fundamental than Gutenberg's invention of the printing press. Gutenburg did not disturb what was understood about written language: its formality; its impersonality; its objectiveness and 'timelessness'; its grammatical complexities; its hierarchical mode of organisation. But technology is now challenging these notions - for instance, the geographic separation and temporal co-presence of two people interacting via electronic mail.

This challenge of the new communications media also has a deeply subversive potential in relation to language. While Gutenberg's revolution made language in its written form more central, the current revolution is taking us both backwards and forwards into a new era of iconic forms of communication, backwards and forwards into hieroglyphics. The emphasis is on the visual. In a new multi-modal, multi-media form of text, what is happening is a fundamental challenge to the hitherto unchallenged cultural centrality of written language.

In some ways we are returning to a medieval manuscript, early print culture where books were rare, copying was current, authorship was not important, reading aloud, listening were the main forms of information distribution, and varied international orthography was acceptable. As the power of the book as an information authority is weakened our society is adding to these medieval conventions: the death of copyright, collaborative composition and changeable texts.[4] Indeed this revolution is central to what we learn and teach in our schools.

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[1] Micheal Shallis *The Silcon Idol.* Oxford University Press ISBN 0-19-286032-1 (1984)
[2] Jane Dorner *Writing on Disk* John Taylor publications 0707 265908 (1992)
[3] C. Preston *Apple to Zap Handbook of Literacy for Learners of all Ages* (July 1994) Apple Publications
[4] Chandler and Marcus - *Education and Computers,* Harrap (1989)

Only the commitment of people like us will ensure that the computer is used as creative and empowering catalyst for the betterment of life not an excuse for the reduction of all human activity to the binary system: yes or no, black or white, male or female. Life is irreducible as we all sense, feel, intimate - and the best computer practice *can* reflect these facts of life.

2.   Computers and Ms Average

So how did it all start? My first encounter with computers was in the fifties. I can see in this incident the excitement of a young learner.

The imperious ringing of the telephone broke into my sleep at two in the morning. A throbbing taxi squatted in the road. Hanging from the window, I saw my father, his pin-striped pajamas replaced by his pin-striped suit, dashing out into the night like Dr. Findlay Black bowler firmly on. The patient was the bank computer. Down again!

The mysterious deletion of a couple of million pounds was the staple diet of breakfast conversation - computer fraud and security issues for our late, late, supper when he came home. The computer seemed a voracious night and day devourer and regurgitator of information requiring constant attention, devotion and coaxing to perform.

My father's bank was in Threadneedle Street in the City of London. Every Christmas the children of bank employees were invited to a spectacular party. Travelling through the grey and empty City streets on a Saturday was exciting in our new party dresses and our hair frizzled by curling tongs. The windowless buildings dwarfed us as we struggled up the marble steps. The Xmas party always lived up to expectations: the biggest tree, the most avuncular Father Xmas, the most sumptuous presents and the wobbliest jelly.

But there was a greater excitement in store one year. My father took my sister and I up in one of the lifts; "To see the computers." In an antechamber, we pulled white gauze hats over our hair like operatives in a food factory. White plastic overshoes and stiff overalls signalled that dust and dandruff were the enemy.

Secret codes were punched into the door panel. Inside the room that was about 20 feet by 20 feet there were ten tin boxes the size of wardrobes. Through the window on their chests I could see giant brown tape reels whirling round.. These mainframe computers looked rather like the old reel-to-reel tape recorders that had eaten from the wrong side of the mushroom like Alice - and grown. There was a hallowed silence. So this was the operations sanctum to which my father, the high priest, was called night and day.

In the sixties and early seventies my adolescence and teacher training days were blissfully free of 'computer awareness'. This has not changed much for student teachers today. I have been keeping the figures for some years. Although BT and

the Institute of Education can now assume that mature students will have some computing knowledge[5], the large majority of initial teacher training institutions only have time for one or two days on computers in the year. This absence of general information is not yet counterbalanced by a wider use in subject areas. As schools take over the full responsibility for teacher training it will be even harder to organise some degree of consistency in computer awareness. Let me remind you, nevertheless, that we remain world leaders in telematics in education in this country, with the possible exception of Holland. We also have the highest concentration of computers in the classroom with the exception of Iceland - but that's another story.

