MICROELECTRONICS AND PUPILS WITH SPECIAL EDUCATIONAL NEEDS

SUPPORT MATERIAL FOR THE IN-SERVICE TRAINING OF TEACHERS

TUTOR'S NOTES

John Garrett and Bob Dyke

Microelectronics and pupils with special educational needs

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Microelectronics and pupils with special educational needs

Support material for the in-service training of teachers

Tutor's notes

John Garrett *and* Bob Dyke

with illustrations by Pat Clarke

Manchester University Press

Published by Manchester University Press
Oxford Road, Manchester, M13 9PL, UK

Distributed exclusively in the USA and Canada by St. Martin's Press, Inc.,
175 Fifth Avenue, New York, NY 10010, USA

British Library cataloguing in publication data
Microelectronics and pupils with special educational needs. – (An Impact inset pack).
Some support material for the in-service training of teachers: tutor's notes
1. Exceptional children – Education – Great Britain – Data processing 2. Computer-assisted instruction – Great Britain
I. Garrett, John II. Dyke, Bob III. Series
371.9'045 LC3986.G7

Library of Congress cataloging in publication data
Garrett, John, 1922–
Microelectronics and pupils with special educational needs : some support material for the in-service training of teachers : tutor's notes / John Garrett and Bob Dyke.
p. cm. — (An Impact inset pack)
Bibliography: p. 69.
Includes index.
ISBN 0-7190-2489-7 : $30.00 (U.S. : est.)
1. Special education—Computer-assisted instruction. I. Dyke, Bob. II. Title. III. Series.
LC3969.5.G37 1988
371.9'043—dc19 88-31874

ISBN 0 7190 2489 7

Photoset in Linotron Times
by Northern Phototypesetting Co, Bolton

Printed in Great Britain
by Bell and Bain Ltd, Glasgow

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Series preface

Packages in the Impact series are designed to enable materials generated from short courses in special educational needs to be made available to a wider audience. The materials have been developed by the course tutors with assistance from Project Impact, a research project funded by the Department of Education and Science and concerned with the development and evaluation of short courses. Each course has been evaluated twice, enabling materials to be modified in the light of the findings from the first evaluation. This package therefore contains the materials included in the second evaluated run of the course and further modified in response to feedback from course participants.

The Impact series covers a variety of topics relating to special educational needs and, although primarily aimed at educational staff in ordinary and special schools, it is likely to be of interest to many other professionals including health, social services and voluntary agency personnel. The materials are intended to be used as part of tutor-led courses and are therefore aimed at those with responsibility for staff development, but may also provide reading materials of more general interest. It should be acknowledged that discussions in a tutor-led course will help the participants towards a deeper understanding of the issues dealt with in the Impact packages.

Preface

Microelectronics and pupils with special educational needs is derived from a course which has, as a main focus, the development of programmes for running in-service courses. The course has been run on several occasions but in each case as a one-week residential block. They have been run by the Council for Educational Technology as part of the Microelectronics in Education Programme.

The package does not seek to provide a blueprint for repetition of the CET/MEP course (though a timetable and brief details which may be of value to persons in a position to run similar courses are given at the end of Section 4). The material is, however, directly derived from the courses in that it reflects the experience of running them. In particular, the examples of course models covered in the package are derived from course members in workshop sessions on the courses as are the examples in *Support material for use with content-free software* which makes up the other book in this package.

Acknowledgements

We are indebted to many who have contributed to the courses as lecturers, tutors, leaders and course members. All have participated fully in study groups, workshops and other sessions and have shared the results of their labours with their fellow students. Some of their work is included in this pack. We are particularly grateful to Nic Nicholls for his support and practical help.

John Garrett, Bob Dyke and Mary H. Hope

Series editors' acknowledgements

We are grateful to the teachers and other professionals who participated in the evaluations and to the advisers and authorities who gave us permission to conduct the evaluations. Most of all we thank the tutor, John Garrett, whose openness and friendly professionalism made us feel very welcome at the course sessions. Suggestions and feedback from colleagues were gratefully received as was assistance with typing. We would like to make particular mention of the helpful and constructive comments on an earlier draft of the materials by Alan Greenwell of St Martin's College, Lancaster.

We are indebted to Pat Clarke who has provided much of the artwork in these materials and who, in order to do so, studied the aesthetic qualities of the BBC microcomputer for many hours.

Project Impact was funded by the Department of Education and Science from October 1983 to September 1986. We are grateful for comments on the materials from the project Steering Committee but the final product here represents the authors' and editors' work and views expressed are not the responsibility of the DES.

Colin Robson and Judy Sebba
Impact series editors

Abbreviations

ACE	Aids for Communication in Education
CET	Council for Educational Technology
CPVE	Certificate of Pre-Vocational Education
FE	Further Education
INSET	In-service training
IT	Information Technology
MEP	Microelectronics in Education Programme
MESU	Microelectronics Education Support Unit
NFER/FEU	National Foundation for Educational Research Further Education Unit
SEMERC	Special Education Microelectronics Resource Centre
SEND	Special Educational Needs Database
TTNS	The Times Network for Schools

Chapter 1

Special education and the new technology

1.1 The microcomputer as a classroom resource

It is generally agreed that, because of their versatility, computers can play a valuable role, alongside a range of other classroom resources, in the education of children and young people with special educational needs. However, although they provide another way to facilitate learning, it must be stressed that they cannot displace first-hand experience from its central role in student's learning. Neither can they take the place of the teacher.

It cannot be overemphasised that the successful use of computers in the classroom depends, more than anything else, on the skills and sensitivity of the teacher and the relationship between the teacher and the students.

1.2 The microcomputer and the curriculum

Microcomputers can support, enhance and extend the present curriculum. Carefully used, the enhancement and extension they help to bring about can provide new opportunities to introduce students to activities that are appropriate to their stage of development.

1.3 New technology in society

The new communications and computer technology, mainly based on microelectronics, is increasingly being used in society generally for creating, storing, selecting, changing, delivering, receiving and displaying many kinds of information.

It seems certain that work, learning, leisure and home life in the future will change. Teachers, therefore, will need to prepare their pupils for living in a society in which the new technology will be found everywhere.

