Microworlds and Real Worlds - educational policy and practice as the context of the InTER Programme

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Introduction and Overview

The InTER Programme of the ESRC was unusual in its inception because it was conceived after a lengthy period of consultation coordinated by Bob Lewis within the Information Technology in Education Programme (ITE), (1985-88). ITE had itself been preceded by a period (1983-85) during which, Information Technology in Education having been identified by the Council as an area calling for concerted research support and strategy, reports were commissioned and widespread consultation carried out. ITE followed rejection of the idea of setting up a single research centre in ITE.

ITE had two main procedures for collecting information about the current concerns among educational researchers in the field of IT:
  (i) acting as a focus for collecting and publishing research papers in the Journal of Computer Assisted Learning (JCAL), which was edited by Lewis;
  (ii) hosting a series of seminars at which key players in IT research and development could exchange ideas and sharpen up their thinking, and disseminating these discussions through Occasional Papers.
A feature of the seminar programme (and to a lesser extent of the Journal) was its strong practitioner base. Under its auspices, through Bob Lewis' mediation, LEA officers and inspectors, teachers and software developers met with educational researchers and had a share in shaping the research agenda for InTER. As a result, from its inception the InTER programme was more strongly orientated than many other ESRC programmes towards the field of application. Teachers and policy-makers at both the local and national levels were very much aware of InTER, through their membership of Bob Lewis' network, and looked

forward to hearing reports of its work and having access to any eventual outcomes. Consequently, InTER needs to be understood, at least partly, in terms of how it responded to the needs of the field of application - i.e. to the needs of educational policy makers, Local Education Authorities, teachers and schools.

The main focus of this report, therefore, is the development of computer based learning (CBL) in schools. Our main concern as InTER evaluators, is with Government policy and practice in IT. This has additional importance because, in marked contrast to other initiatives involving venture expenditure, it has been largely shielded from external scrutiny. In order to give a broader perspective to our analysis, we will also comment in a more general way on the characteristic features of CBL as an educational movement and on the political and economic contexts in which its evolving forms seek a location in educational practice. CBL has, in global terms, a long history, but it has seldom been exposed to systematic examination of its claims. It has been characterised therefore, by private rather than public learning.

a)   Higher Education and IT Policy

The Government has spent a substantial sum of money over the past twenty-five years modernising and sustaining the computer facilities of our universities, most of it to enhance their research capabilities, some of it for administration. Research, both in the natural and the social sciences, is increasingly computer based, and research into computer applications is clearly important for technology based futures, in peace or in war.

The use of computers for teaching and learning in higher education has been slower to develop over this period. Until the mid 1980s it was largely confined to undergraduate service courses and individual enthusiasms. In the 1990s, the Computers in Teaching Initiative (CTI) has coordinated these efforts and encouraged sharing of software and courseware. At the same time the general support for improved computer facilities in the research community has stimulated a new wave of research into learning processes, of which InTER is an expression, sometimes attracting into that field a less parochial array of investigators than have traditionally been interested in the somewhat low status matter of human cognition.

What is emerging from this is an academic community of computer- based learning experts of a peculiar character, not necessarily rooted, as are other academic groups of educators in Britain, in an intimate knowledge of, and commitment to, the processes of mass schooling. Some are, some are not, but the multi-disciplinary nature of computer-based learning research generates multiple agendas, and some uneasy inter-dependencies. When such a community is called upon to service the needs of schools, it would be surprising if the link between research

and action proved to be unproblematic, or indeed the commitment to the mission wholehearted in every case, as InTER has illustrated.

Among the varied sources for CBL research in Britain , the most important has been the ESRC, through the exploratory ITE initiative and the main InTER programme which followed. Nevertheless, in establishing links with its practitioner 'market', the programme has run into some problems..

Firstly, the Council did not maintain its financial commitment. Despite the original intention to fund ten or eleven multi-disciplinary, multi-institutional teams to carry out a broad range of basic research - with the user market firmly in mind and in touch - only three groups were funded, plus a co-ordinating unit and an evaluation. There was no critical mass, in a sense no programme.

Secondly, there were at the end of InTER few products for ready use, partly because basic research is a slow process, partly because most researchers prefer high powered machines, mainly American, while the schools have low-powered machines, almost exclusively British, as a result of Government policy. Whose task is it to do the conversion job? Answer - nobody's. Researchers are typically reluctant, they want to go on with their research. After all, their careers are determined by research success, not by implementation activities. And the Council's remit is research, not development, although dissemination activities were stipulated and applications emphasised in the research specifications for InTER.

This same kind of collective ambivalence that characterises the research community's attitude to development is also writ large across the range of school-oriented action, to which we now turn.

b)   Schooling and IT Policy

Developments in CBL in British schools have been steered by government policy. It has not been a particularly coherent policy, mainly because it was designed and implemented by three different government departments which often seemed to be in competition with one another: the Department of Trade and Industry (DTI), the Employment Department (DE), and the then Department of Education and Science (DES, now re-named the Department For Education, DFE). But there has been a kind of consistency, insofar as there has been a high level of support of varying kinds in this field for more than a decade. The policies for IT have been only a part, although a significant part, of much more wide-ranging reforms of the education system as a whole. These include both reforms in educational practice such as specifying a National Curriculum, and reforms in educational administration which have

shifted control over education away from Local Education Authorities (LEAs), responsible to locally elected Education Committees, to individual schools (under the control of central government). Money has been targetted and concentrated on these reforms, including the introduction of IT, by cutting back on funding for the education system as a whole. The antagonism and frustration expressed by some teachers at the pressure on them to use computers has probably been linked to the lowering of teacher morale resulting from the erosion of their pay, shortages of books and other resources, and what has often appeared to be an attack by politicians and the media on the education system and teachers' professional competence.

The amount of central government money spent on implementing policies for Information Technology in education has been substantial: a total sum of around £177 million over twelve years. The DES launched the Microelectronics in Education Programme (MEP) 1980-86 (£23m over 6 years) to develop software and training materials. The DTI launched the Micros in Schools Schemes in 1981 and 1982 (£15m over 3 years) which half-funded computers in virtually every secondary and primary school in the country. Other significant initiatives included: funding from the DES first for the Microelectronics in Education Support Unit (MESU) 1987-89 and later the National Council for Educational Technology (NCET) 1989- ; and again from the DES the Education Support Grant (£90m over 6 years) to pay for Advisory Teachers in Information Technology to work alongside teachers in the classroom, as well as a substantial amount of new hardware. The DTI continued to allocate money to Education for hardware and software, often at very short notice, as a way of making good use of unspent money at the end of the financial year.

