1 Introduction: what is this book about?

This book reports on the Voices Project, exploring the experiences of teacher educators who have engaged with developing the use of computers in education for most of their professional lives. The aim of the project has been to give voice to the achievements and concerns of participants and to draw conclusions for further development of computers in education.

The participants in the study are colleagues who have worked to develop computers in education over an extended period of time, in most cases twenty five years or more. All have for some of that time used computers in their own teaching; carried out research; worked with teachers; and have had some association with ITTE. The project has, hence, had a greater, but not exclusive, focus on how the history of computers in education has looked to those in higher education rather than agencies such as Teacher Development Agency (TDA), Ofsted (Office for Standards in Education) and Becta (the government supported agency for developing computers in schools) and its forerunners. We should say at the outset that within this introduction, and within the booklet as a whole, we are as far as possible using the term 'computers in education', rather than *CAL, ICT, IT, TEL* or any other similar term. This has the advantage of providing consistency across different phases of policies and consequent 'rebranding' by government. However, it is used in the absence of a better alternative and implies more of a focus on computers as desk top machines than we, and several, of our participants would like.

A project such as this one is bound by time and resources. There are a great many people, perhaps over 300 individuals, who could have met our criteria for this study but because of time constraints we constructed a sample of 15 colleagues with a broad balance of gender and field of interest. All participants gave their active consent and freely of their time. They were happy for their involvement to be recognised in the acknowledgements to this booklet and on a project web site. However, in the main text, following normal convention, all quotes have been anonymised – though both participants, and ourselves, recognise that it would not be difficult to identify speakers in some instances.

Our sample included seven women and eight men all aged over 50. All but two spent most of their professional lives working in a higher education institution (HEI), the other two had extended experiences of teacher support agencies. Twelve had taught in school or further education (FE) college for several years. They have developed an interest in all phases of education but three have been more involved in early years and primary (children aged 5 - 11) education; four in secondary (11 - 18) education. Out of the sample seven have regularly contributed to academic journals and saw this as a key part of their professional activity while eight have had a greater interest in professional projects and professional reporting. Five are

professors in HEIs. All have been based for most of their professional lives in England. None are members of ethnic minority groups.

Interviews with the participants were loosely structured around: their career in general and in computers in education in particular; observations on the use of computers in education; thoughts on where we are now in the use of computers in education and on what the future holds. A striking feature of the interviews was participants' eagerness to engage in the process. Each had reflected in advance on their careers and, to an extent, set their own agenda on what was to be covered. Each interview lasted between 40 and 150 minutes and was recorded. After carrying out and transcribing the first round of interviews, the research team compiled a large list of initial codes which were finally condensed into six overarching themes, namely: Biography; Technology; Application; Philosophy; Policy; Community. Each member of the team then worked with all of the data within a specific theme, breaking that theme down into further sub-themes, or categories, using *NVivo* qualitative data analysis software. For example, the theme philosophy was broken into three major sub areas: personal philosophy of teaching and learning; value of ICT to teaching and learning; and connections made between personal philosophy and interest in ICT. Each of these sub themes generated several further themes, for example personal philosophy was broken down into twelve areas including creativity; challenge, practicality, provisional nature of knowledge and contribution of ICT. With all the data aggregated it was then possible to look for similarity and difference within the sample. For the most part it was the consistency that struck us but there were at times divergent experiences, for example in levels of engagement in designing software, and in viewpoints, for example the value of *Logo* and in the importance put on academic activity. The five different themes are clearly interrelated but the book has been carefully edited to reduce duplication and signal links between different chapters.

In this booklet we aim to provide an overview of the major and sub themes and offer some commentary for debate. A key concern of the project has been to establish participant and community feedback on work in progress through a series of exploratory work in progress reports, a process to which this present booklet contributes. However before reporting on the findings of the project, it is useful to give the reader a brief overview of the chapters and a background to some of the issues being raised within each chapter.

Biography

The biography chapter provides an overview to the themes of the book by looking at participants' professional engagement during their careers. It describes their involvement in education, their motivation to teach and / or support teachers and teaching. It describes their first experience of using computers in education and their motivation for doing so. It looks at the various types of role the participants took on and again how and why they did so. The chapter is very much concerned with professional lives rather than life history but shares with

life history a concern over 'agency and environment', have these professional lives been shaped by the world in which they found themselves or have they developed careers through 'entrepreneurial' undertaking?

