4 Application: a labour of Sisyphus?

This chapter looks at the application of computers in school and in education. It reiterates the idea that computers found their way into schools without a clear rationale. It looks at what the 'desirable' application of computers in school could look like and draws out the factors necessary in order for this to take place. These factors are key to understanding why curriculum change with computers has been slow. Some thoughts on the future development of ICT are given.

How did computers get into school?

The application of computers in schools has always been problematic. This is hardly surprising as *new* technologies are necessarily unpredictable, but participants repeatedly see a lack of preparation in advance of their use in school. In the early days teachers were expected to work with computers when the hardware was unreliable and only a very limited range of software was available. As this participant recalled:

> I started teaching in 1970 in Primary schools. The first time I was really involved in any computing was when the BBC's arrived in school. I still remember because there was all this talk about all this money and I remember that whoever the secretary of state was said that 'we need children to grow up knowing about technology for their work and jobs and so on. And that seemed to be the rationale. But nobody for weeks seemed to actually know what to do with these things. They sat in boxes…

The same participant recalls 35 years later:

> An ex student phoned me and said 'would I be willing to go and do some Smart Board training for them at their school'. They've got ten classes and there was a Smart Board with an attached laptop in every classroom and they'd been installed nearly 12 months and only one of them had been used in that time. Now that when you think that each system is probably two and a half thousand pounds, they'd been standing idle because somebody had decided that they'd put them in but again there was no support or rationale, no discussion.

While this creates obvious difficulties for schools it gave rise to many opportunities for the participants and, of course, for others wanting to use computers. They could start from a blank page, could take risks in using computers and could use the computer as a catalyst for thinking about teaching and learning. In short, they could work out the desirable application of computer for themselves. But, what was desirable?

The 'desirable' application of computers in education

Firstly, desirable use of ICT often supported activities that went beyond the routine and set children a challenge, as this participant commented in talking about using *Developing Tray* with her pupils:

> With those sorts of programmes the answers aren't there, you've really got to work them out. And that seemed to me to be….and I saw in the children, you could almost hear the wheels going round in their brains because they were really having to work hard at doing it but they were really motivated to do it as well, it set a challenge for them.

Secondly, the desirable use of computers involved the pupils in doing something they would find purposeful. In this example pupils are given a role and their products are being created for real audiences:

> The project that followed was Tesco funded and was called Tesco School Net 2000 and was the two year run up to the millennium. We had children be journalists and write up stories and make web pages about them. It took place in primary and secondary schools. Hundreds of thousands took part.

Thirdly, desirable use involved communication. This could be communication within teams (for example unravelling text in *Developing Tray*), between teams (as in developing short films and uploading them onto a web site) and across schools.

Fourthly, in desirable application children were given an element of control, they had choices in the decisions they took and could see for themselves consequences of those decisions; they could retake steps if they liked. It is:

> giving them an opportunity to enquire, which is where I like the idea of enquiry based learning and using the Internet for that kind of thing. It's not for doing things that you could do easily in other ways. And so much of what we've seen over the years has been of that sort.

Fifthly, several went on to emphasise a game like element in desirable application, for example, early simulation software had:

> the word I'm thinking of is a 'playfulness' about it. Because I'm thinking about things like the Mary Rose and the design and technology pack and stuff like that.

Put together desirable application often carried a sense of 'extension' and 'enhancement'. Extension at its simplest could mean offering the teacher different ways of explaining something, for example though the use of multi media projected on an IWB. In terms of pupil activity enhancement could mean giving pupils greater control and more enjoyment. Several felt that enhancement came about when you could not (easily) 'do it' otherwise and pointed, for example to the possibilities opened up by digital storage and the speed of processing. One

coupled enhancement with 'widening the sensory range' not simply in terms of different media, though this was a recurring theme, but also in the accessing, and communicating, of data across distance. Enhancing carried for most participants the idea of changing the curriculum – both the content of what was being taught and the range of teacher and pupil activity.

