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CHAPTER EIGHT
A FOLLOW UP PROGRAMME

We have already seen that the Microelectronics Education Programme is emphasising, in the school sector, the paramount importance of staff training as the initial 'pump priming' stage in curriculum reform. Pre-service teacher training has a bad reputation with regard to the way it caters for training in the use of innovative teaching methods and, in particular, the use of educational technology. Podemski (1981) argues that

"... most teachers lack the ability and the commitment necessary to alter their instructional techniques to accommodate the computer.

Because teachers typically do not receive training in computer technologies, they are not likely, later, to explore the instructional implications of these technologies."

According to Moore & Hunt (1980), teacher educators have created a resistance among teachers to the use of instructional technology because they themselves do not provide, on the whole, good models of teaching technique and the use of new teaching media. And, as they observe,

"The old cliché 'teachers teach as they are taught' may be even more valid where the use of media is concerned."

In the short to medium term, an extensive in-service programme of teacher training is needed to update teaching methods and to encourage appropriate school based curriculum development. This need is, of course, articulated by those responsible for the government's MEP operation (DES, 1981a)

"Teachers require both information about electronics and professional skills to apply the technology effectively in the classroom. The training of teachers, both in-service and pre-service, must therefore be organised in such a way as to

support the curriculum changes envisaged ...

Training is required at a number of levels ..."

The MEP strategy envisages training being provided at five levels :-

1. GENERAL AWARENESS AND FAMILIARISATION

1 - 3 days (or part time equivalent) for teachers of all kinds, but especially for those whose daily work may have less apparent applications for microelectronics than others

2. SHORT SPECIALIST FAMILIARISATION COURSES

Up to one week (or part time equivalent) for teachers who have been 'enthused by the awareness course' or who may wish to modify their subject teaching

3. LONGER SPECIALIST COURSES

Up to three months (or part time equivalent) for teachers requiring additional training in particular fields

4. REFRESHER COURSES FOR ADVISERS AND TRAINERS

5. LONGER DIPLOMA OR DEGREE COURSES

A variety of in-service courses are already run in colleges, teacher centres and universities, but their spread across the country and their range and content are non-uniform. Longworth describes existing provision as

"... a hotch-potch of inadequate training, narrow specialisation and lack of real life foundation on which to base an educational structure."

Fundamental in the MEP strategy is the rationalisation of this existing provision and its structuring to form the regional networks through which we have seen it intends to achieve its project aims. Throughout the country, appropriate centres and trainers are being identified and in-service training courses established on a pilot basis. FE centres are expected to cater for a significant proportion of this provision. Lancashire, having made an unsuccessful bid to act as one of the 14 MEP regional centres, will now cooperate with the metropolitan counties of Greater Manchester in the MEP regional structure. The main regional centre is to be located at the Didsbury campus of Manchester Polytechnic, but the distances, and numbers of teachers, involved in such a large geographical region make it inevitable that there will be a proliferation of in-service centres. Blackpool & Fylde College is already providing in-service training courses for school teachers on behalf of Lancashire County. At present, courses approximating to the first two levels identified by the MEP are being run - a five week 'familiarisation' course, and a ten week follow-up course concentrating on programming skills and project applications. Both of these are run on a part time basis, at two hours tuition per week. Plans are at a development stage to run a longer, applications based, course involving about 200 hours tuition over the period of one or two years. This course would equate to the third level of training identified by MEP. There is no intention to mount training courses aimed at the remaining two training levels at present. Whilst the courses presently provided are aimed at secondary school teachers, college staff may, and do, apply to attend them since there is no formal provision made inside the college for staff as yet.