Teachers of children with special educational needs cannot afford to be ignorant of its use. In-service training must therefore be provided to ensure that such teachers have the necessary knowledge and skills.

They should aim to become able to:

a. Start, load and run software on the model or models of microcomputer used in their school.
b. Identify some sources of appropriate educational software and general

software tools of use in educational activities, e.g. word processing programs, spreadsheets, etc.

c. Evaluate, in educational, practical and technical terms, software relevant to their pupil's learning.

d. Use microcomputers and related devices, with standard and/or specialised software, to provide for the special needs of disabled pupils.

The new technology is also increasingly entering classrooms, schools and local authorities as a management tool. Teachers of children with special needs therefore need to be able to use hardware and software for educational management, for the purpose of keeping students records, storing and updating curricula.

1.4 Purpose of the pack

This pack provides a few fairly obvious starting points for those who organise and direct INSET courses for teachers of children and young people with special educational needs.

The contents were produced for, and by, support teachers and advisory staff who attended CET/SEMERC (Special Education Microelectronics Resource Centre) organised courses. All are aimed to help teachers become more confident about using microelectronics in their teaching.

The pack contains ideas and suggestions for organisers of introductory/awareness courses. It will be of particular interest to Local Education Authority advisers responsible for in-service courses for teachers, co-ordinators of microelectronic work in special education, teachers responsible for supporting and advising teacher colleagues in their own school and leaders of special education micro-user groups.

The pack provides sufficient material for many introductory courses spread over a long period. It should help an organiser to get started.

It is however emphasised that the teachers will need time and continuing professional support if they are to make the most effective use of microcomputers. Further in-service involvement in user groups etc will be needed to develop the teachers' confidence and extend their knowledge, skills and awareness.

Although intended primarily for staff in education, the pack may also be of value to staff in the social and health services.

1.5 Content of the pack

The following chapter provides a three-way classification of software illustrated with a range of examples of each of the categories. The remainder of the *Tutor's Notes* focuses directly on the running of courses, with general considerations (Chapter 3) followed by examples of different INSET

courses for a variety of audiences (Chapter 4). Appendices to the Tutor's notes provide information for reference purposes covering information sources (Appendix 1), software evaluation (Appendix 2), course evaluation (Appendix 3) and a book list (Appendix 4).

The other book in the pack provides support materials for use with content-free software. As explained in the text, this type of software is seen as offering great potential in the special educational needs field. However, because the software is content-free its potential can be best appreciated by seeing what use other teachers have made of the programs. The materials in this part may be copied for non-profit making educational use.

A videotape accompanying this pack is available. This demonstrates a wide range of uses of microelectronics with a similarly wide range of special needs, concentrating (though not exclusively) on the types of software covered in the other book, *Support material for use with content-free software.*

Chapter 2

Three-way classification of software

At the beginning of one-day INSET Introductory courses, most tutors introduce some form of classification of software. The aim of this is usually to ensure that, although there may only be time to consider one category, the teachers will be aware of the wider teaching possibilities of the microcomputer.

In this section some aspects of each of a three-way classification of programs are considered. All have their proper place in the classroom but serve different purposes and have different advantages and disadvantages. The limited number of programs selected serve as examples of the wide range, variety and complexity of software available for use in the teaching of children with special educational needs.

2.1 Structured learning programs

This classification includes drill and practice types of program. Because drill and practice programs seem to have acquired a poor reputation — probably because of the early surfeit of rather dull arithmetic routines — we prefer to use the term 'structured learning' programs.

Good structured learning software provides a precision tool to do a particular job very efficiently.

Such programs are relatively easy to use. The teacher can decide exactly where they fit into the curriculum and the student's progress can be assessed easily.

Programs which may be classified under this heading usually aim to teach a particular point or topic serially using text and/or illustrations, followed by examples and test questions at each stage.

It is perhaps appropriate to introduce them early in any course for teachers of children with special educational needs for two reasons:

a. It is relatively simple to set up and organise classes for their use.
b. They can, if desired, be used to refer to some of the qualities typical of better programs.

While appreciating the advantages of more flexible programs referred to in the other two classifications, it would be foolish to ignore the facility of the

computer for providing opportunities to practise skills learned, which is important for pupils with learning difficulties. The compelling attraction of the micro has long outlasted any novelty factor. Concentration spans are extended and more work can be done in ten minutes than in half an hour with pencil, paper and work card. There is also the well-established advantage of the computer's neutrality and patience.

However, it is generally agreed that most of the rather random drill programs of the early days of computing might now be discarded. Course tutors should now select programs which have defined objectives to provide helpful practice in aspects of the basic skills.

Some qualities to be looked for in good programs of this type are:

a. They should be designed to achieve clear objectives based upon sound pedagogical principles.
b. The objectives should be stated in the documentation.
c. Errors should be notified immediately to the learner. The learner should then be given help to reach the correct response with an understanding of the process.
d. The program should be so 'user friendly' that students of the anticipated ability can operate it.
e. The program's reaction to success or failure should be reasonable, not distracting.
f. It can be useful to have a record of the learner's results so that the teacher can pick out and diagnose problems.

Programs which course tutors might use as examples of the didactic teaching approach, with most of the above qualities, include 'Basic Number Help' (Ladybird-Longman). The first program covers operations with single digit numbers. If there is an error, the remedial provision demonstrates the correct process on a number line. The learner can then give the correct answer. In the second program, which deals with three digit numbers, the correct process is demonstrated when needed by ordering together or decomposing groups of blocks. Good didactic teaching programs encourage teachers to relate the work to concrete materials – in this case to similar blocks. One disadvantage of specific programs is apparent in these programs. Subtraction is demonstrated by decomposition so the programs would not be attractive to schools wedded to other approaches.

Similarly, programs which aim to teach spelling by means of phonic techniques would be unacceptable to some teachers. Two of these programs which adopt a 'look-cover-write-check' format might be usefully assessed during courses. In both cases, errors are notified and the pupil is asked to reconsider the cues.

In 'Eye for Spelling' (esm) the emphasis is on letter patterns or strings. In 'The Compleat Speller' (Nisbet) the component parts of words have to be assembled correctly.