The personal computer revolution found me in the early eighties when we bought a Spectrum 48K for our growing children, a girl and a boy. Games for children seemed to be the purpose of a home computer. I never actually touched the keyboard. On the first day of purchase, we took it with great pride to show my father who had recently retired from Citibank. Usually an obliging man, we were surprised when he refused, point-blank, to plug the little computer into his television.

"How many K does it have?" he said, eyeing it warily, 48"? You remember the dust-proof data-processing centre I ran when you were still at school? You remember all those life sized boxes?" Of course I did. "Well in that entire room there was 30K of memory - and you're not putting 48K through my television set!"

In the seventies we thought we were past all that. Computers were so much more reliable and user friendly. My children invested in a joystick so that they could kill little yellow people, the Green Berets or furry monsters with more efficiency. They jet-setted with Willy and skied with Horace. They went in for karate, kick boxing and diving with the Red Arrows. I began to wish they would return to the television.

In the early eighties my son's school held jumble sales and 'bring and buys' to purchase some ICL computers. My daughter's school held a parents' evening for us to admire and use the new 'Pets'. The young enthusiastic female head of the maths department extolled the virtues of women in the computer world and we, parents, were impressed. My daughter brought home printouts of drawings and games programmed herself. She began to leave the house early so that she could join her computer teacher at 8.00 a.m. - the only space for her year in the computer suite. This stopped suddenly - the young and enthusiastic teacher had developed morning sickness - the Pets were abandoned. Good computer teachers were thin on the ground in girls schools.

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[5] Mellar and Jackson- *IT and entrants to teacher training* Journal of Computer Assisted Learning September(1993)

Preston *The BT Model* - 1994 in progress

3.   My First Training

Reviewing this incident I realized that the quality of the teacher is paramount regardless of whether computers are used as a resource or not. Computers do not appear to replace teachers.

By this time, at the large south London comprehensive where I taught English and Drama, there were computers only in the maths department. So I was surprised to receive an invitation to a 2-day computer course at Kingston in May 1985 run by a body called The Microelectronics Programme (MEP). I was curious - how could computers have anything to do with English or Drama?

Jean Beck, now a director at the National Council of Education Technology, was in those days a down-to-earth advisor with MEP. Librarians have been a great unsung influence on the development of computer use in schools. According to my research, Software in Schools[6], librarians have led the way in CD-ROM and communications services. On this first morning, Jean Beck gave us a brief run down on computer devices in the High Street. She even told me that I would soon be getting my money from a hole in the wall. "Well," I thought, "a pleasant woman, but deluded".

The English heads of department on the MEP course were not very impressed by the couple of spelling programs, a multi-choice questionnaire on Hamlet and a rather explicit version of Hangman selected by a programming advisor. These titles were typical of educational programs written by teachers learning how to program in Basic. The content of these programs was just a useful vehicle for justifying the programming exercise. These programs did have a place in establishing educational aspects of software but I would only recommend professional development today. Not that this debars teachers from the consultation process.

The next day on the course Jean Beck introduced us to Bob Moy, the designer of 'Developing Tray'[7] and an ILEA advisor/teacher. Bob was a teacher and a half. He introduced us to his program as if we were his class. There were thirty of us and one computer used as an electronic blackboard. This was a program that we could see was based on learning theory. The computer was adding to the learning process in a way that could not be replicated by conventional methods. We were faced with a blank screen. We knew that there was a passage of writing to be discovered but we had no idea what it was. We could buy or predict letters and punctuation. The computer would enter our predictions and tell us the score.

Bob kept us in suspense. He pretended absolute ignorance of what the passage really said. And we believed him. We couldn't leave the puzzle alone; the text was perplexing and obscure: some poetry? It was worth investigation. We refused to cheat. We were learning about language structure and styles from the bottom up. At

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[6] Harris and Preston *Software in schools* - NFER/NCET (1993)From NFER, The Mere, Slough, Berks.