MESSAGES

According to Humphries et al (1980) there are five categories of 'message' involved in the dissemination of educational change. The messages concern

- A Knowledge of new subject matter or new technologies.
- B Knowledge of new administrative procedures.
- C New curriculum skills.
- D New curriculum materials.
- E New curriculum outlooks

It is a major problem, in terms of the 'complexity' of the innovation that Dalin (1978) refers to, that CAL innovation can involve each of these five areas of change and 'message transmission'. All messages need a sender. Who are to be the senders of the messages in this case? Educational computing development requires expertise in both technical and pedagogical skills, and it may involve reorganisation of existing methods and the development of a whole range of new teaching materials. The 'trainers' must be capable of coping with the mistrust of teachers in non-technical areas; this mistrust has been built up, according to Longworth (1981) by years of

"... obsession with the technology and with programming skills to the detriment of the applications ..."

Such trainers do not yet exist in numbers, and there is a danger that training may be trivially over generalised on one hand, or over technical on the other. Teachers

need to be able to do things with microcomputers; overemphasis in either direction will limit the achievement of this aim.

In no other area of teacher training can success be more dependent on the availability of adequate facilities and appropriate materials. It simply is not possible to TALK about the use of computers in education, it has to be demonstrated and experienced in 'hands on' sessions. Access to a sufficient number, and sufficient variety, of machines is essential for any in-service provision. Such facilities are in short supply still, and present a real logistic barrier to rapid implementation of extensive training programmes. The availability of microcomputer network facilities, providing a relatively inexpensive parallel of the language laboratory, is probably required to facilitate such programmes. The imminent arrival of the Acorn built BBC microcomputer, and the accompanying television series and software (BBC, 1981), is of tremendous significance in this respect - particularly since the machine forming the basis for this system is one of the two eligible for the Department of Industry matched funding scheme when purchased by schools (see Appendix B). Laboratories, with fifteen to twenty of these machines linked to a large disk store for programs, as well as to the tutor's machine, will allow teachers to practice programming skills or to experiment with CAL materials. Such a network would provide for a combination of group and individual work that is not feasible at present. A well stocked software library, with accompanying documentation and courseware must be available, either within the training institution, or through links with the regional network centres being established by the MEP which is making considerable efforts to improve the distribution of educational software (CET, 1981).

This section has pointed to certain problems and particular needs inherent in the task of training for educational computing based staff development. With these in mind, we can now move to the examination of specific proposals for in-service development programmes.

A FRAMEWORK FOR IN-SERVICE COURSES

Jones (1980) has presented a framework for in-service courses at two levels. He recommends initial 'attitude training' through the use of video tapes of programmes like 'The Chips Are Down', coupled with the provision of stimulating pre-course reading such as the CET booklet 'Microelectronics : Their Implications for Education & Training' (CET, 1978). This sensitisation should then be followed up as quickly as possible by in-service courses at one of two levels : Level I courses at 'area' level for head teachers and other interested teachers, withg Level II courses being provided in each institution by that institution's representatives at the Level I course. The common features of all such courses should be a demonstration, some 'hands on' workshop practice and a lecture. The function of the lecture in this structure should be, Jones says, 'To explain what a computer is'. That is to say, some brief analysis of the hardware components' function is required to provide the intending user of the equipment with sufficient knowledge to allow for confident handling of the equipment. The use of 35mm transparencies and otrher explanatory aids could be beneficailly included at this stage. The demonstration component, using the hardware actually available to the teachers, is of crucial importance.

It should :-

1. emphasise the simplicity of LOADING a program
2. RUN a program of an introductory, interactive nature
3. show the listing (and printout) of the program
4. present a variety of programs from areas across the curriculum

One is reminded of the description of teachers by Doyle & Ponder as 'pragmatic sceptics' whose concern for 'immediate contingencies and consequences' makes them sympathetic towards change proposals which can be seen as 'practical'. Only if proposals are seen as concerned with, and sensitive to, the needs of classroom practice will they be taken seriously. Teachers, it is claimed, will simply not be interested in proposals presented in terms of abstract or general principles and goals.

"Teachers don't have time 'within the situation' to translate principles and goals into concrete procedures for realising them. Because classroom environments are complex and difficult to predict, teachers tend to be oriented towards the concrete procedure rather than the procedural principle."