It is helpful to look at this section in the context of historical changes in UK education. One key point of reference is the *Plowden Report* into primary education set up in 1963, and reporting in 1966. Central to the report was the idea that 'at the heart of the educational process lies the child' and hence the need to see children as individuals. The report argued that schools and teachers needed more freedom in how they taught and what they taught; highlighted the importance of play and learning by discovery and of appropriate evaluation of children's progress. The report was written at a time of change in education. Selection for secondary education (the 'eleven-plus') was, in many local authorities, being abolished and this enabled a broadening of the primary curriculum which Plowden supported. Meanwhile in many schools streaming was being questioned. In a wider context the work of the Schools Council was becoming influential on the school curriculum. One particular innovation here was the Humanities Curriculum Project (1967-72). The project, jointly funded by the Nuffield Foundation and the Schools Council for Curriculum Reform and Examinations, sought to address the problem of large-scale disaffection from learning of students, deemed to be of average to below-average academic ability, as they approached the school leaving age which was being raised to 16. The project had a specific focus on learning as inquiry rather than the traditional instruction-based pedagogy. It also was prepared to engage pupils in discussing more relevant and at times controversial issues. Relevant is that in 1973 the Schools Council also funded the first Computers in the Curriculum Project, based at Chelsea College. So-called 'progressive' innovations in education perhaps reflected wider changes. Society had become less deferential. Youth was becoming more clearly identified and more distinctive. Aspirations for some were enhanced by the expansion of higher education, the establishment of new, often campus based, universities, following the *Robbins Report* (1963). Whatever the tensions and moral panics reported at the time, and whatever recurring levels of poverty and disadvantage, there was a widely reported sense of optimism sustained by rising affluence and increasing mobility.

This sense of optimism and prosperity stalled in the 1970s and 1980s, with concerns over the underperforming UK economy leading to a recurring sense of crisis, and real concerns over the 'governability' of the country. The view from the right was that there was too little order in schools and too little preparation for work. Conservatives were supported by a 'Black Paper' in 1969, followed up in succeeding years, arguing against the 'excesses' of progressive education and for a return to more traditional teaching methods. Mass circulation papers were able to denigrate progressive thinking and seized upon cases such as, in 1975, the William Tyndale School. This was a primary school which had engaged in some radical ideas about pupil voice. However the school was widely seen as badly run and the press had a field day. Meanwhile, in 1976, the Labour Prime Minister of the time, James Callaghan, delivered what is

often seen as pivotal speech to Ruskin College expressing his unease about the weakness of vocational preparation in school and floated the idea of a national curriculum. The pendulum was swinging back from 'fitting the curriculum to the child' to 'fitting the child to the curriculum'. The incoming Conservative Government led by Margaret Thatcher (1979 - 1990) and later John Major (1990 - 1997) carried out a programme of economic liberalisation, alongside several measures which led to more central control over education. These included: the introduction of a national curriculum in 1988; the introduction of an inspection regime (Ofsted); and, in 1992, a curriculum for teacher training again backed up by inspection. Meanwhile local authority influence on education was undermined by encouragement of so called 'opting out' and, in 1990, the break up of the influential, Inner London Education Authority. A new Labour government came into power in 1997 with education seen as a priority. Alongside a noticeable increase in resources to education and a whole range of policy innovations the idea of central control over school, and over the curriculum, has continued. If anything this has been enhanced by top down interventions such as the Literacy, Numeracy and ICT strategies. At the time of writing there have been some steps to 'free up the curriculum' in the revision of the National Curriculum (2008) and 'lighter touch' Ofsted inspections but no sustained change of direction.

Turning to higher education there has been a continuing commitment to expanding numbers of students. Inevitably perhaps, this has not been matched by a proportionate increase in resources so that academic work has become more intense and more managed than in the past. Another significant change has been the research assessment exercise introduced in 1986 which set out to audit the research output of institutions. By marshalling research spending into the most 'research active' departments a wider gap has grown between those colleagues or departments with a focus on research and those with a focus on teaching. These changes mean that many in the sample who have been involved in teaching education see their work as more controlled, more intensive and as being given a lower status in their institutions than in the past.

Technology

This chapter leads us from considering the careers of individuals to exploring developments in technology and how participants responded to those developments. It is a chapter about consistency and change, consistency in beliefs about teaching and learning alongside rapid change in the speed and storage of computers.