[7] Bob Moy *Devtray* and *Allwrite* Software published by ILECC, the Inner London Education Computing Centre. Closed down by Hammersmith Education Authority in March 1994

lunch time we all refused to leave for the pub. Sandwiches were ordered and we continued on our quest for meaning throughout the afternoon.

Devtray has remained an important program for English teachers for a decade. I have seen it used badly and well over the years. I have seen children merely guessing and I have seen them actively devising reading strategies. It is typical of the kind of teaching tool that depends on the teachers' ability to use resources well.

4.   Computers in the Curriculum

This teaching experience is typical of the way in which many teachers find themselves introduced to computer teaching, ill prepared.

It was something of a surprise the next September to find 'IT' in four slots on my timetable.

> "What is IT?" I asked the curriculum deputy.
> "Information technology" he said patiently.   "You are teaching
>   IT to two first year classes this year."
> "Why me?"
> "Because English teachers communicate well and because you
>   had a two day MEP course on computers in May."
> "Two days!" I squealed.
> "Well it's two days more than anyone else teaching information
>   technology this term."

Remember at this point in time I had still never touched a keyboard. I'm surprised I did not make more fuss but I was too ignorant to know what I was agreeing to.

Actually, the first term was easy as the computers had not arrived. We taught the bemused classes from earnest, newly-minted Croydon information technology books.[8] We looked at traditional and modern methods of storing information and tried to see how much information was important to our lives. We interpreted road signs, maps and timetables and learnt about using the computer for information retrieval, creating quizzes and learning to word process. It all seemed very relevant and I just wished I had more training than the experience of life in this field.

When the £75,000 grant from the Manpower Services Commission finally was secured for a computer suite, it was a difficult pill to swallow. I didn't resent the money spent on computers - I thought it essential. But the roof of my classroom leaked and I had no lights or curtains in the drama studio. Therefore, I did hope if the cake was small, the arts would not starve altogether.

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[8] Trisha Strong and Paul McGee *The Information Technology Project* MEP and Addison and Wesley
      ISDN 0 201 1550 9 (1984)

When the Research machines network of 186 computers was installed, I was promised training. We would be kept a week ahead of the students, we were assured. But, oh dear, the week we were to start turned out to be the first week of industrial action on the matter of directed time. No training for me after all.

Never mind. The director of computing studies had stuffed a word processing manual in my overloaded pigeonhole with a note pinned to it, which said, "Teach this for the first six weeks". He had also left instructions for turning the network on. Luckily, one of the boys in my class seemed competent in operating the system. I let him get on with it. For me, every plunge into the computer room felt like driving a different car out of the staff car park each night. I had no opportunity to use a computer between the sessions with the pupils and they were not at all keen to let me have a whole keyboard to myself.

The night before the first class, I sat up late copying commands from the manual onto flashcards. The package was Word: tiny white letters on a black screen - remember- and a menu at the bottom that had impenetrable American commands like 'transfer'. We diligently typed, saved and printed.

> "I'm bored, Miss," said one of my charges after about two weeks
>   of word processing procedures.
> "So am I" I confessed. "What do you suggest?"
> They huddled together in conference.
> "Why don't we use these computers to do some proper English?"
>   one ventured.
> "Yes, let's get back to writing about Chernobyl," said another.
>   "That matters."
> "We could use these machines to publish a sort of newspaper
>   about the tragedy."
> "Or a magazine. We could write letters about nuclear accident."
> "Yes, they won't know the letters are from children if we use
>   these computers. They might listen to us."

So we did learn the niceties of word-processing as we needed them, compelled by the need to communicate in the most professional way possible. We were learning at our own pace. Experts were emerging who were able to move the others on - new techniques spread like wild fire - soon we could all change fonts and sizes - check spelling - centre and justifyThis early experience of computers in the classroom was formative. I have never since been persuaded to 'teach' word processing skills. In contrast, I have found that a publication purpose is a great spur to learning in context.

In that computing laboratory with the pupils, my teaching style changed for ever as well. I was used to commanding a class from the front like a keynote speaker - I could tell a good tale to keep them in their seats. But the cables had been laid round the edge of the room. Computer installation teams knew no

better. As a random consequence, the children had their backs to me and they were totally absorbed, on task, committed - they did not need me. It was a tough moment of truth.

