

## 9

# A dichotomy of purpose: the effect on teachers of government initiatives in information technology

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### **Abstract**

One perspective on the last twenty years, which has seen the introduction of computers in education in the UK, is that it has been an enormously successful and dynamic time. An alternative perspective which I propose here, is that this period has been characterised by a confusion of purpose and lack of clarity of objectives. A chronology of national initiatives indicates conceptual confusion as to the role of Information Technology (IT) within schools, a dichotomy of purpose, and the shifting climate from Computer Assisted Learning (CAL) to IT skills. These initiatives have also shifted their focus away from software development, to in-service training and support through a number of short-lived agencies each with changing foci for implementation. I believe this has inhibited the success of in-service and explains the relatively infrequent use of IT by teachers in schools.

### **Keywords**

Secondary education, curriculum policies, implications, information technology, innovation, national policies

## 1 INTRODUCTION

The growing interest for over twenty years in the role of computers in education in the UK is evidenced by a sequence of national initiatives.

1. National Development Programme in Computer Assisted Learning (NDPCAL) 1973-7: 35 different projects developing and evaluating CAL materials.
2. Microelectronics in Education Programme (MEP) 1980-86: projects in curriculum development; regional centres established for training and resourcing/information.
3. Micros in Education Support Unit (MESU) 1986-8: software development, teacher training and resourcing/information support, but in different bases.

4. National Council for Educational Technology (NCET) from 1988: absorbed an older advisory body (CET) and MESU to act as the agency for a new government initiative, IT in Schools.
5. Information Technology in Schools from 1987: a new government strategy replacing national projects with various grants focused on hardware upgrades and the development of training support for teachers, advisers and trainers.
6. IT in the National Curriculum 1989-95: IT became the only "cross-curricular" subject to be incorporated into the enacted orders of the new National Curriculum (1988). At first IT was part of Technology (DES, 1990), but following the Dearing review in 1994 it was eventually identified as a separate subject (DFE, 1995).

A biennial series of statistical bulletins shows that the number of computers in schools has grown over the same period. However research suggests that IT use is not commonplace, and that there are still a number of barriers to the incorporation of IT into the syllabus.

## 2 ABSENCE OF CONSISTENCY AND DIRECTION

### 2.1 Confusion of role

NDPCAL worked with a clear pedagogic definition of Computer Assisted Learning (CAL)(Hooper, 1975), that is, using 'computers as a learning resource', and he stated that there was a distinct difference between teaching people with computers, and teaching people about computers.

MEP identified two different areas of territory to be covered. First, the investigation of the most appropriate ways of using the computer as an aid to teaching and learning, maintaining the perspective of CAL. In principle software could be developed for computer based learning across the curriculum, but the programme gave priority to applications in mathematics, the sciences, craft/design technology, geography and courses related to business and clerical occupations. The second area was the introduction of new topics in the curriculum, either as separate disciplines, or as new elements in existing subjects. These included microelectronics in control technology, electronics, computer studies, computer linked studies such as computer aided design, data logging and data processing, word processing, and the use of computers as a means of information retrieval from databases (Fothergill, 1981).

During the period 1980-88 there was a proliferation of courses in computer science and computer studies for pupils at both 14 and 16+. Teaching about the computer gained attention, and made increasing demands upon the availability of hardware. In contrast came the publication of a series of reports from subject associations, commissioned by the DES to identify the role of IT for each subject area. These universally espoused the value of CAL for their discipline. But it was a growing separation of CAL from other aspects of learning about and with the technology that I believe heralded the confusion of purpose that is apparent in subsequent curriculum documents.

## 2.2 Developing IT concepts

This apparent confusion of purpose was reflected in the documents that lie at the core of current national perspectives of IT that now influence schools. An examination of three key documents enables me to chart shifts in the definition and role of IT.

### *Information Technology from 5 - 16*

This document reflects the dual perception as it 'sets out to help schools devise a coherent strategy for making effective use of IT, both in the enrichment of existing subjects and in learning about the technology itself'. Under the aims, it states clearly that 'Although IT is only one of a host of important factors affecting society and schools today, it is unusual among current agencies of change in that it impinges directly on the learner at all ages; on the nature and content of study; and therefore on the curriculum and the teacher' (HMI, 1989). It continues by laying out a clear framework of purpose for the use of IT in schools.

'Through the use of IT in the curriculum, schools will also be helping pupils become knowledgeable about the nature of information, comfortable with the new technology and able to exploit its potential. The aims of working with IT are:

- i. to enrich and extend learning throughout the curriculum, using the technology to support collaborative learning, 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 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-quicken pace of technological change, while being alert to the ethical implications and consequences for individuals and society;
- iv. to harness the power of 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 undertake detailed study of computing and to design IT systems for solving problems.'