Ours has often been termed a Technological Age referring to the application of developments in science in every aspect of society. Indeed this application seemed in the 1950s and 1960s bound up with rising prosperity and the break down of class structures after the privations of the war. The basic needs of everyday life seemed to have been met. The widespread use of antibiotics and immunisations had provided redress against life threatening disease. Food

production was expanding with modern fertilisers and more efficient production. Manufacturing industry was more productive, many households began to own cars, telephones and television sets. An iconic challenge for the time was the space race and the pursuit of the first 'man' on the moon. Science and technology seemed to offer previously unimaginable ways of seeing the world and progress at every turn. Riding this wave was Harold Wilson's reinvention of the Labour Party in 1964 as committed to modernisation and to the 'white heat of the technological revolution'.

However, technology carries both promise and critique. Mass advertising and mass consumption was unsettling to some. Sociologists of labour fretted about the alienation of modern mass production. There was increasing awareness of the destructive power of science and its application in the development of atomic weapons and its impact on the environment. A young person watching television in the 1960s could have seen alternate visions of technology played out. *Tomorrow's World* (which started out in 1965) offered, especially in its early days, an uplifting vision of technology but more unsettling scenarios were provided by dramas such as *Doomwatch* (1970 - 1972). Meanwhile, other science fiction such as *Dr Who* and *Star Trek* often hammered home the point that human beings had to use wisely the technological power they had accrued. This tension between the constructive and destructive power of technology continues in recent controversies, for example, concerns about genetic crops, global warming, the surveillance culture and the integrity of electronic data.

Computing power has clearly played a central part in the recent history of technology. Pioneers in industry saw that mainframe computer could not only tackle complex issues but could make huge efficiency saving by mass processing of routine calculations. Computing was from today's perspective incredibly long winded. Coding sheets and hand-punching cards were needed. These were taken to a mainframe computer for processing and the results, perhaps some days later, were provided in the form of computer printouts. The process was considerably speeded up, though still laborious, though the use of teletype terminals. Computing was cumbersome and expensive; its use confined to industry and specialist units in higher education.

The breakthrough came with the introduction of the microprocessor at the turn of the 1970s leading to a fledgling mass market in the home, school, and small business. Some of the first personally owned machines in the UK were made by Sinclair and Commodore. To give an idea of the specification of early machines the Sinclair ZX80 and came with 1 KB of RAM and 4 KB of ROM containing the Sinclair *BASIC* programming language, editor, and operating system. A household television was need for display and an ordinary cassette recorder could be used for programme storage.

To increase national awareness of IT, 1982 was designated 'Information Technology Year' by the Government. Consequently the BBC Computer Literacy Project was launched; this

involved a book, a television programme, a course on the programming language *BASIC* and the 'badging' of a BBC computer. This machine, produced by the UK company Acorn after an open call for tenders, was released as the BBC Microcomputer in late 1981. The BBC model A had 16 KB of RAM; the Model B had 32 KB and came with several input / output interfaces. It was seen as robustly built and, though at today's prices, expensive it proved popular in the home and in school, with over one million machines sold.

In the same period another hardware company which later became Research Machines, and now RM, began to have a strong share of the educational market. The Research Machines 380Z was manufactured from 1978 to 1985. It was sold mainly to schools and was a more expensive machine than the BBC but coming with 56 KB of memory. Later, RM adopted the Microsoft operating system and maintained its stake in education.

A key development in the recent history of computers was that of the Graphical User Interface (GUI) pioneered by Macintosh and developed in machines using the Microsoft operating system in 1985 and, as Windows, in 1990. From this time onwards so called PC machines began to take over with global competition driving down prices. Acorn was squeezed out of the schools market despite producing its own Archimedes machine (at the turn of the 1990s) with GUI and a faster processing speed than other machines of the day.

A further key reference point in the recent history of computing has of course been internet enabled technology allowing communication and sharing of resources across previously unimagined distances. The underlying principle of the Web go back to 1980 and the CERN laboratories in Switzerland. By 1990 the first Web browser and Web servers were ready and in 1993, CERN announced that the World Wide Web would be free to anyone.