Desirable application could be recognised when children were *engaged* - a loose word often used in the sense of capturing attention and being productive. One participant describes how children became engaged in writing poems supported by word processing and relates this to the Csíkszentmihályi' s idea of flow:

> And so we would put a poem in a particular genre and then they would go away at the word processor and come up with their own to try out on each other. And those sessions you had to beat them off with a stick to go away at the end. They would have stayed there for hours if you let them. I think looking back on it now it's the first time I wanted to use the term 'Flow' of absolute attention to the task with no idea of how much time was passing, being absolutely in the moment. Those are the kinds of things that ICT gives you that are very difficult to do otherwise.

The idea of desirable application becomes clearer when set against the undesirable use of computers. Here activities were often designed solely to develop computer skills, did not extend and lacked purpose. One participant recalled the dry, didactic teaching about computers in the early computer studies courses he taught. Several commented on routine word processing lessons. This participant observed a class in which pupils were making posters using a desk top publishing programme but there was no audience in mind and hence no discussion of fitness for audience:

> The question I asked them was why are you making a poster? The problem with this sort of discussion is that there is another question Which is: if that activity of making a poster in *Word* has got no real meaning, then why are you doing it?

Is teaching of the subject undesirable?

Very often lack of purposeful use was associated with the teaching of ICT as a subject or the timetabling of ICT in computer suites. One noted the prevalence of skills based approaches in ICT as a subject:

> The one thing I have kept up all this time is supervision of school experience, I have been into primary and secondary schools but if I see another disco spreadsheet I will scream.

Another lamented the routine use of packages in ICT lessons in a school with which she was associated:

> They don't teach ICT, they don't think it is necessary they teach word processing and spreadsheets, I don't consider it ICT, I say you should be teaching, handling information, modelling, analysing, communicating information, they look at me as if I'm mad.

No-one specifically said that ICT should not be taught as a subject, even if this was implied by one or two participants particularly when stressing the cross curricular use of computers and the constraints on other subject teachers wanting to access machines. However most felt the problem was one of sticking too closely to schemes of work provided by agencies rather than the idea of the subject itself. Schools should be teaching capability (the purposeful use of computer skills to solve problems) rather than skills. In addition, two out of the participants wanted ICT as a subject to have more computing elements to it and saw the teaching of programming as being both academically challenging and worthwhile, not simply defended in terms of vocational value. Another supported a much more rigorous approach to modelling and saw this as the key to unlocking the subject.

What makes desirable use of computers possible?

If we know what desirable application looks like, what needs to be in place to bring it about? Nearly all participants held the broad view that the use of technology was neither good or bad in itself it all depended on the use to which it was put: hence the role of the teacher was crucial. Of course the teacher needed to be resourceful in accessing facilities - in the early days this sometimes meant 'strong arms' as participants recalled carrying equipment to and from classrooms which they knew would not appeal to many colleagues. Organising access meant negotiating with coordinators and support staff. It meant managing pupil access to machines in the classroom and had implications for whole class teaching. But none of this was any good without the confidence and pedagogic insight to 'frame' an activity which would provide purpose and engagement for pupils and the confident to intervene as required. You could not rely on the software to drive the activity:

> And that the crucial thing in application was the way that teachers interacted with the software. So it's what I later called a kind of framing task if you like. It has to be set up with some kind of reasoning, it has to be embedded to show the before and after, and the teacher has to be not interfering all the time, but actually be aware of what is happening.