(HMI, 1989)

There are two distinct approaches incorporated here, with a pedagogic role at first being followed by vocational and somewhat technocentric aspects in two and three. These aims are supported by a detailed list of objectives and translated into specific issues that can be addressed. Geography, for instance, is described as 'one useful model of how IT concepts can be related to activities in various subject studies'. The aims were converted into 'IT concepts and objectives', listed as communicating, data handling, modelling etc. These, by the end of the document, have become central, and a subject is demoted to being merely a context for delivery. Thus IT concepts and skills are defined as being separate from CAL for subject-based learning.

### *Information technology in the National Curriculum*

The dichotomy noted above continues in the National Curriculum Technology document (DES, 1990); teachers are exhorted to take both approaches, but at different stages one message appears to be more important than the other.

IT is defined thus:

'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 also be able to make informed judgements about the application and importance of information technology, and its effect on the quality of life.'

(DES, 1990)

These are in effect a condensed form of the IT concepts the HMI document identified. The related programmes of study are then defined:

'In each key stage pupils should develop information technology capabilities through a range of curriculum activities which will:

- develop confidence and satisfaction in the use of information technology;
- broaden pupils' understanding of the effects of the use of information technology;
- encourage the flexibility needed to take advantage of future developments in information technology;
- enable pupils to become familiar with the computer keyboard;
- encourage the development of perseverance;
- enable pupils to take greater responsibility for their own learning, and provide opportunities for them to decide when it is appropriate to use information technology in their work.' (DES, 1990)

Although related to the HMI aims, the vocational aspects are dominant and increasingly technocentric. It is difficult to relate many of these capabilities to a subject-centred curriculum learning purpose. In the Teachers' Notes on IT in the National Curriculum (NCC, 1991) IT is referred to as a tool in the curriculum with 'a number of functions'.

### *Rewriting the National Curriculum*

By 1994 it was apparent that the attempt to maintain the dual role of IT as a tool to deliver the curriculum and as a subject with a conceptual and skills basis in its own right was under substantial strain. In the Dearing review, IT is separated from Technology (DFE, 1995):

'IT capability is characterised by an ability to use effectively IT tools and information sources to analyse, process and present information, and to model, measure and control external events. This involves:

- using information sources and IT tools to solve problems;

- using IT tools and information sources, such as computer systems and software packages to support learning in a variety of contexts;
- understanding the implications of IT for working life and society.

Pupils should be given opportunities, where appropriate, to develop and apply their IT capability in their study of National Curriculum subjects.' (DFE, 1995)

So following the familiar list of IT concepts and skills, the role of a tool to support subject-based learning has been reduced to a mere recommendation.

### **2.3 Dichotomy of purpose**

Thus it would appear that the notion of CAL has been made more diffuse by the increasing notion of separate concepts and skills of IT. It is, I believe, this which has made for problems of misunderstanding the role of IT within specific subjects. Where geography teachers may chose to use a data base to encourage pupils to pose and test hypotheses about, for example, population growth, at the same time they are being asked to teach about data retrieval and ensure that a specific and measurable IT capability is delivered. At every stage a teacher using IT has added complexity and potential conflict of purpose. Although the documents espouse the role of computers to support learning and teaching, the phrase CAL has almost completely disappeared.

It seems to me that the increasing interest in the notion of IT skills, and the shift to support the use of commercially based IT packages, is geared to prepare pupils for the world of work, and thus is more related to a vocational than a pedagogic rationale (Hawkrige, 1990). Elsewhere this has been referred to as the 'commodification' of education.

### **2.4 Disjointed teacher training**

Since 1980 in-service education has been a part of the national strategy for bringing about the IT revolution in schools. But as with the articulation of the purpose of educational computing, every few years the style and means of implementation has changed.

In MEP teacher training was focused on initial awareness courses to be followed by longer (up to one week) and further (up to three months) specialist courses. The majority of these were to be delivered through new regional centres, not existing institutional bases. A large numbers of teachers attended awareness courses, and the director of MEP, Fothergill, claimed that a quarter of all teachers in UK had been on an MEP in-service training (INSET) course and used computer based learning materials. But it is clear that the impact of their training was minimal. Indeed, Her Majesty's Inspectorate (HMI) reported that 'too late in the day, did they address a major need: to see the role of the new technology through the eyes of the uncommitted classroom teacher and assess the likely contribution which IT was observed to be making to learning in ordinary lessons' (1987). Although there had been successes, these 'need to be seen against a background where the majority of pupils and teachers rarely used microcomputers'. HMI commented on the 'cascade' approach to INSET: 'some teachers were unable to obtain sufficient time on return to school to cascade'. During any school visit, HMI also found that where teachers were

using or teaching about the new technology, their initial training had in only rare instances provided a foundation in IT work.