In addition, the DE put very substantial funding into the development of technical and vocational education, which included a substantial element of funding for hardware and software. Its pilot Technical and Vocational Educational Initiative (TVEI) in a small number of schools from 1983 to 1987 (£240m over 4 years), aimed to develop students' technical skills while at the same time attempting to bring about radical changes in teaching and learning styles; and this was followed by the TVEI Extension project, 1987-97, which is bringing all remaining schools into the project with greatly reduced funding per school (£900m over ten years).

The inspiration for all this spending on IT in Education came from Government Ministers, who appeared to believe that development in IT would be able to rejuvenate the economy .. as well as creating for themselves a dynamic, go-getting public image. The computer also appeared to have gripped the imagination of the general public. The DTI scheme half-funding microcomputers for primary schools, was such a success that it cost twice as much as was originally envisaged. Parents, pupils, governors and local communities clubbed together to

run jumble sales and sell raffle tickets to raise the necessary 'matched funding'. The euphoria was such that the arrival of the computer in the school was often a significant occasion: we know of one case where a teacher was appalled to be called into the Head's office one day before school, shown the computer still in its box, and told that a photographer from the local paper would be arriving at 11.30 that morning to photograph the children using it.

What are the outcomes of these policies? In the 1992 elections education was high on the political agenda with many politicians linking decline in the economy to an alleged decline in educational standards. But the focus of debate is now teaching methods (Alexander et al, 1992) and the system of teacher training (DFE, 1992), rather than IT. The power of the computer to inspire faith in policy-makers and conjure up money may be in decline. It is time for a dispassionate assessment of the results of two decades of IT policy.

It is not at all clear why so much money has been spent on IT in Education, or what the government hopes to achieve by it. In part the obscurity arises because three different Ministries have been involved in separately funding programmes. Although the Cabinet Office assures us that this is an era of cross-Departmental teamwork, there is some evidence that CBL in schools has been, and continues to be, disputed Government territory, with implicated Ministries pursuing separate, and in some aspects, mutually destructive agendas. It doesn't help that two of these departments, the DTI and the DE, have provided schools with hardware and software without any particular educational end in view, so that we are left to infer their intentions from their Departmental responsibilities. Until the recent appearance of the HMI booklet, *Information Technology 5-13*, even the DES left the educational rationale of its various IT investments largely unstated .

The only thing that is clear is that the Government thinks CBL is an essential component of the curriculum. As a result it is now part of the mandatory national curriculum. But CBL is still a long way from solving its problems of widespread implementation in an educationally defensible form. Much has been claimed, little assessed and even less achieved in our classrooms. Protected by its popularity - students like it, parents value it, aspiring politicians wear it like a lapel badge - CBL has for the most part escaped a number of hard questions. It is time to ask them now, while the field is still fluid. If CBL is inevitable in our school systems, then we must learn from our experience in order to shape its future.

The Culture of the IT Innovation

The key to understanding the culture of the IT innovation is to recognise that computers, far from being neutral tools, are the objects of highly charged emotions. We can see this

mirrored in the responses of children, some of whom spend extensive periods of time locked onto the computer screen and others of whom have relegated the computer to the attic. In around 1985 Britain had the highest proportion of home-computers per head of population in the world - most of them owned by children. To possess the computer was, at first, all important - it was the desired Christmas present: the symbol of wealth, parental affection and worldly status. Children took on computers much as they had taken on Rubik's cube, the skate-boarding of the 1970s, or the hoolah-hoops of the 1950s. It began as a 'craze' and from the first it carried a gender-bias: more boys than girls owned their own computer or had access to the computer at home (Culley, 1988), and it was predominantly fathers, rather than mothers, who purchased them. Once possessed it could be used for games - which mostly developed psycho-motor skills (eg. in eluding the monsters) while giving vent to basic emotions (fear of the monsters, aggression in killing enemy attackers, competitiveness to reach the highest score) in an ultimately predictable, potentially controllable and therefore secure environment. Or it could be used for programming, to store and sort information, to write, to solve problems - all of which required initial cognitive effort in mastering hardware and software, and promised real pay-offs in terms of cognitive gains and improved productivity. This second kind of use was much more demanding and difficult than the former and required considerable imagination in knowing in advance what kinds of problems the computer might help in solving. Only a few children moved from the games stage to pursue this second path, because it felt like - and was - hard work with indeterminate gains. Even those who did, often got no further than copying into the computer the program listings in their favourite computer magazine (which, by the way, suitably impressed adults for whom this simple process was so alien that the resulting programs were akin to magic). The magazines reinforced the gender-bias since they were marketed more-or-less exclusively for boys.

These highly charged emotions result, it seems, from the computer's power as a symbol of modernity and technological progress. It has never been culturally neutral. Richard Hooper, in the *Final Report* of the National Development Programme of Computer Assisted Learning, sees the computer as "damned by association" in its impact upon the educational community:

> (The computer's) ubiquitous role in organisational life is seen as symptomatic of the technologisation of society, a process popularly associated with dehumanisation and domination. The computer is, in these terms, the instrument of those in charge, and a symbol of their power and inaccessibility to the individual citizen.
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> (Hooper, 1977, p..58-9)

Consequently, his experience in NDPCAL was that many teachers were pre-disposed to view the computer as a likely threat to some of those educational values which they held most dear. It may not be by chance that many adults who have embraced new technology with

enthusiasm have gone through a period of serious computer games-playing. By this means they can be seen to have personalised and domesticated the computer by incorporating its use into their leisure-time. But many adults, as a result of professional responsibilities and limited access to resources, were only offered the chance of the second kind of computer use pursuing cognitive gains. In Britain, this has been particularly true of teachers, whose access to resources has been severely limited by a tacit assumption that students should be given priority. Especially in the early days, scarce computers were placed in classrooms not in staff rooms, and teachers only had extended access to computers if they stayed behind in the evenings or bought their own machine with their own money.

Territorial factors also came into play: in secondary schools computers were nearly always placed in the Maths department - often 'owned' by one individual male who was later to become the Head of Computer Studies; in primary schools computers tended to gravitate to the classroom of a male member of staff who, almost overnight, found himself categorised as the 'computer expert'. In addition, as with children, access to computers at home was much more frequently available to males than females, since it appears that men were more likely than women to place priority on the purchase of a computer for their own use. Perhaps their cost, by comparison with other resources, was partly responsible for the career-enhancement which many teachers gained from their association with computers, both financially in terms of responsibility allowances and through increased status in the eyes of pupils and parents.