While the teacher was needed to frame the activity he or she needed to adapt to events in the classroom, teaching was necessarily unpredictable and using computers meant trying something new and therefore risky. Teachers needed to accept a level of risk and do this in a public space. One participant recalls her first attempts at teaching word processing and illustrates the value of learning by experience:

> I was given a word processing manual, no computer mind you, and told you teach them word processing on Monday and I spent the whole weekend doing flash cards with 'Save' and 'Edit' things like that and then of course on the Monday the children whopped past me and started to use the key boards. And I said 'stop, stop I don't know what you are doing' and it was in that period that I saw a complete change in what children actually do when left to their own devices. And when the teacher actually knows less than the children and eventually after about four weeks of this one of them said 'I am bored' and I said 'I am bored as well but at least you have a computer but I don't have one, what do you suggest?' and they said 'before we did this, we were doing a magazine with you and wasn't what this is for and the moment I got to that idea all this business of teaching skills went out the window.

This idea of knowing less is an interesting one, the teacher needs to know that children have certain skills, and often may have more skills than they themselves have, but as in the above example this does not mean abdicating their pedagogic role. This point re-emerges when talking about social networking and online games - applications widely used by young people but rarely used by most participants. One notes about game playing:

> And I think there is less to this than meets the eye because it is still avoiding the purposes of its use and the difficult questions about how do we conceptualise learning in the twenty first century. You know, just playing games I know raises important questions about hypothesising and planning and what have you but the victory narrative that is ascribed to games I think is getting us off the hook a bit.

The teacher then is seen as the key factor in the desirable application of ICT as one summed up 'it is not the technology, it is people that matter'. However the technology was important and not surprisingly another key factor was access to reliable hardware and appropriate software. Cassette tape did not offer reliable storage, hardware was often seen as unwieldy and there was too little of it. Some of the software was similarly unchallenging, especially the early drill and practice programmes and, later, ILS which was seen as 'deskilling' teachers.

Providing training and support for teachers

Given the barriers and the need for pedagogical understanding, teachers needed training and support. LEA advisors had a key role in helping teachers share ideas across schools and to act as an intermediary between teacher and expected practice. A constant criticism was the lack of support for teachers; money invariably went into equipment rather than training. Some could find examples of good practical support though very often this was achieved through unconventional means:

> One school I know they'd taken on a parent helper and she's got a little bit of an interest in computers but they developed her and sent her on courses so that she at least understood all the hardware and whatever so she could sort out initial problems that would happen. But she was involved in the planning, she was an integral member of the team, she understood what the school was trying to achieve. She was available

> whenever a class went into the suite, working alongside the teacher, to support the teacher all the way through so that it meant that it did away with a lot of the fears the teachers had because they knew that there was somebody there to support them. And that's really important. But some schools haven't quite twigged that yet.

Teachers needed to work to an appropriate time frame; they would not get it right first time:

> After the technology goes in, you get a dip because teachers are so busy with the technology that they actually close their practice down, they are less innovative. Once they have controlled the technology they can expand and go on.

This often meant it was important to work with what you had, and what you knew, rather than chase new technology - the latest developments may offer less than imagined:

> There is keeping up, and also there's the problem of the red herring. Bits of technology that come up and we pursue them to see what happens and it fizzles out because we thought they were a good idea so there is always this bit about all needing to keep up with the latest thing and then we actually find out that we wasted effort.

A sensible time frame could create a virtuous cycle in which a department started with a modest aim, succeeded in that aim and found the confidence to take the next step. This participant recalled a department that began with digitising images as they were short of textbooks, not a ground breaking move but something that led on to other things:

> But they found that once they got into it that it took on a life of its own because people were beginning to use the resources that they were collectively developing and finding that they were going down so well that it motivated them to do more with ICT.

The disappointing impact of computers in education

Nearly all the sample were agreed that that there were many examples of desirable and inspiring use of computers but overall impact was not as great as they thought it would be when starting out:

> I think the thing that would surprise me is actually the slow rate of progress. You know if I think where we were in 1980 and I now think we are 20 plus years on and really how is the classroom radically different now? How is the teaching radically different? Really I would have expected far more progress in that time scale? We are still talking about how we engage more teachers, how do we manage the resources.