We allowed the technicians to dictate the room layout until Deryn Watson[9], pointed out that teaching methodology should take priority over technical convenience in the general scheme of things. Nowadays an IT manager will take far more care over computer groupings. Some schools have designed computer rooms with mushroom workstations, cabling coming through the centre of the mushroom. What makes the difference now, of course, is the laptops which do not dominate a small classroom and are portable enough for field trips.

But faced by the pupils' backs in that south London computer lab, I reoriented myself and became facilitator and a learner. It was an exciting opportunity to explore the mechanics of good writing. After I had overcome the initial terror at teaching a subject I was not trained in, I discovered students empowered and enthused by working at their own pace. Each student was engaged in purposeful activity and I was free to sort out the real intellectual obstacles. The machine reinforcement freed me to give more individual attention to pupils who were self-motivated.   Reorganising text and correction were easier on the screen. Publication opportunities made pupils more concerned about accuracy: a group of girls nearly come to blows over a full stop. This was the kind of commitment in the classroom we were all searching for in the run up to the new GCSE courses.

5.   Designing Educational Software

The best boost to my teaching skills was the opportunity to design software. Just after Christmas in the first academic year of teaching computers, an invitation from BT arrived asking me to join a team of teachers to design educational software at King's College, London University. This was to involve me in an eighteen-month project that published an adventure game, SCOOP, and a newsroom simulation, NEWSNET, teaching information technology in the classroom by practical methods. But when the invitation first arrived I simply saw it as an opportunity to keep ahead of students who were, at the time, teaching me.

My one-day secondment to Computers in the Curriculum at King's College was a whirlwind of activity on top of four days teaching without a free period. But I began, at last, to learn in depth about educational computing.   The full-time associateship, sponsored by Croydon LEA the next year, was a welcome opportunity to use my co-ordination of the 'SCOOP' and 'NEWSNET' design group as a reflective experience.

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[9] Deryn Watson *Developing CAL: Computers in the Curriculum* Harper ISBN 0 06 318382-X (1987)

This major collaboration between industry and education began in 1985. The Computers in the Curriculum project, based at the Centre for Educational Studies, King's College, London University, worked with the BT Education Service on a software project that was planned to coincide with the DTI three year £3.5 million scheme to encourage schools to buy software. This project which was intended to widen the choice for schools cost £200,000 and resulted in six titles in science, technology, information technology and English.[10]

Teachers from Croydon and Leeds were invited to propose ideas for software that were relevant to classroom needs and teaching demands. These groups were to work with telematics specialists in designing, specifying, developing the software. Group co-ordinators were seconded from their schools for one day a week. Other teachers would be bought in to trial the material in the classrooms. Co-ordinating the players was no small feat. The team numbered 46 people: programming teams, industrialist and educators[11]

Leeds LEA had identified the need for telecommunications software for use in physics. The teachers who joined this group were, by chance, all male science teachers. Their shared subject gave them a united purpose and a clear understanding of what their subject required: signal transmission, pulse code modulation and picture manipulation for sixth forms.

Croydon LEA already had a track record in developing materials to teach the new subject information technology. The project, therefore, attracted teachers across a range of subject specialisms and included both men and women. As information technology was such a new subject and no-one in the group had the security of a formal training, it took us much longer to identify the subject matter that was appropriate.

What we were sure about was that we wanted to harness the motivation and concentration we had seen in children in computer games. Eventually, using the theme of investigative journalism, we created an adventure game called Scoop and an international newsroom simulation called Newsnet..

In Scoop the student took the role of a journalist using on line information retrieval, fax, radio pagers to investigate a recluse millionaire and tell his story. Yes, not millionairess - I realise we missed a trick but Croydon teachers were unversed in equal opportunities in the days when Croydon was a Tory flagship. The theme of our second program, Newsnet, daughter of Scoop, indicates how much our own understanding of international journalism and IT had improved. Each terminal represented a different country. The simulation was based on headlines for a simulated week. The more the journalists collaborated on electronic mail and the more detail they uncovered in the databases, the nearer the truth they moved.