One result of the prevailing ambivalence towards computers, and teachers' limited access, has been to surround them with subterfuge, and greatly to increase the unintended outcomes which generally result from any educational innovation. For many teachers, the computer was quickly relegated to a psychological attic. This could be done in several ways: the computer might be displayed as a status object and left to the children to do with as they pleased; it might be rejected and opposed on the grounds that it was time-consuming and irrelevant to educational aims; it might be used for a small number of trivial tasks (usually with "drill and practice" software) which could be justified as having some educational value and had the advantage that they held the attention of the children much better than any other such activity; or it might be integrated with existing patterns of teaching in a way which used its presentational advantages without requiring any cognitive engagement (eg. producing "best copy" of writing previously done by hand - for display on the classroom wall).

Faced with the enthusiasm of some colleagues who had become locked into computers-as-games many teachers adopted an oppositional stance: in some cases as a screen to cover their own sense of threat to their status as competent adults in the eyes of the students. And, faced with the obvious power of computers to enhance colleagues' status and career prospects others found ways of taming the computer so that it could be used in undemanding ways -

rendering it cognitively impotent, so-to-speak. In doing so, they jumped on the band-wagon without any real commitment to using the computer to improve the quality of education for their students (see Olson, 1988). The decision to adopt or reject the computer appears to have been rooted in the self-image and cultural affiliations of individual teachers. In terms of gender, the bias in society for men and not women to become involved in technology (Cockburn, 1991, p.43) was reflected, at least initially, in more male than women teachers choosing to use computers; in the same way, boys rather than girls were shown using computers in the illustrations in school text books, advertisements and magazines (Sutton, 1991, p.483), and after-school computer clubs became the exclusive domain of boys unless special days were allocated as 'girls days'.

One of the attractions of using computers for adults may be that they re-create the total absorption, and in many cases the relatively simple step-by-step procedures, of playing childhood games. Take the case of a financier specialising in the international stocks and shares markets. He or she might arrive at work at 8 am and left at 6 pm, having spent the day keying in purchases and sales involving very large sums of money, for all the world as if playing a particularly absorbing game of *Monopoly* - with monopoly money. Such an interpretation is supported by the success of the WIMP environment in which 'windows', 'icons', 'mouse' and 'pull down menus' allow us to use psycho-motor skills to control and manipulate a games-like world of patterns and symbols. If this is so, the distinction we have been drawing between the 'computer-as-game' approach and a second more serious approach to the computer as a cognitive and presentational tool becomes blurred. All computers can offer a games-like experience to frequent users. This perhaps explains why a small number of teachers have devoted a great deal of their time - and often money - to acquiring skills in operating software, and setting up and maintaining the school's computer network. For these teachers the computer has perhaps re-created an escape world of absorption in the game - which brings with it professional rewards, making it an ideal hobby.

Changing Rhetoric and Changing Times

Seen as an educational movement, computer based learning doesn't appear to make sense. Perhaps that's why it has been slow to make progress, in terms of its impact on schooling. Broadly speaking, it is a thirty year old movement, largely confined to the USA for the first decade. It began there as an electronic page turner in an attempt to revive a dead idea, programmed learning, and an unpopular psychology, behaviourism, which confined its development to rigidly controlled instructional forms. But America was a dominant world power with a buoyant economy and the educational culture of the time was progressive, favouring active, social and collaborative learning. Even if traditional CAI had been able to

prove its labour saving claims, which it didn't, it was running against the grain of curriculum development. It was a movement without educational credentials.

By the end of the sixties, this concept of the learner as captive of the computer was challenged by the concept of the learner as controller, and throughout the seventies and into the eighties the voices and the imagery of people like Seymour Papert became more dominant in the discourse about computer based educational futures. Computer power was to be placed within the command of the pupil. In this scenario the teacher as PLATO gives way to the learner as Einstein, pondering, as Bonello-Kubath & Kubath (1988) put it, "the simple rules that govern life and the universe." Here we have a transformational projection beyond the wildest dreams of the progressive movement. In the words of McLean (1982), "The goal is also to engender an appreciation of meta-level intellectual activities which increasingly include assigning appropriate information processing tasks to machines while getting on with the higher level human thinking."

The computer attraction is doubtless due, in part, to it being a good example of the kind of "technological package .. mass produced and widely disseminated - like automobiles" which House (1974, pp.213-4) points out has particular attractions for national governments looking for "magic solutions". It has managed to inspire faith in people who hold two quite different educational philosophies. because they see it offering a potential solution for the most fundamental and perennial problem in education: how to tailor teaching to individual students' needs within a system of mass schooling. For instance:

- Liberal-humanists claim that Information Technology can liberate learners. Students will be able to select their own subjects of study, accessing information from data bases held locally in CD-ROM or on large computers linked to their microcomputer by optical fibre cables. Their WIMP environment, presenting a standard, user-friendly software interface, will enable them to synthesise and analyse information by key-word searches and/or hypertext pathways sufficiently flexible to adapt to their own preferred learning styles. Using powerful generic software - word processors, multi-media data bases, graphics packages, spreadsheets, and Logo-based modelling/control software - they will be able to set their own problems, pose and test hypotheses, and reach conclusions and solutions. In the classrooms of today and tomorrow children will work collaboratively with their peers and teachers, supported by these powerful IT tools. They will be empowered because the hardware and software will free them from their own limitations of motor-control and cognitive development. It will extend their teacher's ability to provide "scaffolding" for their learning, so that more and more of their time can be spent on activities which lie within their "zone of proximal development" (Vygotsky, 1986; Pea, 1987). They will be able to publish their writing

using desk top publishing software and laser printers; design, build and control their own inventions; compose and perform their own music (without the tedium of learning harmony and counter-point); and perhaps more besides .. Moreover, students with physical impairments will be able to achieve as much as their fellow-students, because specially designed software and customised 'single switching' will not only overcome their impairment but offer them the same improved learning opportunities as their peers. Theoretically, all this is possible.