'Box Clever' (Microprimer) has a different approach. It is designed to teach words at a 'pertinent' level from 'Keywords to Literacy' on the basis of shape. Remediation is provided by the teacher whose attention is drawn by a buzzer sounding if there is a fault.

There are computer programs specific to reading schemes and any selected by a course tutor could be of interest. Colin Terrel has devised a scheme in which computer programs with synchronised speech play a major part. When it is published it should be well worth the attention of course organisers. 'Play and Read' (Prisma Software) has a tape to play on a cassette recorder in synchronisation with a program. In subsequent practice games there is correction but no remediation. 'Read Well' (DACO Software) uses a phonic approach over eight programs.

'Computer Software for Primary Reading and Language' by Pauline Bleach is a useful source of information about a large number of such programs. Course leaders might find this publication from the Centre for the Teaching of Reading at the University of Reading of value.

In curricular areas other than basic skills, fewer specific programs have been written for pupils with learning difficulties. There have been some under the general heading of life skills. 'Clocks' and 'Timetables' from the Microspecial Pack are examples.

Map-reading programs aimed to help teachers of Geography include the Dudley programs ('Five Way', Heinemann and 'Micromap', Ladybird-Longman).

Some specialist subject programs designed for mainstream pupils could be demonstrated to course members and ways of adjusting them to suit special needs pupils discussed. Some may be used as a class teaching resource. Others can be viable after pre-use preparation or with the addition of synchronised speech to overcome difficulties with reading.

Structured learning programs, sensibly used in conjunction with the more flexible programs of the other two categories, can make an essential and valuable contribution to a wide, well-balanced curriculum for pupils with special needs.

2.2 Adventure and simulation programs

Adventure games (such as Granny's Garden) and other revelatory types of software can be more flexible and exciting. Such software can be used over wider areas of the curriculum, giving greater scope for the imagination.

However, effective use of these programs is more demanding on both teacher and pupil. Careful preparation and good classroom management are essential. Assessment of the student's attainments is also less clear-cut.

2.2.1 *Stimulating interactive problems*

A computer adventure program presents the user with a stimulating interactive problem-solving situation in which the person, or better still the group, is required to investigate a number of locations and to react to the situations met.

2.2.2 *Locations*

The locations may be described in words or pictures or a combination of both. The language used may range from the minimal, using large easy-to-read characters, to a whole screenful of text. The former may also be supplemented with suitable pictures to give an indication of requirements. The latter caters for the pupil who is required not only to read and understand the material presented but perhaps, with the more able child in mind, to encourage 'Reading beyond the Words' as well as 'Reading for Meaning'.

2.2.3 *Decision-making*

Adventure games and simulations vary enormously. Generally, the user is expected to enter various locations, solve and react to various clues and collect various objects, finally arriving unscathed at the last point of the program. Throughout the program the user is required to take careful note of the information provided and to make decisions in the light of known information. These decisions may be fairly obvious in the case of some programs. Alternatively, the decisions may need to be made not only from the information provided but from previous experiences in using the program. Indeed, some games are so devious that solutions are only possible after playing the game for many weeks. (MESU Briefing Sheets Nos. 7 and 10 give more details.)

2.2.4 *Developing imagination*

Adventure games are particularly useful in motivating and stimulating the imagination of students of all ages. They also allow abstract ideas to come alive. Many teachers have reported on the increased group interaction and particularly on the extent to which the weaker members of a group become involved.

Adventure games provide a fertile source for group discussion, whether it be deciding which items from the magician's hoard will be of most use in negotiating the haunted forest, or how to negotiate the

half inch thick steel door bearing the legend 'Insert your security pass in the slot'. Since the majority of these games are based on text, insightful analysis of written material is at a premium, and seemingly innocent comments on the screen are probed for deeper meaning. 'Yes, I know it says – THERE IS NO LOCK THAT I CAN SEE, but what do you think it's telling us?'

2.2.5 *Cross-curricular work*

Programs of this type are often used as a springboard to additional classroom work in many curricular areas away from the computer. Typically, perhaps twenty per cent of the time is spent using the computer, its role being to create the environment for the learning experience. The 'John Chilton Project Report' (1985) refers to the school's Adventure Island project and their findings after using a typical adventure program.

2.2.6 *Supporting material*

Suitable follow-up work depends upon the skill and inventiveness of teachers but more and more publishers are providing support material. 4Mation Educational Resources, the producers of Granny's Garden, Dragon World, and Box of Treasures, provide a good example of this practice. Additionally, in-service courses may often suggest alternative ways in which the material may be used in the classroom. A good illustration of this approach is provided by the article by Margaret Murphy in Northern Ireland MEP's Micronet Publications (reprinted in the support material to this book).

2.2.7 *Pupils with learning difficulties*

There are many adventure programs available. Some have sections which may be solved within a particular teaching session. Others demand that the users return to the problem solving situation over a period of several weeks to investigate and discuss potential solutions. Additionally, during such times the person or group may be required to keep a careful diary of the computer's reaction to their efforts and to investigate alternative strategies.

This may seem to suggest that the effort and time involved is beyond the attention span of less able pupils. On the contrary, there is much evidence showing that such pupils tend to be both extremely well motivated by these interactive type programs and to work effectively over an extended period of time.

2.3 Content-free (flexible framework) programs

2.3.1 *Introduction*

This last group includes programs such as databases, word processors, Prompt and Touch Explorer which are essentially tools allowing the teacher (or pupil) to determine entirely what is being done. It also includes the growing number of adventure generators and other content-free types of program. Content-free software offers scope for new, imagination-stretching experiences and a widening of the existing curriculum. It makes correspondingly greater demands on the teacher and on in-service resources, but there is increasing evidence to show that the results are well worth the professional expertise and organisational effort required.

There is a varied collection of programs into which teachers or pupils can place their own content. Some of the programs are fairly specific in their intentions. A number enable the teacher to set up passages for cloze procedure, practising inferential and reading skills. Others provide a framework and inspiration for pupil's imaginative writing. The outcome of these programs may be projects across the curriculum, or scientific investigations into the pupils' own environment.