The impact of the Internet on the world of industry and commerce has of course been huge. For example E-retailing in 2007 accounted for an estimated 15 billion pounds worth of sales with particular importance in the field of travel, electrical goods, food and entertainment. The impact in the home has been, if anything, more marked, notably in the UK, with very high usage of site such as *My Space, Beebo* and *Facebook*. Young people regularly turn to the internet for both leisure and study. Schools have traditionally lagged behind, rather than led, developments in the wider world but nearly all schools are now networked and produce their own sites. Intranets are widely used for storage of pupils' work; rudimentary e-portfolios have been introduced; many teachers are involved in creating their own online resources and distributing them during their teaching. Pupils can often access and complete work off site and share their work with a wider audience including pupils in other schools, parents and the world at large.

Future application of computers in schools and the world at large are unpredictable. Recent history tells us the processing speed, memory capacity have increased at exponential rates and may well continue to do so. At present there is a lot of interest in mobility and personalisation

of devices particularly through the use of wireless mobile devices with phones, internet access, camera, MP3 player, and Global Positioning System (GPS).

Application

This chapter looks at the application of computers in school and in education. It looks at what participants see computers as offering learning and the reasons why their use has been so problematic. Not surprisingly in- service training and CPD are seen as essential to promote what is described as the desirable use of computers. The types of training that best support teachers are considered.

Some general background is helpful here. Computers came into many schools with no clear *educational* rationale, and it was easy for many teachers to see them as a solution looking for a problem. This marked the beginning of agencies to support schools and also the beginning of a do it yourself culture with some teachers writing their own programmes As storage became more robust teachers and advisors could develop and share 'small' programmes though floppy disks to assist with particular skills or provide more exploratory learning. Some of the examples mentioned in the chapter include *Micro Smile, Eureka, Granny's Garden* and *Suburban Fox*. *Micro Smile* was a set of simulations and games initially to support the school mathematics programme SMILE which originated in London schools. *Eureka* contained several simulations (such as showing a bath filling up) to illustrate how variables such as time and volume could be graphed. *Granny's Garden* was an immensely popular educational adventure game, the aim was to find the six missing children of the King and Queen while avoiding the evil witch, through a series of logic puzzles. *Suburban Fox* was a simulation of a fox population which allowed users to explore the impact of altering environmental conditions. Alongside simulations and games such as these, content free programmes such as word processors, spreadsheets and databases were designed for schools. At the same time less ambitious programmes were developed which sought to give children practice in particular skills and some writers at the time worried whether the introduction of new technology might take schools back in time to drill and practice.

The programme *Logo* provides a key talking point in any discussion of the early application of computers. At first sight *Logo* was simply an accessible introduction to programming which had its most popular application in the management of a 'turtle'. This was a screen pointer or a small turtle shaped robot which the user could direct through simple controls such as *Forward, Backward, Left Turn, Right Turn*. It was always intended by its designers that *Logo* should be offered to learners in a very open ended and learner centric way. This, it was felt, would result not only in some mastery of programming but would serve as a context for developing important thinking skills such as planning, de bugging and habits of engagement and persistence. In a sense *Logo* provided a powerful metaphor of the user's control over the machine. A controversial area here was the role of the teacher. While most recognised the key

role of the teacher in framing activity, some very much saw the interaction of the learner at the machine as the key to learning rather than learning in the context of the triad of learner – teacher – technology. The great strength of *Logo* was its low threshold, high ceiling nature, users could get started very quickly but take programming wherever they wanted to go. However, in practice *Logo* became very much sidelined as occasional activity for the mathematics classroom.

A key reference point in the application of computers in the classroom was the National Curriculum. In the first document (1988) Information Technology appeared as strand of the curriculum and it was expected to be taught within a cross curricular approach. Whether by design or not, this led to increasing use of general purpose programmes, rather than subject specific software. The thinking here was that the same software could be used repeatedly which in practice led to the 'Microsoftisation' of school software as *Word; Excel* and, in time, *Access* became increasingly used. Small programmes remained but became less attractive as they did not make use of graphical and later multi media capabilities afforded by the new machines with greater memory and processing speeds – though of course the idea of educational software was continued by more commercial providers producing CD ROMs. The National Curriculum was revised in 1995 and *Information Technology* got its own subject status which it has kept, though later re branded *Information Communication Technology*. Reflecting concerns in the teaching of the subject a national strategy was introduced in 2002 and guidance materials appeared in the months that followed.