- Free-market capitalists often make many of the same claims but put a slightly different slant on them. Policy-makers and teachers will be able to identify students' needs and structure their learning tasks so that they exactly match their learning needs. If a student has a problem with an area of mathematics, an interactive video package or expert system will be able to teach and test, in response to the student's precise needs, until the problem is overcome. The worlds of work and school will partially merge. Schools will be able to offer their students direct experience of the work place through links with local industry and commerce, using new technology to enable students to work on joint commercial projects with the company, and providing youth training in the school for company employees. The extent to which students should be encouraged to set their own problems and develop autonomy in problem-solving and decision-making is recognised to be open to debate, but it is claimed to be essential to prepare students for a work place in the twenty-first century where menial tasks will be carried out by machines and there will be a premium on independent thinking and the ability to work well in a team. IT enables these skills to be developed. It is affirmed that the cost-effectiveness of schooling will be improved. With the aid of IT teachers will be able to give more individual attention to students, despite increases in class size: first, because computers will increase the amount of time students spend motivated and 'on task', enabling teachers to direct more time to teaching individuals and less to crowd control; and second, because materials for open learning, consisting of multi-media packages of software, course-ware and printed documents will greatly increase the opportunities for self-study, and enable teachers to manage learning with a combination of contact and non-contact teaching time. (Moves in this direction are already being introduced in higher education through the Teaching and Learning Technology Programme (TLTP), as a policy initiative to cope with big increases in student numbers without any increase in teaching staff.) Theoretically, all this is also possible.

Now, there are many more modest expressions of these heady aspirations, but what they all have in common is a learning environment that is radically different from the computer managed classrooms of the CAI pioneers and, what is more to the point, radically opposed to contemporary trends in schooling. In this hypothesised environment, traditional teaching has

no place; the teacher is a facilitator and orchestrator of a multiple modality, diverse set of learning activities; the social dimension of learning is restored through computer-mediated collaborative forms of work; children learn how to think rather than what to think and develop their own learning styles.

These are good liberal ideas. Take out the technology, and they have a lot in common with the aspirations underlying many of the curriculum developments of the sixties in Britain, or with the progressive movement building on the philosophy of Dewey in post-war USA. But once again the computer-based learning community, having transformed itself and acquired impeccable credentials, is running against the tide. Because the tide has turned. Those countries which for twenty years invested heavily in professionally-led curriculum development have now abandoned that enterprise and its values, in favour of a centrally controlled production model of schooling on traditional lines. So the new, revamped CBL makes no more sense now than the old did in its time.

On the contrary, the prospects for American-style CAI have never been better. In Britain we have a government of the radical right which has, over a period of fourteen years, taken a decentralised, power-sharing system of schooling and transformed it into a centralised system under political control. Thus, we now have a national curriculum specified in terms of content and goals for each subject at each stage, and a national assessment system of attainment tests to monitor both individual and collective progress. These tests also function as a form of comparative accountability for individual teachers and schools, now under the lay control of governors with budgetary autonomy. Experimentation in the classroom (what used to be call curriculum development) requires the specific permission of the Minister of Education. All this is justified in terms of equality of opportunity and entitlement and the need to raise standards, but what appears to be emerging is a highly stratified system of schools, teachers and learners, powered by the values of possessive individualism and negative interdependence, i.e. a competitive, not a collaborative learning environment.

Under such a system it is difficult to see how the kind of learning environment for CBL described earlier can be attained. It is not on the political agenda. The Minister for Education at a recent Conservative Party conference called for "back to the basics" and "traditional" teaching. And he can do it. As we all know, attainment tests can and do control not just the content but also pedagogy of provision. When they are used, as seems to be the intention, as a measure of teacher performance and therefore of teacher competence, what we can expect is a high level of standardisation in the educational process and a level of educational ambition restricted to what these tests can reliably and validly measure.

These are precisely the conditions in which traditional CAI can thrive. It is stable, standardised, universal and measurable, and therefore commercially viable. CAI of this kind has not disappeared from American schools or been superseded by more sophisticated and intelligent tutorial systems. Not in market terms it hasn't. From its early days in the sixties its marketing strategy was based on a combination of forecasts of rising labour costs in the public school system of the USA, falling costs of computer hardware, federal commitment to subsidising remedial programmes for disadvantaged children, and a continuing emphasis on basic skills of literacy and numeracy. Now, almost thirty years on, that commercial strategy is coming good, both in domestic and export terms. Admittedly federal subsidy has declined sharply, but the other assumptions were well-founded.

In most respects the educational legacy of Reagan/Thatcher economics has been remarkably similar. In the USA, following the publication of A Nation at Risk in 1983, which talked of "unilateral educational disarmament" and of a "cafeteria-style curriculum", State after State moved quickly to take more direct control of their school systems, to specify syllabi, to introduce or extend criterion-referenced assessment, to emphasise basic skills and transmission teaching, especially for low-achieving children. And some people are even talking up the idea of a national curriculum to raise standards across the USA, thus guaranteeing an educational 'entitlement' to every child.

As in Britain this egalitarian rhetoric has been heard in some very elitist quarters, and has been supported by otherwise opposed political groups. This is surprising, given that nothing is better calculated to reassert and rationalise cultural group dominance than the imposition of an academic curriculum and an instructional pedagogy on all children. It is, however, only too easy to see the attractions of such systems in countries which, like Britain and the USA, have polarised their societies and, in the context of bankrupt economic policies, seek political salvation in protecting the "haves" and controlling the "have nots".

What does this mean for the future of computer-based learning in schools? According to a recent review of computer-based learning in the USA (Scott, T. et al. 1992), by 1985 some 400,000 public school pupils, the great majority of them from inner city, culturally disadvantaged populations, were doing drill and practice CBL on a daily basis, with more sophisticated CBL confined to wealthy schools. A two tier system of CBL then, for a two tier society? The commercial corporations who are busy selling CBL in the USA in the form of integrated learning packages don't see it that way. The only market they can see is the inner city market and the only product they are pushing is the low level, low cost, teacher free, teacher proof drill and practice in the basic skills package. It dovetails neatly into the new emphasis on performance monitoring, with the computer's capacity to maintain records of achievement for both individuals and groups.

So is that the future for CBL, in our own inner cities on this side of the Atlantic? Does it make any sense at all to talk, as some contemporary advocates do, of children "becoming their own epistemologists" (Bonello-Kubath & Kubath, op.cit.), of computer based networking "catalysing critical analysis by students of societal issues that may pose a challenge to the status quo"? (Cummins & Sayers, 1990) Even if there was a market, which there isn't, even if there was a profit to be made from that market, which there isn't, even if any of us had governments which would back such ideas, which we don't, how is such a transformation of schooling to be brought about?

