CHAPTER SIX
ONE COLLEGE

The College p.91

The Experience So Far p.92

One Machine : A Case Study p.95

The Situation p.99

THE COLLEGE

In this section of the study Blackpool & Fylde college's experiences in educational computing will be summarised, and the implications of current developments on the college's future activities assessed. The college is a large institution with 370 full-time teaching staff and over 3000 full-time equivalent students. Courses in the college cover the full range of full=time and part-time further education, from craft level up to high grade professional courses. Their provision is organised on a faculty basis, according to their vocational bias. There is a large GCE operation catering for 500 full-time students on straightforward O and A level courses, which parallel provision in the 6th form colleges, and for a sizeable number part time day and evening students. Additionally, a number of vocationally linked courses having a significant GCE component are provided for pre-nursing, drama and secretarial students - 250 students are currently enrolled as full time students on such courses. The college frequently acts as a focus for general community programmes, for example the Adult Literacy scheme, and, as an Open University study centre and Open College participant, provides the regional community with a range of services additional to its formal academic and vocational courses. It is already clear from enquiries from the general public, and from teachers in schools in the region, that there is wide interest in computers and their use. All computing facilities in the college will be fully used, with courses scheduled each day and evening for the academic year 1981-1982. It is anticipated that there will be a need to provide extensive in-service training opportunities, for college staff and for school teachers, to cater for the curriculum implications of this interest.

THE EXPERIENCE SO FAR

Whilst computing and computers have always been of interest, from an academic point of view, to a sizeable number of college staff, practical involvement at Blackpol is comparatively recent in origin. Historically, computing had developed in two institutions in the Lancashire region (Preston Polytechnic and Blackburn College of Technology) with a commitment on the part of these two institutions to provide a service to other FE centres in the county via batch processing, or the use of remote teletype terminals. In practice, shared access allowing Blackpool to use terminals did not become available until late 1978. In view of the increased importance of computer use, and their rapidly reducing cost, the college began, in early 1978, to put pressure on the County committee dealing with computer requirements in FE to relax existing controls on computer purchase in order that the college might purchase some mini- or microcomputer equipment - the case being made at that time for the use of the equipment in a curriculum and an administrative role. The controls were relaxed and the equipment began to arrive. By October 1978, when a County circular determined the distribution of such equipment in the various colleges, three had machines (Blackpool(4), Lytham St. Annes(1) and Blackburn(1)). At the end of the academic year 1978-1979 an amalgamation of the Blackpool & Lytham St. Annes Colleges into the new Blackpool & Fylde College led to the existence of a pool of equipment, and a sizeable team of involved staff. Documents included in Appendices I,J & K illustrate the kinds

of development in educational computing that were being talked about, or achieved, during the ensuing two years. During this time there has been a continuing commitment to investment in computer hardware resources amongst members of the college management team. This has resulted in the college's acquisition of a hardware base that is quite capable of supporting a considerable amount of curriculum development. The detailed breakdown of the location of the equipment which is included in Appendix C shows a strong concentration in two faculties, The Faculty of Academic Studies and the Faculty of Construction & Engineering. There is a limited amount of equipment in use in each of the other faculties also.

There has been rapid growth in the provision of electronics and computing courses in the college; courses for teachers, hospital and fire service staff have been run, as well as a variety of specialist programming courses. New staff with technical experience in computing have been appointed, and a college coordinator for computing made responsible for harmonising developments across the institution. There is no computing department as such - rather, the use of the computer as a tool is thought to be a necessary development theme for each and every department. Nevertheless, a pattern of interests and responsibilities is emerging. The development of hardware based education and training is concentrated in the engineering departments, whilst programming, teacher courses and CAL development are mainly provided by the science department. Involved staff across the college cooperate in catering for the frequent requests received for the provision of seminars and demonstrations for local business and industrial concerns. It should be emphasised that, at present, the main part of the computer use is NOT for CAL

across the curriculum. More machine hours are used for 'hands on' practice in programming skills and the development of projects by computer science students than for any other purpose. However, CAL is being used in increasing amounts. The Schools Council Computers in the Curriculum materials for physics, economics, biology and home heating are being used in classrooms, principally with GCE students, on a regular basis. The software for these materials has been adapted by the staff using them (none of whom have any formal training in computer programming or computer science) to run on a variety of microcomputers – much recent work on the adaptation of Schools Council materials has been done forthe Apple II machine. Packages for geography and chemistry are likely to be used during the coming year, and some useful statistical programs accompanying the biology package will be made available tio students carrying out projects in psychology which require extensive data processing. The CAL materials available do clearly provide 'add on' experiences which are used for enrichment purposes primarily. However, their nature is such that they can provide a focus for open ended project work. The availability of revelatory mode CAL programs on diet and home heating for students in GCE Human Biology and Environmental Science groups has led to a number of these students constructing original investigations which involve use of computer programs.