This brief overview highlights that there has never been a settled view on what we want computers to do for education and it not surprising that evidence to assess their impact is contentious. A landmark report, the *Impact Report*, appeared in 1993 which sought to compare learning outcomes between pupils with high access to computers against those with low access. It concluded that computers did have a positive impact on learning but not a consistent one. A key reason for a lack of impact was felt to be the absence of a threshold for access which could only be addressed with more machines in the classroom. A later study, ImpaCT2, was conducted between 1999 and 2002 and involved 60 schools in England which explored the relationship between the use of computers and attainment from a wider range of criteria. Evidence suggested, at least to the satisfaction of Becta, that the use of ICT did impact positively on attainment. This argument was strengthened in another large scale study – the Test Bed Project which ran from 2002 – 2006. The idea here was to provide 30 schools and college with enough equipment, if not to take access out of the equation at least to reduce its influence, in assessing impact. Teachers were also supported with professional development opportunities. Again there was felt to be an association between attainment and the use of computers, though greater in primary than secondary school. At the time of the project there was a lot of interest in the use of Interactive Whiteboards (IWBs) as a tool to support whole class teaching. There was an underlying impression that teachers wanted to use technology to

support, and extend their existing practice, rather than radically overhaul it and some of the tensions to which this gave rise were reported.

Whatever the case, there is ample evidence from a host of studies over the years that there are important benefits for pupils and for teachers in using computers in education but also important barriers to their use. These barriers include lack of curriculum fit, access, difficulties with equipment and technical, in-service training. There is often a common sense view that computers are a good thing but a deeply divided agenda for just where this 'goodness' comes from and how or whether schools should accommodate to computers. This raises some general questions about securing change in schools. Indeed the development of computers might be viewed in terms of a more general literature on the importance of stakeholders' perspectives on change. Computers are far from a special case of educational reform.

Philosophy

A driving force within participants' careers has been an interest in teaching and learning both from a practical concern as practitioner but also an intrinsic interest in how we think and learn. The chapter highlights their understanding of learning and how knowledge is acquired. It discusses the responsibility learners have for their own learning and the role of the teacher in framing activity. It suggests that computers both support and reinforce a philosophy of teaching.

Again to see these ideas in a wider context it is useful to return to the *Plowden Report*. This drew firmly on Piagetian theory. This is hardly surprising as during the 1960s the influence of Piaget and his interpreters was very strong and his ideas were widely accepted. Clearly the idea of looking at how young learners make sense of new information, rather than viewing the mind in terms of input and reinforcement stimuli, was going to appeal much more to the intellectual spirit of the 1960s. Coincidentally Piaget was a very deep influence of work on Papert, who co-founded the MIT Artificial Intelligence Laboratory, and worked with the team that created the first version of *Logo* in 1967. However, by the end of the 1970s ideas of social cultural learning were taking over from the constructivism associated with Piaget. Here the work of Vygotsky was central. Vygotsky was, like Piaget, concerned with mental processes but put into the focus the tools which the learner uses and the support for learning provided by 'significant others'. Vygotsky's work became ubiquitous but was hitherto almost unknown and *Mind in Society*, only appeared in English in 1978. Since that time the social cultural view of learning has informed new approaches such as Activity Theory and Community of Practice and, more recently, Actor Network Theory.

Policy

This chapter looks at phases within policy from early support and experimentation in the 1970s, to a more prescriptive phase in the 1990s and beyond. It describes what participants see as strengths and weaknesses in policy and highlights the distinctive perspective they have on developing and assessing the use of computers in education.

The use of computers was given Government endorsement when in 1981 Kenneth Baker, the newly-appointed Conservative Minister for Information Technology, launched the 'Micros in Schools' scheme with an emphasis on the vocational aspect of computers in education. The Department of Trade and Industry (DTI) provided £16 million to subsidise the purchase of British computers in schools, in part to kick start a UK computer industry. The Department of Education and Science (DES) provided £23 million to launch the Microelectronics Education Programme (MEP), which ran until 1986. This programme was influential for several of the participants. It was run from a small building in Newcastle, under the directorship of Richard Fothergill. It produced materials, crucially software for direct use in school, and some support was offered for teachers at least as far as resources would permit. Its focus was on both computing and on cross curricular use.

To increase national awareness of computers, 1982 was designated 'Information Technology Year' by the Government. This was followed by another major initiative launched by the Conservatives in the early 1980s, entitled the Technical and Vocational Initiative (TVEI), which provided further financial aid for schools to purchase computers. TVEI was an initiative that radically altered the focus of control in education; imposed, as it was, by central government without consultation with the Local Education Authorities or the teaching profession.