Opportunity to try out the various computer based applications should therefore be provided, and comments and critical discussion invited, in order that practical problems of implementation should be fully anticipated. 'Hands on' sessions should be provided for two reasons. First, in order to allow teachers to perform at least some measure of elementary programming in BASIC. The experience of having actually controlled the machine by writing and running a computer program, however simple, is invaluable. Without it, there will be, even with the best available educational

software, a lack of confidence and an element of threat presented by the machine. BASIC is an easy programming language in which to write simple programs, and, having mastered a half dozen or so fundamental operations, teachers can produce workable programs. An outline of programming concepts that should be included in a simple familiarisation course is presented as Appendix N. A second function of the 'hands on' sessions should be to provide teachers with the opportunity of seeing CAL materials from the 'student's eye view'. Practical aspects of CAL software design, such as the importance of simple screen layout when information is presented to the user, will only be apparent to the teacher/designer if he sits down at the machine and follows CAL sessions unaided. Following the acquisition of certain skills in BASIC, such sessions will take on extra value as teachers become able to see ways in which they can adapt available software to suit their specific needs. It represents an excellent opportunity to observe the degree to which CAL materials may be made 'transparent' to the user, requiring no technical skill in computing for successful operation of the programs. At the same time, teachers may begin to see (if the learning environment is thoughtfully prepared) how CAL may promote student interaction rather than suppress it. Group projects and exercises should be used to counteract the belief expressed by a significant majority of questionnaire respondents that using CAL meant missing out on such interaction.

A COURSE PROPOSAL

Any course proposal should make mention of its character in respect of the following questions :-

1. Who will be the students ?
2. What are the aims and objectives ?
3. What will be the content of the course ?
4. How will the learning experiences be arranged ?
5. How will the assessment be carried out ?
6. Who will be teaching the course ?

The students for the introductory familiarisation courses should be drawn, initially at least, from those members of staff who have had no, or very little, experience with microcomputers. If any problem of recruitment occurs, those respondents to the questionnaire who indicated their desire for some training may be approached directly. Since the need for 'microelectronics awareness' is universal, there need be no selection of course members on the basis of work area. For more advanced courses, with higher demands on programming skill, it may be necessary to identify certain areas of college provision (e.g., business studies, production control, graphics/technical illustration) as priority areas. It is highly likely that the existing pressure of demand on scarce hardware and teaching expertise resources will continue : the priority areas would be those within which an urgent need exists to stimulate the development of new methods to match changing industrial and commercial practice.

The aims of an introductory course should be to build familiarity with the nature and operation of microcomputers and to develop a favourable attitude towards their use as an educational tool. To pursue the first of these aims, objectives may be defined to cover the operation of a particular machine and the simple skills of BASIC programming. The second aim is rather less easy to develop operational objectives for, but it is felt that negative attitudes to the use of machines in the ways now proposed (i.e., for CAL as opposed to CAI) stem largely from ignorance of the true nature of CAL. Accordingly, attention to familiarisation will be likely to result in improved attitudes at the same time.

A course of ten hours tuition, spread over five weeks, represents an adequate introduction to the field. Given the existing commitments of suitable course tutors in the college, it is unlikely that more than one such course could be in operation at any given time. Courses of five weeks duration could be mounted four times during the academic year. This means that, with a maximum class size of 20 students, the majority of questionnaire respondents who fall into the group wishing for training and having little previous experience could be given some training within one year. The content of this course would, of necessity, be limited in scope. The following course structure is proposed :-

Week 1

Summary of historical development of computers and educational computing; outline explanation of the components of hardware using the Apple II Plus as the demonstration system; demonstration of program loading, running, listing and printout on the same machine.

Week 2

Demonstration of CAL software from Schools Council Project;

demonstration of Faculty of Academic Studies student records system; use of the Applewriter word processing package and graphics tablet for the preparation of a student handout.

Week 3

Programming Session 1 - 'hands on' using PETs or BBC network and related structured worksheets; selection of elementary 'project' theme from a limited choice.

Week 4

Programming Session 2 - 'hands on' using PETs or BBC network and related structured worksheets.