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[10] *BT Educational Resources Catalogue* BT Education Services, BT Centre, 81 Newgate Street. London, EC1A 7AJ 0800 622302 (1994)

[11] *C. Preston Computer Assisted Learning from the Coordinator's Perspective* Centre for Educational Studies, Kings College, London University (1989)

I wrote an investigative novel into these three databases. Slick Cut, an international jet-setting criminal, oiled through the data under a range of pseudonyms, putting his relatives in positions of power all over the world. As the student journalists uncovered information about his nefarious dealing the extent of his criminal operation became clearer. Eventually the pupil journalists would realise that the man who had rigged all kinds of activities internationally, was the same man who had bought the paper mills in Sweden that supplied the paper to the International Gazette group and the factory in South America that supplied the computer chips. Just a little more digging and delving and they would discover that, yesterday, Slick Cut bought the International Gazette Group. So what could they say about their owner?

To be able to give students the experience of the pressures of ownership on writing was for me the highest level of learning that Newsnet could achieve. But the computing skills they were learning were also not inconsiderable. Newsnet was the first educational integrated package. The user worked in an environment that linked three databases, desktop publishing, electronic mail, word processing and a networked wire service like Reuters. It was also the first educational program to use the communications facilities of a network as well. As a result of the Newsnet design I have just been out in Chile developing a system of collaborative rural newspapers based on those ideas of eight years ago.[12]

Scoop was also technically innovative. The design emulated Microsoft windows on the BBC microcomputer and was the biggest program ever designed for the BBC with twenty-five picture locations.

This innovative style owes most to the programmer, Phil Wood. He had decided to use Assembler because Scoop promised to be so big. Assembler was a low-level language closest to the binary code that involved him in coding long series of numbers. There was no prototyping or subroutines in those days in educational computing. If the teacher designers did not like the interface he had taken a month to write he would have to start all over again. One number in the new sequence wrong and the program would not function. One day we arrived to find that he had programmed a story line left lying around from our meeting the month before. He showed me that he had nearly reached the page turn. "Why do you do this section, Phil?" I asked. "Because it was there," came the reply. I turned the page and showed him the other side. "But Phil, this story line has no ending! We've rewritten the whole thing now!" He had to start again.

The coding for Scoop took Phil eighteen months to complete. Using a HyperCard prototyping shell it would take about a fortnight today. The teachers donated nine months 'spare' time to the project. Political views have changed and teachers would no longer be prepared to give this commitment unpaid. However, there are now new strategies used in Project Miranda work to make the best of

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[12] C. Preston *Surfing the Net*, a multimedia interactive network for Chilean schools (1994) Paper in Progress

teachers' relevant experience without overloading their time. Professional development rewards are the key.

After two years, Scoop had sold ten times more than any comparable educational package. This commercial success was because BT supported a marketing and dissemination programme, which allowed me to train teachers in information technology all over the country using Scoop as an illustration and a tool. Scoop has since been adapted by the Dutch government POCO project to use with a series of television programmes and national training workshops.

Commercial success in educational software is difficult because the school base in this country is so small. Much of the commercial material has American roots and displays the technical virtuosity of programming teams rather than interesting content. In the commercial world programmers intent on displaying their programming pyrotechnics will grab any little furry animal and any kind of Holy Grail to use as pegs. I have put out an SOS: "Where are Shakespeares Of Software?" to my colleagues in the Society of Authors and the Guild of Writers do not insist on getting involved. Authors are beginning to respond. Authors and artists should develop more confidence in their collaborative role. When Phil, Wood the Scoop programmer, landed a programming job in industry at three times the salary, he took me out to lunch. We had had some really heated discussions at times about what Scoop and Newsnet ought to do, so I was particularly pleased that there seemed to be no hard feelings. "Far from it," he said. "You insisted on achieving the educational aims and objectives of the programs in complete disregard of what I thought the computer would do. You made me stretch and bend the rules. In fact, I was given this job because I had taken the BBC B further than anyone thought it could go - so thanks for the push!"