CBL and Innovation Theory

Here the literature of CBL is seriously deficient, both in its attention to this issue and in its response to it. Sometimes it seems to be assumed that CBL can realise its intended effects, on individuals, pairs, or groups, independent of what else is going on in the classrooms, either before or after, or contemporaneously. Sometimes, and a great deal of hope rests on this proposition, it is argued that CBL is a powerful agent of change, capable of compelling a reconstruction of the learning environment, i.e. the catalytic power of CBL, the Trojan horse theory of transformation. And sometimes, much more so in recent years with growing recognition of the social nature of effective learning, teacher education is seen to be the key.

The point is that these are all discredited beliefs. You wouldn't think, reading the CBL literature, that we have thirty or forty years of experience, bitter experience of the most part, of curriculum innovations intended to achieve the kind of transformation that CBL enthusiasts dream of. We began by thinking it would be easy, a matter of rewriting the textbooks or of producing and disseminating curriculum packages, went on from that simplistic view to a new slogan, "No curriculum development without teacher development", and from that to the realisation that institutional change was a necessary precondition of teachers being able to change. By this time the very notion of single innovations having the power to change learning environments had been discarded, the illusion that they could only be sustained by the temporary infusion of additional resources and rewards. The institution was the catalyst, not the innovation, neutralising and assimilating every intervention that constituted a threat to its arrangements, values and habits. And schools themselves were, as Ernest House pointed out in his classic evaluation of the politics of innovation, 'frozen' institutions, locked in the social order of the institutional structure of social management and control. (House, 1974)

This massive failure, in terms of its objectives, of a professionally-led movement to modernise schooling and improve its quality, made it easy, both in the USA and in Britain, for governments to step in and take control of schooling in the ways we have summarised, to marginalise the infrastructure professionals (the so-called 'educational establishment') and to put into reverse the professionalisation of teachers, replacing that concept with something closer to a workbench view of teaching.

How insulated the CBL community seems to be from this body of experience and strategic thinking about educational change, from matters that preoccupy other groups concerned with school improvement. Of course, CBL is different from other educational innovations, even technological ones like radio and television, whose advocates also promised a revolution, but which have settled for a modest place in the classroom. It's an evolving innovation, constantly changing its form, its capabilities and therefore its educational possibilities. It is dominated by technology-push and by computer-specific interests, compulsively chasing an ever constant horizon. The lumpen, recalcitrant, slow moving mass of the real world of schooling can be seen as an irritating distraction. Some of the names given to contemporary software programmes invite such comment. Take *Shopping on Mars*, or *The Alternative Reality Kit*, for example. Why bother with the real world when you can invent your own?

But we must give serious consideration to the claim that CBL is an educational movement, that is to say a movement intent upon changing educational practice by, in its own terms, emancipating and empowering learners. Where, when and how are questions that are put to other innovations - why not to CBL? This raises the central question. As the gap grows between the educational imagination of the inventors and the ideological and economic feasibility of their scenarios (rising software costs having replaced hardware costs as the main financial disincentive) why do governments continue to invest in CBL?

In Britain, CBL is the long distance runner of post-war curriculum development. It could even be called the sole survivor, with a record of twenty years of continuous Government backing. In that time a hundred other ideas for improving the quality of educational practice have come and gone - taken the money, had a go, and left little trace. None of them achieved the promised transformation, though some were influential for a while, and some founded traditions, in action research, in teacher education and in school development, which embodied the learning curve of which I have spoken, and which were beginning to flourish before the juggernaut of political control rolled over them.

CBL in Britain, has had more public and private money (including voluntary parental contributions) invested in it than any other innovations, some £200 million pounds in the past twenty years, nearly all of it in the last decade. And still it goes on, despite the successive

failure of successive investments. There is little to show in terms of educational impact in the light of even a benevolent educational critique. CBL is truly the phoenix of educational innovation.

The truth is that there are some rather obvious reasons for this apparently indestructible faith in the future of CBL, which we will address in the next section.

The Industrial Rationale

We live in a world which is becoming increasingly computer-dependent, a process that is already irreversible whether we look at industry, commerce, war or social management and services, whether we look West or East, North or South, at the developed, developing or third world economies. It is also an increasingly competitive world of economic interdependence, in which, for Western nations at least, the command of computer power is seen to be an essential precondition of competitive success in wealth creation. Computerware and computer-based products are therefore both an industry and a market in themselves as well as a means of enhancing the quality and lowering the costs of other goods and services.

Back in the sixties, European anxieties about the threat posed to our science-based industrial future by growing American domination of data-processing and communication technology rumbled intermittently in the corridors of political power, some arguing for a European response, others for national initiatives because of the urgency of the situation. It was seen to be a task for government, and a comprehensive one, much influenced by a speech of Hubert Humphrey, then Vice-President of the USA, in Paris in 1967, when he said, "If technological advance occurs more rapidly in the United States than elsewhere the reason must be sought in educational, organisational and economic factors."

In 1969 there was a call for action from a British Parliamentary Committee, and in 1973 the first major Government initiative in CBL was launched, an initiative which in its structure embodied, for the first time, an explicit link between economic development and educational development.

Incontrovertibly, it is a frequently-stated claim that there is a link between education and the economy. But what is it? Some people doubt if there is one. Certainly international comparisons of national investment levels in education bear no systematic relationship to economic prosperity. Politicians from many Western countries visit Japan, looking in their schools for explanations of the Japanese miracle. What they find is rote learning and the encouragement, by parents and teachers, of a degree of competitive intensity between pupils

that mocks any notion of schooling as a civilising process. The parallel trends in the USA and Britain are moderate by comparison.

But all Western governments feel more and more compelled to intervene in the educational systems they provide - not just to control costs and win votes, although failing economies invariably scapegoat schooling, but to assert a view of the relationship between education and the economy. This always involves a projection of labour market needs, an increasingly hazardous exercise in the context of global economics.

Twenty years ago, about the time when the term 'computer literacy' was coined and advocated as an essential addition to the traditional view of basic skills, the general view was that the advanced industrial nations needed a large, highly skilled workforce to man the technology-based and technologised workplaces of the future. That view has since been complicated by a number of factors - the main ones being the unexpectedly fast and fierce growth of competitiveness in that marketplace of the developing world, with its low unit costs, draining away investment in the West by the mobile internationals, and the increasing capacity of computer-based applications to de-skill some occupations and eliminate others.