In contrast a minority of participants held a 'glass half full' perspective:

> So you know, why should we expect it all to happen quickly? Why should we expect sudden impact. You know, the pace of uptake of this innovation has probably, despite everybody's complaints about how slow it is, has probably been faster than anything else ever!

The idea of impact is a difficult one, but key was supporting changes in teaching and learning and not just the introduction of technology per se. In fact a lot of technology had entered school:

> Every school you go into these days has got a significant technological element, obviously secondary schools pretty much are on the internet and do make regular use of it. Every secondary school will have several clusters of computers some schools will have hundreds of computers, so there isn't an issue about schools embracing technology, and interactive whiteboards and this that and the other. What I think is the problem is the slow rate of change in embracing a different model of knowledge.

This is reinforced by another participant comparing local resources to those he had seen elsewhere in Europe:

> I thought ICT would be here but I certainly didn't think we'd have computer suites in my local primary school and smart boards and white boards. You know, a week ago I was in Germany and there was ICT in schools, one computer that was in the staffroom, for the staff to work on. There was none in the classroom at all. No whiteboards, nothing like that.

Why, then, was it going wrong? A key concern was that in different ways schools were, to use a much repeated phrase, 'locked down'. They were controlled in what they could teach and in what they should assess. Learning was further bounded by an outdated delineation of subjects. One participant gives an early example of curriculum control constraining teachers:

> There were a number of times where things became a little down…around about then 1989, when I was teaching an MSc course when we'd had a wonderful evening with the teachers, absolutely tremendous evening. We'd done some really good stuff on spreadsheets and we'd really been enjoying ourselves. I said to one of the guys I was working with 'You gonna try this out on Monday morning?' He said, 'No, it doesn't match the National Curriculum' so we could get over all the technical problems, we could solve all the other problems, but that was a real put down.

Another participant reinforced these concerns over curriculum control but saw, that in a wider context, the tide had gone out on the kind of progressive ideals associated with his first use of computers:

> But certainly it was obvious to me, around about '86, that the Logo paradigm didn't really have much of a chance, because the influence of progressive views on daily classroom life was quite small, and in fact what happened by 1986 it was quite obvious that the concept of having a computer room in the school where children were allowed to be fairly self directed in their playing with *Logo* and turtle graphics was simply never going to happen. Leaving aside equipment problems there is the mindset of the teacher and schools.

A common refrain was that while technology had had a huge impact on leisure and social activity in general, schools were not keeping pace:

> And nothing has changed except that divide has got more profound, I think, and we are just giving prescriptive education in schools. But the things that are really important to kids, the real experiences that are going to impact on their lives happen elsewhere. And that's going more so for me, not less so. So schools in a sense are just not keeping up with the changes.

Participants were careful not to blame teachers for this. Two, for example, emphasised that schools were a moral force in a society in which there were terrible examples of discrimination and fear. Schools were important to address disadvantage, as one recalled in her early teaching career in London:

> When the heating broke down and they should all have gone home why did many children stay in school? Because their homes would have been colder and more bleak than what was going on in our classroom that afternoon. And there wouldn't have been parents at home for them, you know. And I came up against a social experience, should I say, I came up against class, deprivation, an urban environment and political systems, political realities.

In spite of this recognition, exasperation with schooling crept into several comments:

> And I think secondary schools, we really have a problem. Not all, some are wonderful, but its very hard for them to be wonderful. In general teenagers are treated as if they were idiots they are really put through regimes as if they were in a prison they're told what to do, you can sometimes go past a classroom and you hear patronising voices talking to them, no kind of challenging language, low level language, boring tasks, …..and that's really frightening. My granddaughters say to me 'they really don't like us at the school, I don't think they like us'.