Week 5

Project analysis; further programming techniques and course evaluation session.

The structure outlined above combines the three elements recommended by Jones, namely lecture, demonstration and 'hands on' workshop in an attempt to provide a balance of learning experiences. The hope is that, even in the absence of early follow-up training courses, there will be enough guidance provided to allow those keen to go further to be able to work with machines themselves and to explore the availability of CAL materials in their own subject areas.

It is not proposed that any formal assessment should be attempted - it would be quite inappropriate to a short course such as this. In the case of longer, higher level, courses consideration will be given to the possibility of arranging for recognised certification by agencies such as the CET. Educational computing skills will be at a premium in years to come and it will be in the interest of teachers, students and institutions alike that the certification should be based on a well planned assessment programme which encourages the development of an appropriate

blend of theoretical knowledge and practical skills. Educational computing in schools and colleges is still in its infancy and, since the skills involved are themselves not yet fully defined, it is unclear at present what form the most appropriate assessment of such longer courses would take.

A conscious effort should be made to recruit course tutors who have a broad view of the role of computers in education and have, themselves, experience in a range of areas of teaching. In this area of development more than most, the 'specialist' approach is likely to alienate potential users of the technology. The widely perceived link between computing and mathematics/pure science is now more real in people's minds than in practice, but it, nevertheless, has a powerful influence on the degree of relevance that the computer is perceived by individuals as having for their own classroom practice. Sensitive handling of the first 'familiarisation' experience of teachers from those less typically computer oriented fields such as the social sciences or modern languages might well be most influential in stimulating further commitment to exploration of educational computing's role in their teaching areas.

FOLLOW UP

During the first term of the academic year 1981-1982, those questionnaire respondents wishing to take advantage of in-service training opportunities will be circulated with details of courses currently available, inside and outside the college. Armed with the questionnaire responses as evidence of widespread interest, negotiations are in hand to arrange County financial support for an ongoing staff development course programme. The same evidence is being used as support in internal and external discussions on the subject of the college's acquisition of a BBC Microcomputer networked laboratory - such a facility, though not strictly essential, would very considerably enhance our ability to provide familiarisation and advanced courses for both our own staff and for the region's school teachers. Our proposed long course, 'Classroom Computing' (see Appendix O), is being designed on the assumption that such a facility will be available. Expansion of the preliminary draft outline produced so far is anticipated by Christmas 1981, with an intention to start the one year course in September 1982. It is expected that this expanded proposal will follow the lines suggested by the Computer Education Group for the 'Computers in Education' component of their proposed National Diploma in Computer Education. The relevant section of their proposal is presented here as Appendix P. Its content and proposed time allocations are comparable with those in the Blackpool proposal.

In the national Microelectronics Education Programme, broad regional development is being accompanied by the support of particular projects in institutions with particular interests and active projects. Similarly, within the college, the attempt to provide for large scale staff development is likely to be accompanied by support for specific projects. A number of these exist (see Appendix M) and the energy based development may serve as an example of them. In addition to the inter-faculty project on the micro-based temperature monitoring system referred to earlier, negotiations have been entered into with agencies such as the British Gas Corporation, British Petroleum and the Department of Energy for the development of CAL software and courseware on the theme of energy conservation. The motivation for seeking such contracts is frankly one of building prestige. It is hoped and expected that successful involvement in projects producing CAL materials for national distribution would act as a stimulus for CAL development in a range of areas in the college curriculum. The proposed character of such development is illustrated by the submission to the British Gas Corporation included as Appendix L of this document.

POSTSCRIPT

THE FUTURE

The future is very exciting, for there are many opportunities which we have not so much missed as as not had time for. Because it is all so new, there is no tradition to build on which means that everything we touch is so painfully slow, and there are so many mistakes with so much that must be thrown away. At times this is a little depressing, but a rational voice continually whispers that we learn as much from our mistakes as we do from our successes.

The lack of tradition we exploit so that we have degrees of freedom, and, as our computing community grows, we have a larger group of people to share the work." (Tagg, 1980)