For the free marketeers who have ruled Britain for the past thirteen years, the response has been to privatise public utilities and publicly owned industries, leaving them free to pursue profitability without regard to social considerations, and to urge automation of labour-intensive skilled occupations. The cost of these policies is a growing problem of social management - of rising levels of unemployment, rising levels of crime, rising levels of discontent among the underemployed, and political turbulence and instability. But, it is not just a British problem or a problem of right-wing governments - there are now some sixteen million unemployed in the European Community, three of them in Britain and three in France, which has just ended a long spell under a socialist administration.

The point is that the kind of economic and technological determinism that powered the rhetoric of government intervention in the sixties and seventies drew its confidence from an industrial projection predicated on high-tech skills and full employment. That projection has not been fulfilled, and has been replaced by a scenario of labour-saving capitalisation of a scaled-down manufacturing base with a very limited requirement for high-tech, high fliers, a larger requirement of low paid, minimally skilled minders, and a permanent pool of work-seekers surplus to requirements. In these circumstances we are entitled to ask "what now is the rationale of government support for CBL in schools, given so little evidence of its educational effectiveness?" In the absence of a satisfactory answer, we may be tempted to conclude that it has little to do with education, and everything to do with providing a hidden

subsidy to the IT industry and with using schools as a lever to persuade industrialists to invest in technology.

This still leaves us with the question of what the Government wants from CBL. Although successive governments in the UK have so far backed the professionals' opposition to drill and practice CAI, this still remains the most common form of CBL in our classrooms, and it's not difficult to imagine that a cost-conscious government with a 'back to basics' slogan, having established through curriculum control the conditions in which high volume, low cost technology can flourish, will at some point be tempted in that direction. But leaving that option on one side, we can still pose the question. If it is no longer computer literacy for all, what is it? Computer deference, computer loyalty? Better education, or anything-goes acclimatisation?

As we shall see, it's a rather confused picture, not least because of the uncertainties surrounding the future of the IT industry itself in the British economy to which we will now briefly turn.

Notwithstanding the political demand, in the late sixties, for comprehensive government action to galvanise IT development, the British computer industry continued to languish throughout the seventies and by 1983 was in a mess - fragmented, small in world terms, with a rapidly growing trade deficit, unable to finance its own research and development needs. This was two years after the Japanese launched their fifth generation computing programme.

The Government responded with the ALVEY programme: a five year, £350 million pound initiative, in advanced information technology, designed to improve the competitive position of the IT industry. It was a collaboration between government, industry and academia, with £70 million going to the universities, who were becoming adept at sustaining their computer interests by varying their proposals to suit the priorities and requirements of a changing pattern of sponsorship - in this case the Ministry of Trade and Industry, the Ministry of Defence and the Science and Engineering Research Council. This was 'pre-competitive R and D', a concept which rationalises costs and risk among competitors to establish a shared technology base before they separate to compete in the market.

It was assumed that the programme would be followed by a second and even a third phase, in the hope that it would establish a structural change in the organisation of IT R & D on the basis of which the national industry could flourish.

In the event these hopes were dashed and there was no continuation into the nineties. The main strategic goal was not achieved. The industry continued to decline, market shares

dropped, some whole sectors of industry passed into foreign ownership. We won't go into the reasons, as given by the programme evaluators, but it's difficult not to agree with them that too much too soon was expected of the initiative, especially in the context of a general decline in the economy. The Government continues to look for cost-effective ways of marshalling the necessary resources for industrial resurgence in IT, as indeed does the European Community, but continues to be restricted by the political disease of short-termism, and the lack of will to invest in sufficient scale to match the problem. Both these problems have also afflicted educational investment, as we shall see.

There are two points worth making about this initiative. The first is that it was independently evaluated and the evaluation published, hardly surprising perhaps in a country that has insisted, for some years now, that all venture capital programmes be submitted to external scrutiny, but a scrutiny, which is notable for its absence in the area of CBL educational investment. The second is that, although we have mentioned both the strategic and the structural goals of the initiative, these were at no stage of the initiative clearly set out - they were in fact reconstructed by the evaluators through a process of sifting and synthesising the documentation. Little wonder that many of the participants cried, "foul" when the initiative was pronounced a failure.

That is the background, political, educational and economic, against which most of the educational initiatives we describe have been played out. Keep it in mind as we go on from here.

Incorporating Computer-based Learning into the mandatory National Curriculum

In 1973 the Government launched the first of a series of initiatives in CBL, called the National Development Programme in Computer Assisted Learning, with development in Higher Education its major focus. One of the authors of this report, Barry MacDonald, was responsible for the educational evaluation of that Programme. This was followed, as we have already described, by a series of initiatives in the 1980s, focused on IT development in schools. At the end of this period of major investment, CBL was made mandatory for all schools, all teachers, all children as part of the national curriculum.

The first thing to say about that is that it is an astonishing outcome. Nothing that we know about the current state and status of CBL in the schools remotely suggests that it is ready for the kind of freezing process entailed in the production model of schooling, and nothing that we know about the state and status of CBL materials in the curriculum resources market remotely suggests that it can be safely left to claim its share of individual school budgets. By

way of illustration, let us quote one or two key passages from a low-budget, 'state of the nation' evaluation of CBL in schools which we and some colleagues carried out for the DTI in 1988.

"Primary schools, by virtue of their organisation and freedom from exam pressures, lend themselves to good educational deployment of computers - group collaboration and cross-curricular work. Although good practice has been slow to emerge, the last two years have seen a breakthrough, on the part of some teachers in some schools, to experimental and innovatory practice that constitutes a departure from drill and practice, instructional routines.... It remains true, however, that even the few computers available (and it is still few despite the increase) are far from being fully utilised."

"The situation in the secondary schools is considerably worse, despite the greater number of computers available to teachers. Initially devoted to support examination courses in Computer and Business Studies, they were, and to some extent still are, confined to a few teachers and students. The notion of cross-curricular application is still, for the most part, just dawning on teachers, and computer enthusiasts are having a hard time promoting across the school use."

"In both sectors more equipment is needed, and existing equipment needs replacing and updating. Teacher training, both in-service and pre-service, is also a prime requirement. Children are well-disposed towards computers, teachers less so, either because they feel incompetent, or because the available facilities are inadequate, or because they are not convinced of the educational potential."