In 1986 another initiative, the Modem Scheme (DTI), put £1 million into enabling schools to buy a modem to link up their micros. The Microelectronics Support Unit (MESU) was set up to carry on the work of the MEP. Its remit was broadly similar though with a greater focus on a cross curricular approach and on producing support materials rather than software. MESU explicitly set out to commission research in this new area and establish links with academia. The White Paper, *Working Together - Education and Training'* (1986) announced national expenditure of £90 million over ten years to extend the TVEI programme, further strengthening a centralised approach. Around the same time the Government funded an interactive video project, Interactive Video in Schools, from 1985 to 1987. Eight packages were introduced: *Challenges; Design; Disco; Environmental Education; Geography; Life and Energy; Missing the Obvious;* and *Siville.* Six of these projects focused upon primary and secondary classrooms and two upon teacher education including in-service education. The major limitation of the programme was technological – the programme was carried out before the analogue – digital crossover. Another interesting development during this period was Neris

(1987 – 1989) or the National Resources Information Service – an independent trust, supported by government. Neris was a teacher resource database available on line, via the *Prestel* and *Campus 2000* networks, or through a CD ROM. In addition to details of educational suppliers, films, software and so on, Neris also contained lesson plans and worksheets for direct use in the classroom and was a precursor to the National Grid for Learning.

Along with mainstream support for computers, Government initiatives in the 1990s included support for the use of *Integrated Learning Systems* (ILS) which offered an individualised route through material very often in the context of numeracy and literacy. In addition multimedia laptops for teachers were supported via a pilot project (1996-98), £4 million to supply 1,400 teachers; followed by a main phase 1998, £23 million to supply 10,000 teachers and heads.

A further initiative towards the tail end of the Conservative government included The Education Departments' Superhighways Initiative (1996 - 98). This highlighted the development of the Internet and the educational opportunities this offered. It was also the first time policy makers, ICT providers, researchers and practitioners were brought together to examine ICT across every sector; primary, secondary and higher education.

The development of computers in education received a further boost with the new Labour Government (1997) committed to new projects and increased spending. A major influence on the Labour Party as it prepared for Government were the *Stevenson* (1997) and *Mckinsey* (1997) reports which argued that there was enough evidence to make it worthwhile going for a 'step change' in levels of funding for computers in school alongside training of teachers. Accordingly, a new training initiative was introduced financed through the lottery and its New Opportunities Fund which became known as NoF Training. Trainers were independent organisations, with quality assurances in England from the, then, Teacher Training Agency (TTA). Local Education Authorities were directly involved; over 75% were either accredited training providers in their own right or were receiving direct funding for supporting providers. In England, very nearly all eligible teachers signed up for the programme and in total over 390,000 teachers and virtually all schools took part. Alongside this, the National Grid for Learning in its first phase (1998-99) provided £100 million for hardware, software and Internet connectivity for 8,000 schools; between 1998 and 2002, £657 million of grant funding was made available to schools in England through the Standards Fund to help develop provision (infrastructure, services and content) and a further £710 million of expenditure was allocated between 2002 and 2004.

Consequently the government's NGfL and NoF Training initiatives were relaunched as the ICT in Schools Programme (ICTiS), which continued funding for schools to purchase hardware. Other significant projects and funding schemes have included: Strategic Leadership in ICT (SLICT) – a programme of in-service training for senior school staff; Curriculum Online – a learning materials scheme with approved software and funding. A related flagship

policy of Labour has been the Building Schools for the Future (BSF) programme (set up in 2005) to help local authorities and schools invest in new or revamped buildings with appropriate computer infrastructure. Over £3 billion of funding was released in 2005-06.

As with previous Governments some renaming went on. IT became ICT (stressing the communication angle) and NCET, the government supported body to promote computers, became Becta with a more specific focus on policy, partnership with other bodies and commissioned research rather than production of material, or the providing of in-service training, in its own right.

Community

In this chapter we search for key features of the research community and its distinctive contribution to the development of computers in education. It looks at how a research community grew, what benefits members got from it, its achievements and areas of tension and weakness.

A spur for research for some participants was ESRC funding and their Programme for Information Technology and Education. A related development here was the setting up a new academic journal, *Journal of Computer Assisted Learning*, edited by Bob Lewis, in 1985. The brief of the journal was wide and like other journals of the time saw teachers as part of its core readership.