This priority given to educational good practice above technical expediency was the most important philosophy I learnt from the Educational Computing Unit at King's College, London University, which was directed by Dr. Margaret Cox. Most teachers' progression is rather behind that of their students. In the Computers in the Curriculum department at King's College, I was seen as the below average teacher test-bed. "If she can use it so can a chimpanzee with a sock over its head" was the general view of my computer competence. Richard Millward of Small Talk fame was especially patient with me. I called him in one day in the conviction that my computer had taken leave of its senses. I had been shouting at it for half an hour already because, since I had changed the position of the keyboard, the screen filled with gibberish every time I typed. Richard summed up the problem as delicately as he could. "If women of your ample build" he explained. "Lean too far over the keyboard, gobbledy-gook will result!"

After my work with BT at Kings College, going back to Croydon as an advisor in 1987 was something of a shock. Although I had designed for 8-bit machines, at Kings College I had not used them. I was using an Apple machine, which was already greatly in advance of the 8-bit computers. I couldn't believe that primary school teachers were expected to get the hang of these illogical beasts. A blinking

cursor on a black screen is a threat I will never forget. And when someone whispered that the code for formatting a disc on a 186 was a: b:/s I suffered the same sense of incredulity as when a boy in the playground told me about the mechanics of sex. "Why bother?", I thought,." I mean did you ever hear such an unlikely and inelegant waste of time?

This was not the only shock I had. Our daughter, who was sixteen, caught a virus that attacked her heart muscle. She had all the care that the national health and medical technology could give her including a new heart. But three months from the diagnosis she had died.

6.   Special Needs and Computers

I do not need to describe the pain. You can imagine I am sure. But you may like to consider the role of the computer in my life in those first two years. When I could not sleep, when the pain was too much I would put my head into the computer. I could write or develop ideas with a total concentration that gave some relief from the suffering. There is a danger, of course, that inadequate students may find the sense of control they derive from playing a computer game preferable to the life they lead. Why should they ever leave the friendly shores of the screen where they are in control? My experience taught me to respect the way in which they are dealing with difficult feelings.

This kind of concentration can be used for good as well as ill. Yes, the pornographic possibilities of virtual reality are worrying[13] but what about the terminally ill patient who can go to the theatre or walk through a sunny wood without leaving their bed? And what about the trainee surgeon who can practise on virtual patients instead of killing a few real ones on the way to perfection? We have to be alive to the potential of virtual reality and seize the chance....or else?

As a result of my experiences I believe that we must learn to use computers as teaching and learning tools. Broadband and the World Wide Web now provide extended opportunities for learning and teaching at a distance when the lines are more widely installed. More informal and accessible video conferencing and the transmission of multimedia materials, simultaneous exchange of text, graphics and speech make lecturing and collaborative work across any distance more effective.

I have also found that the computer is becoming a tool that is indispensable for the most disadvantaged. Stephen Hawking, the great physicist, could not write or speak without his system nor operate his 'smart house'. Chris Nolan won the Whitbread prize for his novel Under the Eye of the Clock. Not a prize for fiction written by the severely disabled, but an international prize in which his word-processed novel won on its own merits.

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[13] Mark Sealey Educational Computing and Technology March 1994

My greatest insight into the enabling power of the computer was when I was running the Computer Assisted Reading project in Croydon Local Education Authority. One reluctant reader maintained that there was a conspiracy by other pupils and teachers to pretend that the black squiggles on book pages meant something. When we supplied a computer for her she wanted to tell a story. A friend showed her how to key in the first word - THERE.

She stared at it on the screen.

"Print it out please", she said.
I was busy.
"Shouldn't you write some more before we print?" I suggested.
"Print it out please", she insisted.

The girl went to her exercise book and pointed to an unintelligible squiggle. The girl said, "That 'There' printed is the same word as my written 'there', isn't it?" Her teacher described the look of revelation on the girl's face as the kind of expression that keeps a teacher going for another half term. In fact, the sort of expression that blesses a teacher's vocation.

The explanation for the girl's joy was her new understanding. Her handwriting was so uncontrolled that she had never been able to make the connection between printed book and exercise book before. Interacting with the keyboard made all the difference to her perception of words. She became a normal reader.