2.3.2 *Encouraging written work with word processors*

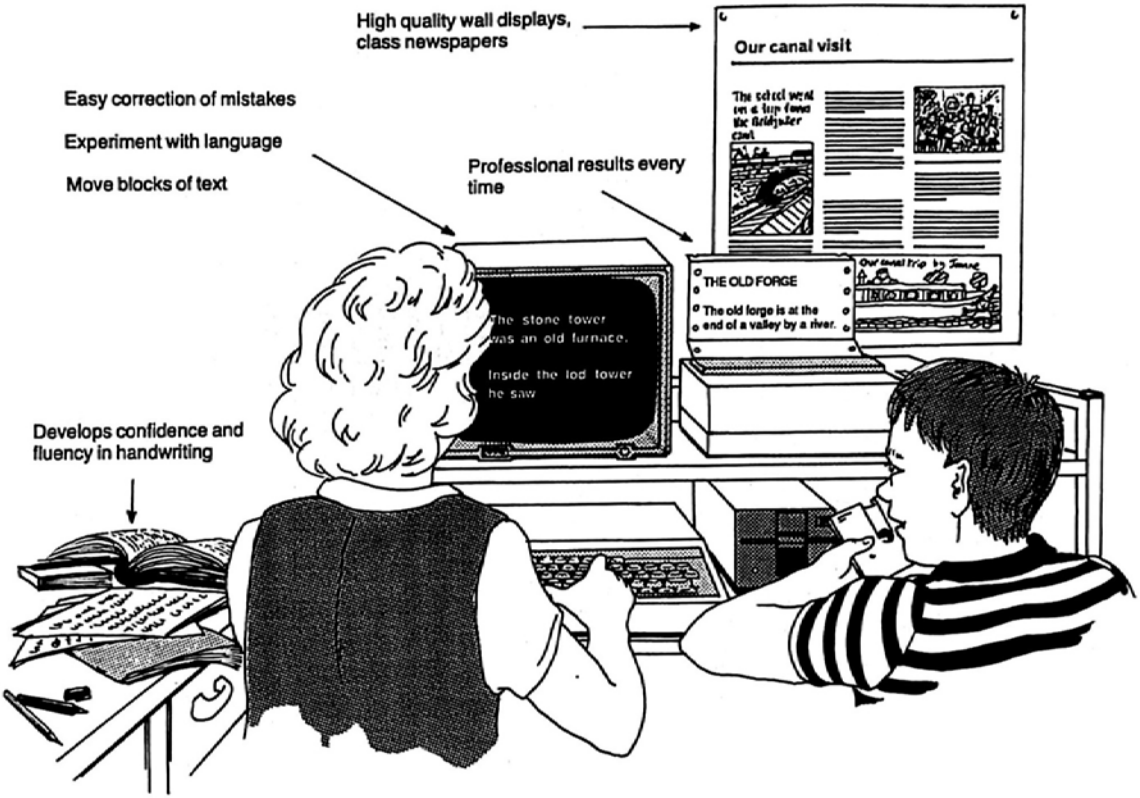
Word processing is a new and exciting approach to written work of all kinds which is already producing spectacular results with low attainers.

A Word Processor program is probably the most powerful tool we can put in front of a less able pupil. At the same time, for teachers new to computers, word processors are easily understood. They are the kind of program which can readily fit into existing activities in the classroom.

For the pupil with special educational needs, a word processor program on a microcomputer is far more than just a clever typewriter (See Wordwise and Creative Writing, MEP).

There are specialised word processors which offer facilities to check spellings such as Edspell (LTS), or offer alternatives to overused words e.g. Wordstopper (LTS), or provide a library of pictures to be drawn into the text e.g. Story (H & H Software). Another useful option is a word processor with its built-in dictionary of words which can be personalised.

However, the straightforward professional-style word processor,


High quality wall displays, class newspapers
Our canal visit
Easy correction of mistakes
Experiment with language
Move blocks of text
Professional results every time
THE OLD FORGE
The old forge is at the end of a valley by a river.
The stone tower was an old furnace.
Inside the lod tower he saw
Develops confidence and fluency in handwriting

as used in the Business Studies Department, can revolutionise the written work of many special needs pupils e.g. Wordwise (Computer Concepts), View (Acornsoft), Edword (Clwyd Technics).

The standard word processor frees the pupil from worries over mistakes in the text, allowing easy revision of written work. Work can be carried over and developed as it is saved on a disc.

The television screen display encourages a small group of pupils to cooperate in producing written work. The group shares the task of creation and correction, moving sentences and paragraphs to best advantage.

The teacher may prepare beginnings of stories, worksheets, narratives with missing words and sentences or mistakes to be spotted and corrected.

All these schemes allow the pupil to produce a large volume of work in a short time. As with all work on the word processor, the end result is to a professional standard of presentation.

2.3.3 *Two powerful programs*

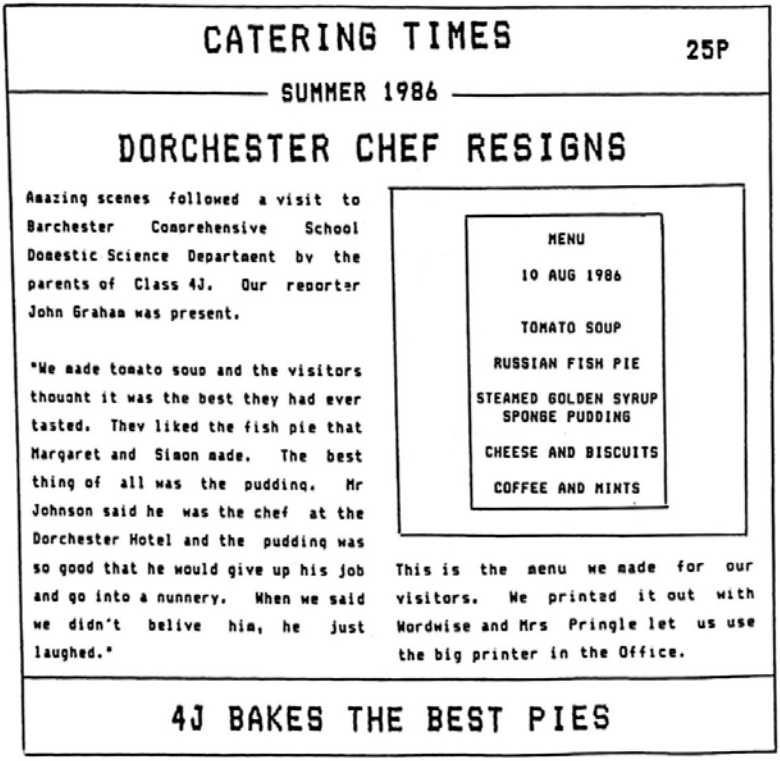
a. *Front Page*

Front Page (MAPE) is a kind of word processor program which reluctant writers have found strongly motivating. It is very simple to use, turning any piece of writing into a realistic front page of a newspaper. The latest version provides for up to two further pages of text laid out in columns with emphasised subheadings. The limited space for text brings its own advantages to the hesitant writer.