"In 1988 it is clear that a beachhead in the schools has been established, but no more. The basic need, for more and better machinery, remains a priority that can only be met from central funding. The need for more and better educational practice is just as critical. One will not take us much further without the other. Both require central support."

<div align="right">(MacDonald et al, 1988)</div>

This was the situation immediately prior to the decision to make the teaching of IT a mandatory part of the National Curriculum. Neither the necessary resource base nor the required teacher competences were in place to enable the curriculum to be put into practice. This picture of CBL in schools was later confirmed by other surveys and estimates, including one which said that the schools needed another 150,000 machines simply to meet the ratios required by the National Curriculum.

Meanwhile, existing curriculum policy for IT was in line with the progressive ideals we have already outlined. In 1989 Her Majesty's Inspectorate had set out a broadly liberal-humanist philosophical basis for Information Technology and five specific aims:

i. *to enrich and extend learning throughout the curriculum, using the technology to support collaborative working, independent study and re-working of initial ideas as well as to enable pupils to work at a more demanding level by obviating some routine tasks;*

ii. *to help young people acquire confidence and pleasure in using IT, become familiar with some everyday applications and be able to evaluate the technology's potential and limitations;*

iii. *to encourage the flexibility and openness of mind necessary to adjust to and take advantage of, the ever-quickening pace of technological change, while being alert to the ethical implications and consequences for individuals and society;*

iv. *to harness the power of the technology to help pupils with special educational needs or physical handicaps to increase their independence and develop their interests and abilities;*

v. *to help interested pupils to undertake detailed study of computing and to design IT systems for solving problems.* (HMI, 1989, p2)

This document, perhaps anticipating a narrowing of opportunities in the forthcoming specification of the National Curriculum, emphasised the importance of Information Technology's "critical role in enhancing the learning process at all levels and across a broad range of activities including but going beyond the National Curriculum." (ibid, p.2) In the event Information Technology was incorporated in the National Curriculum in two ways.

First as Attainment Target 5 in the Technology curriculum:

Pupils should be able to use information technology to:
• communicate and handle information;
• design, develop, explore and evaluate models of real or imaginary situations;
• measure and control physical variables and movement.
They should be able to make informed judgements about the application and importance of information technology, and its effect on the quality of life.

(DES and WO, 1990, p.43)

This Attainment Target is then broken down into 39 separate statements for each of the 10 levels of Attainment. Examples of learning tasks which might be given to pupils include:

Level 3: Use a word processor to draft a class diary; use information technology, with voices or conventional instruments to make music and replay it. (ibid. p.45)

Level 8: Model and investigate the growth of bacteria using a spreadsheet, use a graph-plotting program to find a curve which fits a set of experimental data. (ibid. p.48)

Secondly, as these examples suggest, IT is to be taught, not as a discrete subject, but by teachers integrating its use as a generic tool in their teaching of a number of subjects:

Information technology should also be studied through core and other foundation subjects.   (NCC, 1989, paragraph 5.5, page 25).

This intention that every teacher should become a teacher of IT is spelt out in the non-statutory guidance which demands that schools should have both "an IT policy" and "an IT implementation plan" which should, "identify the contributions of subjects to the development of IT capability." (NCC, 1990, section C1) The parliamentary Orders for the three 'core' subjects - English, Maths and Science - include specific mentions of computer use and these are considerably expanded in the Programmes of Study which provide more detailed curriculum guidance.

Putting these policies for what should be taught, and which teachers should be involved, into practice is, of course, a different matter. Hargreaves (1991) has pointed out the scale and complexity of the demands being made on teachers. Detailed specifications of attainments targets in 3 core subjects and 7 foundation subjects for ten different levels, tied to a pattern of continuous assessment with additional Standard Assessment Tasks administered at ages 7, 11, 14 and 16, is demanding enough (particularly for primary teachers who are responsible for teaching all subjects). When 5 cross-curricular themes (not including IT) are added to that, the logistics of the problem are formidable. The content is specified, but not the organisation of teaching and learning, which in theory leaves teachers free to teach through integrated topics. In practice this becomes difficult, however, because of the need to be sure that every attainment target has been covered. On the other hand, there are obvious economies of time in integrating teaching across several subjects, and for primary teachers who are responsible for teaching the whole curriculum, this offers real benefits. (At the time when Hargreaves was writing there were 17 Attainment Targets in Science, 14 in Mathematics and 5 in English [the 3 core subjects], and five 'strands' in Technology Attainment Target 5 for Information Technology, to be taught and assessed at ten levels across the full 5-16 age range. This has since been simplified so that there are now 4 Attainment Targets in Science, 5 in Mathematics and 5 in English, but primary teachers are still faced with a formidable logistic exercise.)

The practical problems of remembering everything that should be taught and finding a time and a place to fit it into the curriculum are considerable. The response to the problem has been the production of a very large number of planner sheets and grids. Those produced especially for IT usually attempt to cross-reference "communicating", "handling information", "modelling", "measurement and control" and "evaluating applications and effect" to the attainment targets in the core and foundation subjects. For example, the *Focus on IT* pack produced by NCET in collaboration with South Glamorgan LEA (NCET, 1990) includes a summary sheet on each of these topics which lists subjects down the right hand side and codes them in each case for "strand development", "major application" or "marginal application". Physical Education, for example, is coded as a minor application for "information handling" and a major application for "measurement and control". A second wave of these planners and grids is now being produced to support assessment of information technology in the national curriculum (see, for example, *Planning for Assessment: IT and the National Curriculum*, from South Glamorgan LEA, 1992).

A more serious problem, in addition to these practical problems, is teachers' lack of the necessary knowledge and understanding of IT to plan learning tasks, using particular pieces of software, which will teach (or test) the 5 strands of the IT Attainment Target at the appropriate level for each pupil. Murray (1992) reports that in his research many teachers were unable to match named IT activities and software to national curriculum strands and gauge their level of attainment. He comments:

> "This complex inter-relationship between IT strands, software types and classroom activities clearly illustrates that a level of specialist understanding is necessary if teachers are to make sense of, and deliver, IT capability as defined in National Curriculum documentation." (ibid. p.97)

We are experiencing the inevitable legacy of a policy which invested much larger sums of money in hardware and software than in teacher training. Murray's study makes clear the scale of the need for teacher training if the National Curriculum for Information Technology is to be taught satisfactorily.