ONE MACHINE : A CASE STUDY

There has been no planned development of CAL in the college to date. Its adoption has occurred piecemeal. Accordingly, there has been no formal attempt to evaluate its use. In any event, the small number of students so far involved would make any quantitative analysis of its effects suspect. However, a degree of anecdotal evidence can be provided.

A microcomputer system was purchased in June 1980 by the Physical Sciences section of the science department. The machine was located in a small room adjoining the environmental science laboratory. Whilst available to any member of staff or student, the machine was specifically excluded from the stock of equipment permanently available for use in computing courses. It was to serve as a proving machine for experimentation with CAL, faculty records, registration and timetabling and as a testbed for any other idea that someone might have for using computers in an educational application. The system needed for such a potential range of applications had to be versatile - after careful assessment of alternative machines, it was decided to buy an Apple II Plus system with twin disk drives for extended storage, 48K of memory, a graphics tablet and printer, and a sizeable library of software (including all the Computers in the Curriculum materials). The £3000 spent on the system has had truly unquantifiable benefits - it is literally impossible to put a value on the staff learning and support it has provided, nor on the progress its presence has encouraged in the introduction of computer based records systems. Additionally, as a popular demonstration system, it has been used in numerous

public open demonstrations, in staff seminars and teachers courses to provide many people with their first inklings of what the 'new technology' can provide for them.

Students, on the whole, enjoy using the machine. In order to take their turn to use the heat loss/fuel costs program, Home Heating, to process data they had acquired from fieldwork, students would frequently stay in over lunch, or behind after hours. After a moderate amount of instruction in keyboard skills, the first students involved found no difficulty using the package. From there on, students 'in the know' tutored their peers until they all knew how to operate the machine satisfactorily. Occasionally, students not following the environmental science course would wander into the lab to observe proceedings and to ask questions about the program and the machine. Conversation with the students regularly involved revealed that they had talked with friends and parents about the projects and were obviously quite proud of the fact that they had 'been using the computer' - Hawthorne effect might well be a contributing factor in the apparent success of the experiment.

Some evidence of quite advanced learning emerged. One young man, having compared his family's gas bills with the machine's predictions of heating costs over a period of some weeks, complained that something was wrong with the computer. Despite having carefully gone over the input data for his home's construction and dimensions, there was still a significant discrepancy between predicted and actual costs. This puzzled both student and lecturer for some time, until it was realised that inappropriate data for average internal temperature were being used by the machine. As soon as the correct data were

substituted, machine predictions looked more reasonable. That particular student learned a good deal as a result, and not only about heat loss and fuel bills. Ignorant as he was of Kemmis's distinction between revelatory and conjectural CAL, the mistrust of the results the machine supplied him with had caused him to question the model built into the CAL program. In doing so, his learning moved onto a higher plane. The next logical step would have been (had not exams and the end of the college year intervened) to amend the model conjecturally, by adapting the program. The scope for development of microcomputer based energy work of this kind has recently been made in a paper presented to the first International Conference on Energy Education (Gray, 1981), and delegates at that conference indicated that parallel development of energy based CAL is proving useful in the USA as well.

The same young man, along with several of his peers, mastered the use of the machine in its word processor role in order to produce handsome questionnaires for project work being carried out at ICI, where the students felt their documents would need 'to look good'. A class investiagtion of migration into the Fylde required questionnaires for a sample of 400. Again, the micro was used for its word processor capability - multiple Banda masters could be produced from a single disk file, and these could then be used to run off spirit duplicates cheaply for the whole student group to use. As emphasised earlier, such 'emancipatory' use of the machine is one of its most attractive features educationally. At Blackpool, microcomputers, including the proving machine, are now used routinely by a number of staff for the production of all their course notes and handouts, as well as memoranda, reports and correspondence. As with the CAL itself, such facilities provide the

opportunity for both staff and students to do things that otherwise they couldn't have done, or wouldn't have had the time or skill to do.

In similar vein, work in the energy education field has pointed to the need for extended regular monitoring of temperatures inside the college buildings. Previous student attempts to maintain regular records have floundered as weekends and holidays (and, the sheer boredom of doing the same thing a thousand times!) have had their effects on the records' completeness. Whilst students on one course have a need to acquire this reliable temperature data, there are students on other courses in the college whose practical training equips them to construct electronic devices that could do the job ! Currently, students following a one year MSC sponsored course in microelectronics are designing and hoping to produce a portable and automatic temperature recorder capable of storing seven weeks of hourly temperature readings. This device, when full, would be debriefed into the Apple, which would then store and process the data. The machine would then print out tables and graphs for the environmental science student to use - for him the authentic labour consists of their analysis rather than the data collection. It is hoped to present the details of this project's origin and development to the Micros in Education conference being held at Lancaster in March 1982 (Farnworth & Gray, In Preparation). What is achieved by such projects ? Realistic project work for both groups of students and an object lesson for the students in how groups of people with varying skills and training combine to solve a problem - what better educational outcome could there be than that ?