There are many good moments like this in my early history of using computers. I saw Gujerati children in Tower Hamlets burst into tears of pride when they saw their own writing on the screen for the first time using ILECC's Allwrite; other children with special needs clamouring to have their work put on the wall because it looked as good as all the other children's work. Mapuche Indians in Chile have never had a written language. Translating their culture onto a multimedia network is not only preserving it: their self-esteem has risen, they are using their language in school which had embarrassed them before. They are recording old traditions on the network and creating new words for a new world in the oral and pictorial networked dictionary.

7.   Surfing the Net

And what about the Internet in education – the World Wide Web which was first hyped as the Superhighway? What is interesting is that from the first I found that on the Internet everyone communicated as an equal. And information was available internationally to people who had previously been disenfranchised. For example, the academic community never reveal sources. But I was impressed that eye witness accounts of the Beijing Tiennamen Square massacre were spread around the

world in 24 hours. In addition, in the Balkan Wars messages like this cry from Vukovar in Yugoslavia under siege were affecting.

APEL ZA VUKOVAR IZ VUKOVARA!!!!!!!!!

How can I start a story of death and desire to live?
How can I describe millions of feelings in plain words?
How can I concentrate when a packet of death explodes nearby
    every few minutes?
How can I ask for help from someone whose face I cannot even
    imagine?
How can I ask in the name of thousands of people, and whom
    can I ask, when all the appeals and cries for help to stop this
    insane bloodshed have been unanswered?

Some of the twenty million users worldwide answered and passed this poem on. This lack of editorial control on the Internet is, for most users, the most important feature. Opportunities for research are increasing as well. The service represents learning at its most anarchic and individual. On the other hand, it appears that still ninety per cent of users are actually male, white and middle class. Any doubt is because some female users sign on as men to avoid sexual harassment. Nevertheless, despite uncertain gender, internet users are growing by at least five per cent a month. The Internet has become an element of popular culture new learning methodology is emerging.

'The only really new metaphor is internet. I've spent the last six
months with my head in cyber space. I tell you that Internet is
different. It's a paradigm shift, a new world.'[14]

Whether this was the expectation of the US federal government which started this phenomenon is doubtful, but it has great draw for the users if only because it can insulate from the uncontrollable elements of human life on the planet. 'There is no weather on the Internet'.[15]

Electronic communications products raise international issues. This amorphous, unedited service available on BT networks represents a challenge to government, education and industry. The Internet is a challenge to some company cultures that are hierarchical and authoritarian. There are strong demands in America and in Britain for more control of the service especially government rights to read messages in order to intercept the activities of international crime and doubtful

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[14] David Brown *Surfing the net* ICTE Conference address March 1994 the Institute of Education,
    London   University.
[15] Douglas Adams *Media* The Guardian September 1992

entertainment industries. But only rich nations can be corrupted: the developing world is disenfranchised from this information service by poverty, gender and poor telecommunications infrastructure.

Where does education stand in the debate? Some academics welcome the opportunity to 'surf the net' unhindered. Some teachers may prefer to have some control over the interface used by the students in their charge. The debate will rage on.

8.   Telling Old Stories in New Ways

And who was the Miranda who gives her name to the MirandaNet Fellowship? She is not an acronym. The Fellowship was founded in memory of the spirit of our daughter, Corinna – a new Renaissance woman – already making digital learning contacts around the world. But the namesake is the daughter of Prospero in the Tempest who in the sixteenth century said, 'O brave new world that hath such people in IT." After all, it is only an accident of history that Shakespeare did not have a computer. If he had what would he have done with this resource? It is an interesting conundrum that young learners today like to consider.

I wrote about my childhood experiences of computers at the bank some seven years ago in the preface to my dissertation about Computer Assisted Learning. My supervisor was a computer scientist. I admired his crisp, spare writing style: clearly expressed, simple ideas in a logical sequence. He rarely expanded on any subject. He scored through my Preface. "I really can not see what any of this personal stuff has to do with the design of Scoop. I suggest you ditch it. No-one will be interested."

I hope that he was wrong and that in this ethnographical study you have found some points to chew on in the adventure of Ms. Average as she travels on the quest for computer literacy. In looking back on these critical incidents I have myself learnt more about the barriers and challenges that many teachers' face when Information Technology (IT) becomes part of the teaching and learning arsenal.