In MESU the dissemination mechanism changed. Working directly with Local Education Authorities (LEAs) and higher education institutions, the focus shifted on 'training the trainers' rather than engaging directly with teachers in schools. The software development component rapidly shifted to the development of courses and training materials for advisory teachers. In 1988 the new IT in Schools initiative was announced, as a 'major new strategy on new technology in schools'. MESU was closed; the central thrust of the strategy to be serviced by NCET, focused almost exclusively on in-service training. Software development was not mentioned, which heralded the subsequent emphasis on the role of general purpose, commercially designed packages for curriculum delivery. Different course materials were produced which replaced the earlier ones with the curriculum emphasis.

By the late eighties there was an increasing perception that the training provision, both in-service and pre-service, had been piecemeal and ineffective. A survey of IT use in schools (DES, 1989) showed that although half the teachers in secondary schools had been on initial awareness training, less than 25% reported to have made significant use of computers, except those in computer and business studies, and on average less than 10% reported that IT made a substantial contribution to teaching and learning. The Trotter Report (1989) painted a woeful picture, claiming that most aspects of the initial teacher training system were not equipped to keep pace with and make a proper contribution to the developments in IT use in schools. The Parliamentary Office for Science and Technology report (POST, 1989) was critical of aspects of policy and in particular a lack of clarity of objective and consistency of strategy.

A substantial proportion of the IT in schools grants initiatives in the mid-nineties still focus on training courses and materials, in recognition of the failures of the last fifteen years. The changing perception of a role for IT in the curriculum has created a confusing pattern in which classroom teachers find themselves exhorted to use the new technologies.

### 3 THE REALITY IN SCHOOLS

The effect of this confusion and ever-shifting perceptions may be one reason for the evidence of relatively little take-up and regular use of CAL or IT skills in schools. The latest statistical bulletin, (DFE, 1995) shows still less than 10% of teachers (apart from those of computer and business studies) reported IT making a substantial contribution to teaching and learning; little change in the last six years.

ImpacT was a major national research project, 1989-1992, that engaged in a longitudinal in-depth research study on the role of IT in pupils' learning (Watson, 1993). Despite extensive monitoring of resources and use, little discernible difference in effect was established between classes with widely different resourcing. The effects of IT use on pupils' learning was only clearly established in two subjects, mathematics and geography. The overall message from the ImpacT project was that while some valuable IT work was taking place in subject classrooms, this was not happening widely. Where it was happening, the role and perceptions of the teacher, above all other variables, was critical.

The case study component of the project enabled a more detailed exploration of the motivations behind those teachers who did use IT. It was the keen IT users who managed, despite considerable organisational difficulties, to obtain access to resources and who were flexible in their approach to its use. Often it was only their interest which persuaded schools to take advantage of hardware purchase schemes. In particular it was these teachers who recognised and enjoyed the pedagogic potential of IT because it related to their own philosophical underpinnings about teaching, and the nature of their subject. Few of these teachers had been on any in-service courses associated with the national initiatives. They were at home with CAL; they 'taught with computers' rather than 'delivered IT'.

But the schools themselves and their colleagues did not display such confidence. Rather they reflected all the confusions of national policy on the ground. Headteachers and school prospectuses extolled the virtues of computers to enhance subject learning. But in these same schools the computer rooms were almost universally booked for business information skills, and basic IT skills courses. Pupils would 'do' a term of word processing, but not then use the application again for any normal curriculum work. Recent OFSTED (1995) inspection reports confirm that IT has barely impacted upon the work of teachers and pupils. Following the Dearing review there is a real danger that IT will become the domain of specialist teachers.

While there are strong economic and social pressures for incorporating IT into schooling, there are also resistances. Skillbeck (1975) distinguishes between curriculum change that may be planned by the participants who wish to change the situation for their own satisfaction, and change which is haphazard, which the participant may choose to accept or reject. He draws a further distinction between change that builds upon the established system, and change which by being more disruptive and comprehensive provides genuine innovation. The fact that the introduction of IT can be defined as both hazardous and disruptive contributes to the problems of incorporating it into the school curriculum.

It is my contention that the range of government initiatives has simply made the process more complex and haphazard. The confusion over the role and purpose is mirrored in schools; the piecemeal and inconsistent in-service provision appears to have left little impact upon the profession itself. There is a role for both computer assisted learning and the developing of IT skills and concepts in the curriculum. But it is still only those teachers who have a clear personal professional commitment to using computers for their own pedagogic ends who have brought about the only real change discernible in schools.

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## 5 BIOGRAPHY

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