Front Page may carry news of the weekend's activities, of forthcoming school events, of a recent school trip, a topic in environmental studies or a discovery in science. It may lead to the production of a large-scale wall-newspaper, using a word processor with a large print output.

b. *Prompt-3*

Prompt-3 (Blue File) is a special word processor for pupils who experience difficulty with writing or who are at an early stage in learning to read. It is a simple big-print word processor with the added advantage of using the Concept Keyboard to provide one-touch typing of difficult words. Very hesitant writers can have all the necessary words for a piece of writing put on to the Concept Keyboard. The program makes it very easy for the teacher to prepare and change the vocabulary sets on the overlay for individual pupils or for group use in any topic.



The use of paper overlays on the Concept Keyboard means that even pictures or maps can be used to generate text as a finger is moved about on the surface.

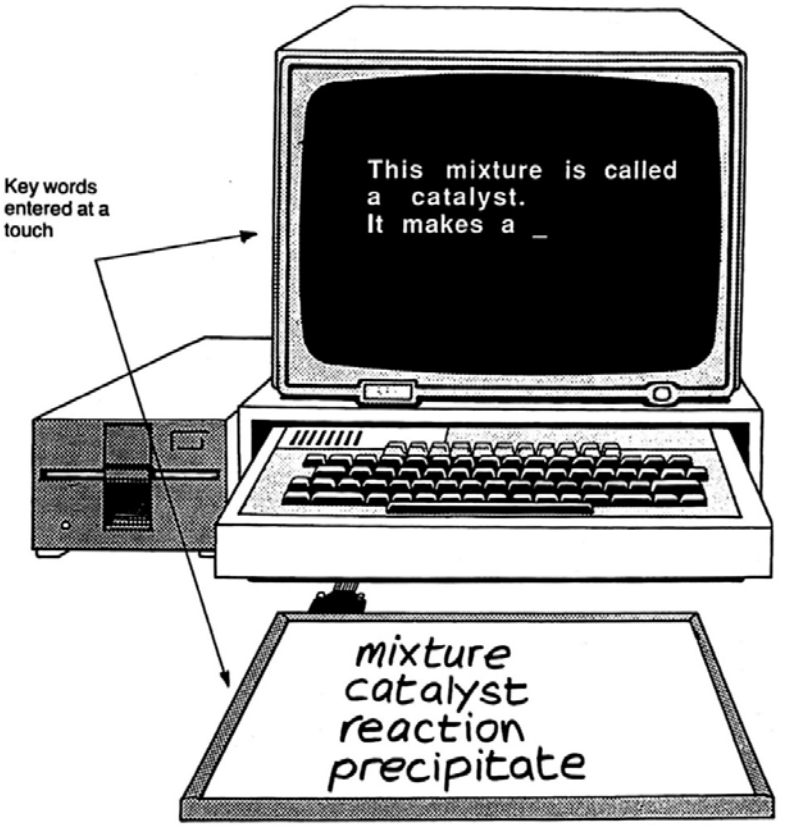
Possible Uses:

Prompt can be used by pupils at any level of literacy to extend their work across the full curriculum.

After a visit to the zoo, for example, pupils can touch pictures of the animals they have seen to put the names on the screen and then have them printed out to record the event. This can be extended by the pupil typing in simple sentences and then transferring difficult words from pictures etc. on the Concept Keyboard overlay.

2.3.4 *Learning the language*

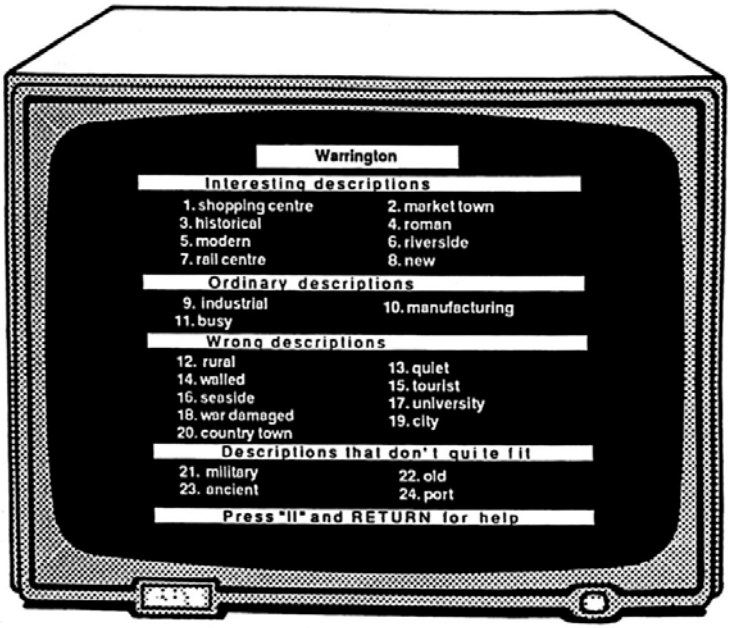
A pupil without a complete grasp of language for any subject is



floundering. Each subject has its own language, not only its technical vocabulary but also the peculiar phrases and constructions used in discussion and teaching. There are some very adaptable computer programs which can help the pupil to become a fluent language user. These examples are ideally suited to small group use and positively encourage cooperation.

a. *Maker/User*
Maker/User (N. Micromedia) develops an awareness and richness of descriptive language. In fact it transacts business with the users entirely in terms of descriptions. The program asks for a number of items of the same category (these may be anything – types of armour, kinds of cakes, reptiles, French towns, etc.).