A catalyst for others was Project INTENT coordinated at the Centre for Applied Research in Education, University of East Anglia to support the use of computers in ITE. The project was concerned with the quality of teacher education; providing support for educators; and developing management strategies and was supported by both NCET and individual institutions. It was set up in response to concerns about student teachers' preparation to use computers as expressed in the *Information Technology in Initial Teacher Education Report* or *Trotter Report*. Project INTENT created its own journal (*DITTE*) and encouraged colleagues new to research to publish their findings. There were clear connections between *DITTE*, which ran from January to June 1992, and the publishing in the same year of ITTE's *Journal of Information Technology for Teacher Education* (JITTE), from 2002 *Technology, Pedagogy and Education*. Of course there were other longer established journals. *Computers & Education*, set up in 1976. It was originally based in the USA but has been co-edited for a long period by Jean Underwood in the UK and has regularly included case studies of UK based research. The *British Journal of Educational Technology,* set up in 1970, had its roots in the National Council of Educational Technology (not NCET), chaired by Sir Brynmor Jones, Vice-Chancellor of the University of Hull.

ITTE itself was set up in 1986 and while having a general brief to 'promote the education and professional development of teachers and….to improve the quality of teaching and learning

with ICT', it has had a niche role in supporting the initial teacher training departments of universities and colleges of education. It has organised its own conferences and a biannual research conference. It has largely institutional membership, including nearly all HEIs in the UK.

ITTE members have networked with comparable international organisations, most directly through SITE, the ITE arm of the Association for the Advancement of Computing in Education (AACE) in USA. SITE was founded in 1990 and has a similar interest in both theory and applied practice as ITTE. Another international organisation mentioned by participants is the International Federation for Information Processing or IFIP - an 'umbrella organisation for national societies working in the field of information technology'. Its journal is *Education and Information Technologies.*

Participants also spoke of their involvement with more practitioner based associations, including MAPE, Mirandanet and Futurelab. Micros and Primary Education (MAPE) formed after a conference in 1981 at Exeter University for primary teachers, headteachers, advisors and lecturers. MAPE produced an influential newsletter called *MicroScope* which was circulated to local primary schools and later to LEA advisors. Membership reached a high of over 5,000 in 1993 but fell back as teachers turned increasingly to official guidance (e.g. QCA schemes of work) and NoF training. MAPE eventually amalgamated with NAACE. NAACE was established in 1984 following an HMI Conference for IT Advisers at Newman College. It had a strong focus on practice and sought to support ICT advisors in schools and in support services. In 2004 it became Naace made up of the old NAACE, MAPE and CEG the Computer Education Group, publishers of *Computer Education*. The new group had over 3,000 members in 2007 and several 'partners'. The MirandaNet Fellowship was founded in 1992, as an international network of policy makers, teachers, teacher educators, researchers and commercial developers. In 2008 it had over 800 members in 40 countries worldwide. It has put on a wide range of seminars and conferences, supported projects and online forums. It publishes an E journal and many reports and case studies. Finally, Futurelab is a not-for-profit organisation working with partners to generate new ideas about teaching with computers and carrying out its own research and support for teachers. Again it publishes reports and has commissioned some influential literature reviews.

Discussion

The final chapter of the book contains a reflection on the issues raised by the team working on the Voices Project. The aim is to provide not so much a summing up but a diversity of reaction to stimulate further debate within the research community at large. The idea is to

stimulate a conversation rather than draw one to a close and you are invited to add your viewpoint at a Project Blog.

About the book

This introduction has given the reader a background to the development of computers in education. The following chapters biography; technology; application; philosophy; policy; community tells us what it looks like from the perspective of people engaged in both the practice and research of teaching and learning; and who see value for teachers and learners in the application of computers. It is of course a partial perspective and perhaps a different book would be written if we had spoken to classroom teachers and to policy makers. This book will interest those with an interest in pursuing a career in research, an interest in technology and indeed anyone who wants to understand a little more of what has happened since computer met school.

The Voices Project was carried out by Michael Hammond, University of Warwick, Sarah Younie, De Montfort University, John Woollard, University of Southampton, Vicky Cartwright, University of Warwick and David Benzie, University College of St Mark & St John, Plymouth. Michael Hammond wrote the introduction and chapters on biography, philosophy and collaboration. He also edited the book into an overarching narrative. Sarah Younie contributed a chapter on policy, John Woollard on technology and Vicky Cartwright on application. Penny Nunn assisted with the final production of the book.

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