In-service training and CPD – a means for developing desirable use of computers

While there were serious constraints on teacher development, in-service training and CPD could help support teachers through change. However, the training needed to be appropriate. First, CPD should be focused on pedagogy as well as technology. Most HEIs and most LEAs offered a range of skills sessions but while these might have value they did not prepare for the application of computers. However, getting the balance between skills and application was not always clear:

> And in a way I could break that down to if somebody's going to use a new computer application then training in how that application works is sufficient to enable them to use it, but they need education in order to be able to make effective use of it. And I think that you can use different techniques depending on what you're trying to do but that we haven't always been very good, and I include myself in that, at discerning the difference.

Second, teachers should be given the time and space to think their application of computers through. Good CPD hands over to teachers. It 'does not tell them what to do' but encourages them to apply principles of teaching and learning for themselves. This participant tells a story against herself:

> One of the teachers on the course said that she'd really like to do some work on databases with her children but that it was going to be difficult to do with one computer, so could she arrange to bring them into the centre and use all our equipment? And we said yes no problem. I was shocked when this teacher brought her class in to find that she did as a lesson with them exactly what she had done in one of the training sessions. And I was thinking 'well this isn't right because we didn't design that with children in mind'. We'd designed it trying to make sure that the teacher understood how the programme worked and have some insights into it, rather than having any specific subject objectives connected to it. And that was quite a salutary lesson and that quite changed the way that we approached INSET after that.

Third, CPD needs to engage teachers in using ICT in the classroom and reflecting on that use, it should not be seen as a one off event – though many could remember offering just such events!:

> So its not the one-off day course that we all used to run where we take people out of classrooms and showed them something or other and filled them up with 32 different things they could have done with it and send them back with no time to engage with it. It's much more about a longer process of CPD where people are given a time to explore something and try it out and exchange with others.

Fourth, the change process needs to be supported in school and this is easier if this is done as a team and supported by senior management in school. Sometimes, as one observed, teachers needed to be told to use the computers:

> We started looking in terms of INSET where there might be sticks in education that could be useful in order to get teachers going. They weren't resentful about it at all because they were saying that actually having to do it has made all the difference. There needs to be some kind of collective understanding and collective support because if you're going to insist that people do things in a certain way, you've got to make sure they know how to do it and that the support mechanisms are there.

Fifth, CPD needed to be responsive to teachers and this often required differentiation of needs. This was frequently discussed in relation to the shortcomings of NoF training:

> So we've got ICT coordinators who've got loads more experience and understanding of ICT than many other people still going through this course and berating it all the way because they don't need it basically, it's not doing anything for them.

Future application of computers

In the previous chapter we mentioned some future scenarios for the use of computers, but how hopeful were participants about realising curriculum change? There were contradictory feelings. On one hand, the disassociation of school from changes in society was becoming more and more marked and perhaps this meant we were reaching a 'tipping point' leading to a less regulated approach, more collaborative learning, and new forms of assessment around the use of computers. On the other hand, participants could see that even applications such as word processing, which were long established and universally seen as useful, were not being used to anything like their full potential:

> But above all, they (*teachers*) need, what I needed when I had my first word processor, they need a sense that what they're doing is purposeful that it's going to be useful, that it's going to make a difference to them and their students. And how can any teacher feel like that, how can an English teacher feel that it's a good idea to get all their kids to write essays on a computer so that they've got the power of being able to create text with internal development rather than just …. how can they seriously do that when as one English teacher said to me three months ago, I've got to do two timed tests a week in the three months going up to GCSE's and they're going to have to do the exam in handwriting.

Summary

This chapter has looked at the application of computers in school, the opportunities participants saw and the difficulties they experienced and observed. It discussed both desirable application of ICT and desirable types of in-service training. It drew attention to the nature of schooling and binds the development of computers to pedagogic as well as technological change.

We posed the question 'Why is the introduction of computers so problematic?'. The response is that participants see a complex interaction of factors involving individual teachers, hardware and software, school and policy decision. There is too little clarity and shared understanding over what we want computers to do and how we can achieve this.