'Maker/User'



The users are then encouraged to feed the program with as many useful adjectives as possible. These descriptors are then split into categories of 'Interesting', 'Ordinary', 'Wrong', 'Don't Quite Fit'. In this way, a great deal of informal analysis of language is practised. A quiz feature brings the process to life.

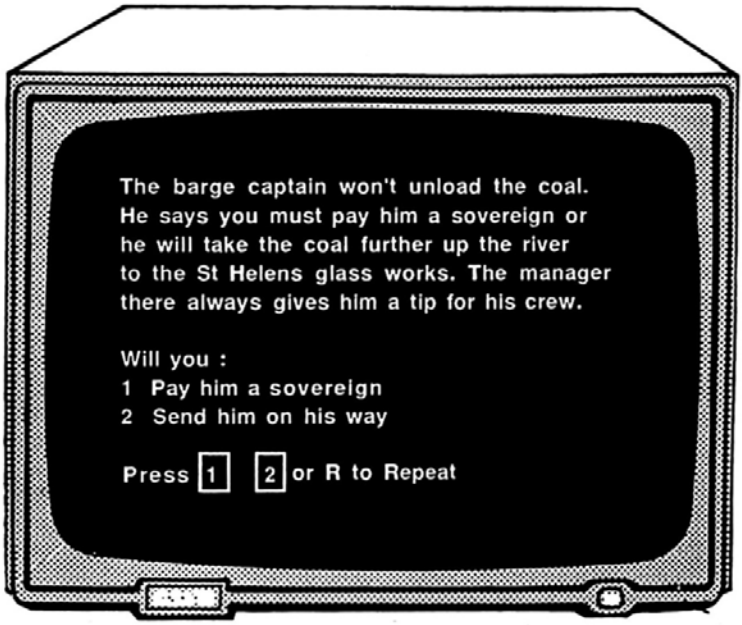
b. *Story Writer*

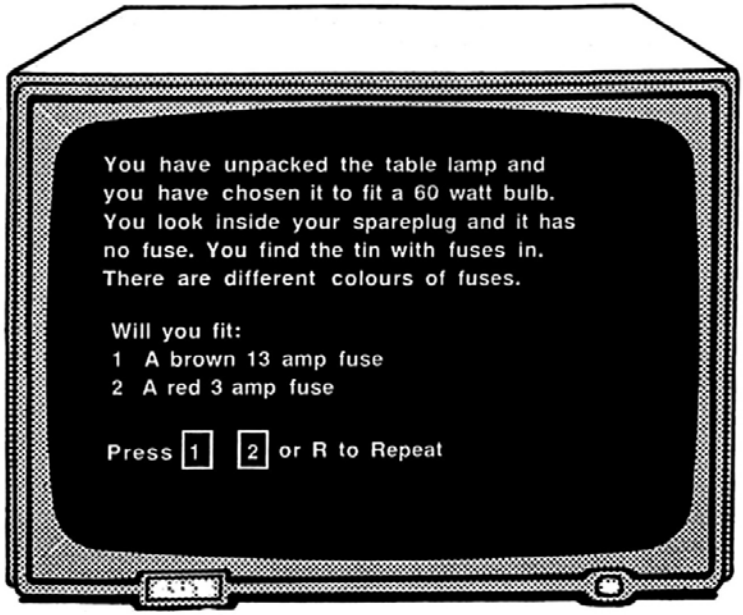
Story Writer (esm) was designed to enable pupils to write adventure games in the form of a 'branching tree' of decisions to be made (see below).

This format has great power in developing the language of transaction and decision for any topic e.g.:

'Will you (1) add acid to the water (2) add water to the acid?';
'Is this a job for (1) contact adhesive (2) epoxy adhesive?';
'Should the skipper head for (1) Dogger Bank (2) Iceland?'

Material prepared by pupils can be passed to other groups for assessment and development.

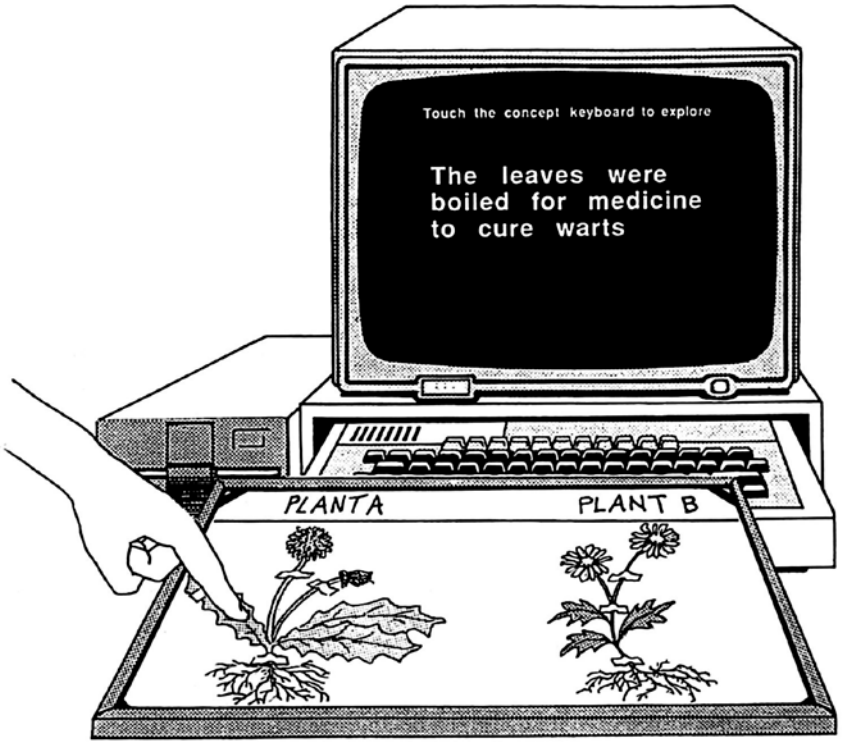

The barge captain won't unload the coal.
He says you must pay him a sovereign or
he will take the coal further up the river
to the St Helens glass works. The manager
there always gives him a tip for his crew.
Will you :
1 Pay him a sovereign
2 Send him on his way
Press 1 2 or R to Repeat