Many CBL enthusiasts have hailed the incorporation into the mandatory curriculum as the breakthrough they've been hoping for, the coercive element ensuring that it is taken seriously and spreads rapidly through teacher training and curriculum practice. That is perfectly true, but the enthusiasm is surely misplaced. Taken at its face value, that is to say treated like any other curriculum requirement - no subsidies, no more than its fair share of the £30 million which is all the Government has made available for the implementation of the national

curriculum, it would in our view constitute an abandonment of CBL to a predictable fate - poor practice, almost instant obsolescence and widespread teacher disillusion and cynicism.

Surely this is not what is intended. It doesn't make sense in terms of the Government's continuing commitment to an IT future. Of course, on the other hand, it is impossible to believe that the Government's intentions with respect to CBL support are based on a realistic calculation of the costs of institutionalising and sustaining CBL. Even ballpark figures for such an enterprise are rare, hardly surprising when one American (Lickleder, 1984) was bold enough to estimate the cost of a ten-year programme to provide and support an electronic desk for every American pupil at $130 billion. Some support will, however, be provided.

If that view is correct, then CBL will continue to be treated as an exceptional case calling for ad hoc investment by government, and that makes the experience of the past twenty years significant in terms of the lessons it has to offer about how best that commitment can effectively be discharged.

Let us look first at the lessons from the seventies that should have, and perhaps did provide a basis for investment in the eighties. We are referring here to the previously mentioned National Development Programme in CAL, a five year initiative that was evaluated by a team, under the direction of Barry MacDonald.

The Case of the National Programme as a Model Initiative

The launching of the Programme, together with its organisation and strategy marked a significant departure on the part of Government, at that time a Conservative Government, with Mrs Thatcher as Secretary of State for Education, from the established machinery and style that had for ten years dominated the curriculum development mission. Till then curriculum development had been largely left to professional control, to the so-called educational establishment, through ad hoc agencies such as, in the case of schools, the Schools Council and to a lesser and more specialised extent the National Council for Educational Technology. Now it could be said that the Programme, which encompassed further and higher education as well as schools, and industrial and military training, was too broad in its scope to be suitably allocated to any of these agencies. Much more influential than that, however, was the fact that the Government was fed up with the failure of these agencies to achieve widespread take up of their projects, which it attributed to a culture of soft-nosed persuasion and respect for teacher choice.

Perhaps even more influential was the adoption by Government of a new role for its own civil servants in government departments, the role of actively securing departmental objectives.

Managerialism had come to Whitehall, and its first embodiment was the Programme. Instead of farming out the two and a half million pound programme to the established agencies, the Government set up a task force under the management of an ad hoc committee of civil servants from the seven contributing ministries, all with a direct or indirect interest either in education or the computer industry, under the chairmanship of the Ministry of Education.

The Programme marked the beginning of hands-on control by Government, of collaboration between Ministries, and of a hard-nosed approach influenced by systems theory and management by objectives. The Committee appointed a small professional Directorate, commissioned two evaluations (the other one was financial) and invited bids for funds. Funding took the form of matched funding, by which applicants had to put up the equivalent resource commitment to that which they sought, and stepped funding, putting continuity at risk by making it dependent upon satisfactory progress at the end of each tranche. Whether or not progress was satisfactory was a matter for Committee to decide on the basis of reports by the Programme Director and the evaluators. That was basically the new model. Thirty-five projects were funded, and the Committee met five or six times a year to consider their progress.

In our Final Report to the Committee, we commented at length on the programme as a model for future government investment, since the continuation of an active government role in CBT looked essential, and in particular on its value as an instrument of public learning.

We began by conceding that at first sight the Programme appeared to be a well designed instrument. It stimulated and supported a range of computer applications in many areas of already visible development, it enabled the exploration of alternative pedagogies, it involved increasing numbers of teachers and students in these activities. Through its diverse evaluative mechanisms the Programme generated an enormous yield of information about its investments and created channels through which this information flowed regularly from the coal faces of experience to the learning centre of the organisation where it could be sifted and stored. Since this centre had direct links into the executive agencies of Government, as well as into the independent research bureaucracies, the Programme seemed to be well designed not only to fulfil its own needs for ongoing informed control but also to generate specialised expertise to guide government action in the future.

But close analysis suggested otherwise. We made a number of points.

A task force, by definition, has a terminal date, in this case the end of 1977. What happens to its expertise? The key figures to look at in this respect were those which concerned the dissipation of those whose full-time involvement in the Programme gave them opportunities

to acquire expertise, i.e. the project development staff and the Directorate. At the end only one in five of the development staff had any prospect of continuity in their institutions, and the Directorate packed their bags and departed the educational field. No doubt this dissipation was of some help to IT industry and commerce, but the point is it was no longer available to the Government.

This leads us to consider the learning capital accumulated by the permanent civil servants on the Programme Committee, a resource surely to be stored and reemployed to shape the future. There are several points to be made here. These were general administrators, not experts in the field. What is more the little time available at meetings, plus the need to get through a crowded agenda, meant they had limited opportunity to engage in more than cursory discussions of particular projects and almost no time to assimilate and distil the overall experience as it unfolded. In consequence there was a de facto delegation of responsibility for judgement to the full-time Directorate, the real centre of Programme learning with direct and continuous access to the projects and to the independent evaluation teams. But, and it is a big but, the civil servants remained accountable to their political masters for the success of a programme over which they exercised no more than boundary control. They were de facto compelled to place their trust in the Director. This placed them in a very vulnerable position - hypersensitive to criticism, resistant to self-examination, and almost invariably hostile to the policy and management aspects of the evaluation we tried to implement.

There is a further point. Even if we concede that the civil servants acquired a valuable stock of learning, that learning was itself certain to be dissipated because civil servants in the British government are moved frequently, both within departments and across ministries.

Our view, in summary, was that the Government's preference for a non-institutional and essentially ephemeral structure had paid a high price in terms of the retention of expertise for future use. By not entrusting the responsibility to the obvious candidate - The National Council for Educational Technology, which was confined to a purely administrative role with respect to the Programme, it meant that the central UK agency for educational technology had been denied an opportunity to acquire the depth of experience that might have institutionalised the management expertise which such initiatives call for.

We concluded this analysis by saying that innovation structures like the Programme, each time they are created to meet a particular need, may have to re-invent the learning wheel.

That evaluation report was neither published nor disseminated by the Government. We submitted it to the Department of Education for circulation, but it was not even disseminated to the members of the Programme Committee. We were ourselves free to publish, but we