THE SITUATION

The anecdotal flavour of the preceding section reflects the uniqueness and small scale nature of the operation described, but there are other unique operations taking place in this infant development area. The work on computer assisted graphic design in the Faculty of Art (see Appendix K) and the development of process control devices in the Faculty of Construction & Engineering would be described in the same way by their originators. Dalin (1978) points out that, in attempting to analyse an institution's capacity for adaptation and development, two variable features of the institution are of interest - its creativity and its capacity to use innovations from outside, to adopt them. He claims that one can recognise an institution's position, albeit rather imprecisely, with respect to steps along these variable dimensions.

THE INSTITUTION'S CREATIVITY

1. Individuals within the institution are conscious of their own needs for renewal.

2. Sub-groups within the institution have expressed needs for change which are common to oter sub-groups or are in conflict with the needs of other sub-groups.

3. The institution has been able to adopt a plan for renewal and is developing motivation for institutional growth - the original innovative ideas are already undergoing change.

4. The institution is developing its capacity or ability for self development - new talents as well as alternative ideas develop.

5. The institution is actually managing a self-renewal process with, or without, external help.

THE INSTITUTION'S ADAPTABILITY

1. Individuals within the institution have knowledge about external innovative ideas and concerns (political, economic, social, educational).

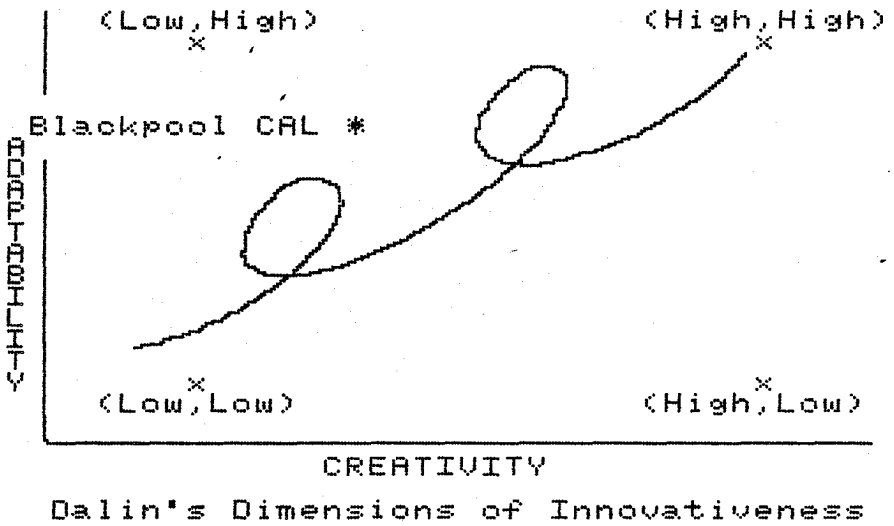
2. Individuals within the institution are motivated to implement external innovations and are actively seeking information.

3. Knowledge is shared among individuals and sub-groups, and motivation to implement outside innovations is growing and developing within the institution. Since the institution is basically 'survival oriented', a process of 'negotiation' and adaptation modifies the innovation.

4. The institution is developing its capacity and ability to use the external innovation, and to maximise those aspects of the innovation which concern the institution (or sub-groups) most.

5. The institution is successfully managing the externally developed innovation. Alterations of the innovation and unintended effects are the norm.

6. The institution has an on-going implemented programme, is being evaluated and is willing to negotiate, re-design and change its own practices according to external demands.



Dalin's Dimensions of Innovativeness

The overall innovative character of Blackpool & Fylde College has been argued in a previous study (Gray, 1979) which used the characteristics identified by Shipman (1973) and Miles (1965) as standards for comparison. As an institution, the college would probably lie well up to the top right of Dalin's diagram - highly creative, and equally keen to use others' ideas as well. However, in the field of educational computing, the college is a late starter. The institution probably ranks at the second step on the creativity dimension Dalin describes and at the fourth on the adaptation dimension. According to Dalin, that marks an institution which has, in respect of the particular innovation concerned,

> "... a low self awareness, a low degree of ownership of the innovation, a high dependency on external assistance, a high degree of adoption. This position can be called 'maximum adoption'."

In respect of the CAL innovation, this description is probably not too far from the truth ... there is still a lot to learn before creativity can really flourish. Subsequent sections of this study will attempt to estimate, on the basis of a more representative college sample, the degree of interest and experience that there is in educational computing use which would contribute to the 'climate of acceptance' that CAL expansion would meet in the college today.