You have unpacked the table lamp and
you have chosen it to fit a 60 watt bulb.
You look inside your spareplug and it has
no fuse. You find the tin with fuses in.
There are different colours of fuses.
Will you fit:
1 A brown 13 amp fuse
2 A red 3 amp fuse
Press 1 2 or R to Repeat

c. *Touch Explorer*
Touch Explorer (Blue File) connects the Concept Keyboard to the monitor screen. Pressing an area on the Concept Keyboard produces words (max. 128 characters) on the screen. It enables pupils to discover information stored in the computer by exploring the surface of the paper overlay on a Concept Keyboard. The teacher (or pupils) can store information in the computer to enable a map, a diagram or a model layout to be constructed on a blank or outline overlay.

Touch Explorer

Clues may be given directly or indirectly. They may send the users to discover other information from resources in school or outside. Pupils can use Touch Explorer to store their own information to supplement a diagram or a plan. The program can provide a touch-activated database related to a collection of real objects mounted on the Concept Keyboard overlay.

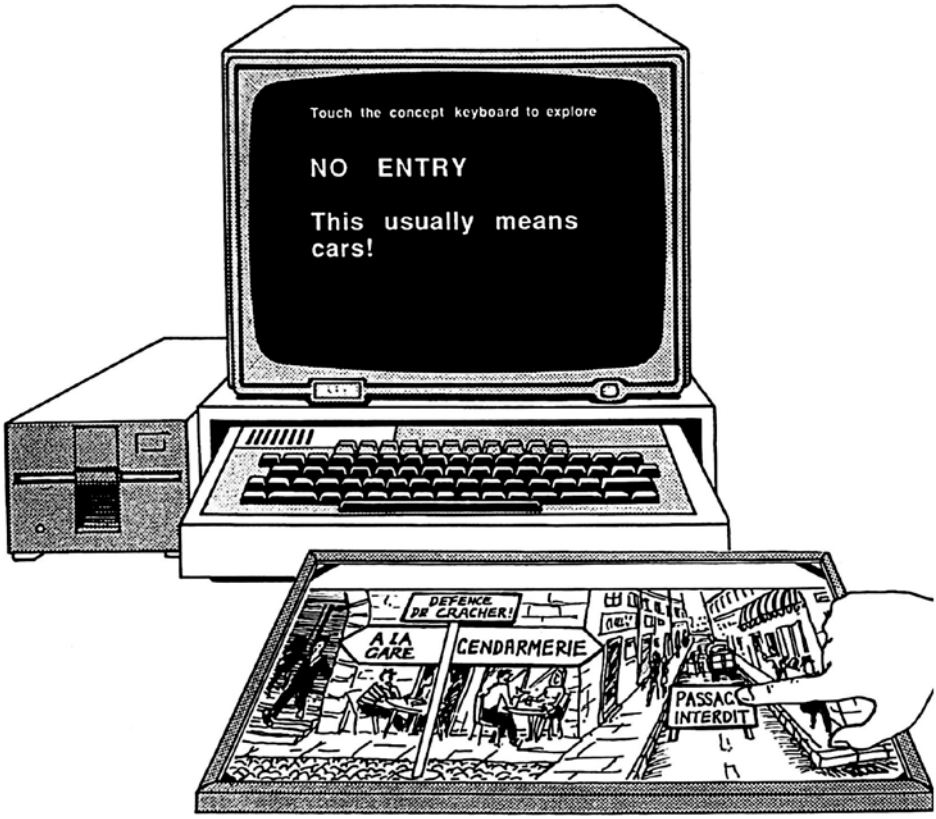


Possible Uses:

Different pages of a reading book can be transferred on to squares of the Concept Keyboard. Pupils then find the correct order of the pages.

An overlay map of an area being studied is prepared for use on the Concept Keyboard. Presses on the Concept Keyboard could then provide the pupil with further information about the country or area.

A talking version of this program is available.



d. *Tray*

Tray (MEP Primary Project — Language Pack) aims to develop linguistic expertise by guiding the user through an apparently impossible task. It presents a piece of text on the screen with only the punctuation visible. No words or even letters can be seen. The pupil's task (usually a group task) is to build up words by 'buying' letters and to look for meanings. They try to reconstruct the piece of text as quickly as possible. Clues from word length and context soon arise and the problem solver is quickly involved in the kind of linguistic analysis which enables the skilful reader to cope with unfamiliar material. Hopefully, this may lead to an appreciation of the whole text as more than the sum of the parts.

Possible Uses:

Less able pupils can work together to reveal written information

about a topic being studied. The text, prepared by the teacher, can be graded to use language of a higher level than they would normally read. Their interest and the activity encourages them to read and understand.

Two different texts can be used to give two contrasting descriptions of the same event or feeling with the same result.

2.3.5 *Databases: feeling closer to the subject*

How many low-attaining pupils feel a sense of identity with the topics they encounter in the classroom? A feeling of involvement can be encouraged if the pupil is provided with the means of discovering, gathering and recombining the facts of the subject in a personalised way. Such manipulation of information is a useful vehicle for encouraging children to argue, discuss and hypothesise, as well as becoming more familiar with the information itself.

Information handling programs on the computer can make this possible. Classroom projects become far more than a matter of copying from books.

A whole family of computer software exists to promote this process. These programs are known as databases.

'Lists' (Blue File) and 'Tree of Knowledge' (Acornsoft) are two programs which are presented in a way which actively invites exploration by teachers and pupils who may be completely new to microcomputers.

a. *Lists*

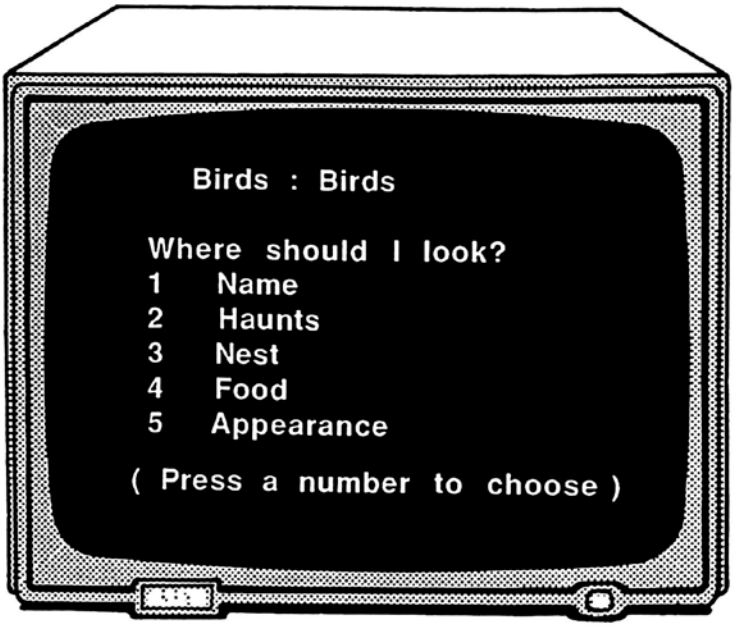
Lists is a simple jargon-free database program which provides an ideal introduction to databases for the complete novice.

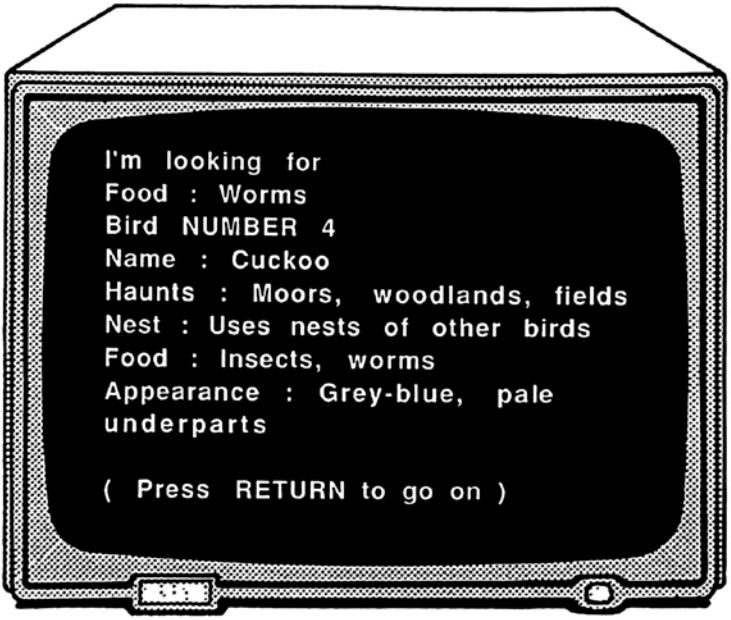
It has the potential for the storage and retrieval of information in areas of the curriculum where facts and knowledge need to be stored, classified and discussed whether by infants, teenagers or adults. The program invites the pupils to feed in information on any subject. The resulting bank of information can then be interrogated in many ways.

However, the real strength of the program lies in the collecting of information and pupil discussion about the way in which the information is to be recorded.

Nixon, the author of Lists points out:

> 'no matter what the chosen topic, the pupils' attention, as they decide on the structure of their list, will be focussed on those qualities which characterise items and allow differentiation between them. Exploring the contents of a completed list draws attention to the features which relate items or distinguish them from one another, reinforcing lessons


Birds : Birds
Where should I look?
1 Name
2 Haunts
3 Nest
4 Food
5 Appearance
(Press a number to choose)


I'm looking for
Food : Worms
Bird NUMBER 4
Name : Cuckoo
Haunts : Moors, woodlands, fields
Nest : Uses nests of other birds
Food : Insects, worms
Appearance : Grey-blue, pale underparts
(Press RETURN to go on)

learned during the creation of the list. Initially the teacher may specify criteria for a search (how many pupils in the school have blue eyes? etc.) but it is hoped that the children will generate their own criteria as they explore.'

b. *Tree of Knowledge*

Tree of Knowledge (Acornsoft) is a commercial program which actively seeks information from the user on any chosen topic, at the same time forcing the user to refine his or her own understanding of the nature of the information which is fed in.

Comments such as 'Give me a question to distinguish between a leopard and a tiger; a knife and a fork; a Fiat and a Volvo', are a feature of the 'Tree of Knowledge' as are the program's invitations to the user to guess what the computer has in mind. The use of these simple databases can lead on to more advanced and powerful programs such as Factfile (C.U.P.) or Grass (Newman College). The power to involve the pupil remains as strong. (See Briefing Sheet No.5 'Information Handling'.)

2.3.6 *Logo: children in control*

a. *What is Logo?*

Logo and Turtle Graphics programs put the child or group in control of the learning situation. In effect, the users learn through the computer.

Logo is a programming language which may be used in a very simple way at first to control the movements of a floor turtle or a drawing system on the screen of the computer. As commands to the program must be stated in a completely logical form, the users encounter a need to express their intentions in a carefully structured way.

The commands are based on expressions of direction and distance, so that these aspects of mathematical thinking are stressed.

b. *Logo and pupils with learning difficulties*

By using a simple Concept Keyboard implementation, e.g. TIG[1], a pre-numerate, pre-literate child, possibly with a mild physical

[1] TIG (Bristol SEMERC) is an interface file entitled 'Turtling in Glevum School' by Marie Buckland. It is a set of seven graded overlays to be used on a Concept Keyboard together with the program Dart. Various forms of floor turtle may be used.

handicap, can exercise control of material at an appropriate stage of development. This can help develop the confidence to make decisions and test hypotheses.

The ability to predict, reflect on outcomes and modify their strategy is generally thought to be the domain of the more able child. However, the use of this software has often resulted in unsuspected abilities being revealed in less able children.

Besides encouraging the ordering and logical expression of ideas within the Logo framework, use of the system gives rise to purposeful (and usually animated) group discussion.

The success achieved by using this software appears to help promote improvements in the self-image, self-confidence, logical reasoning, social competence, expressive skills and decision making of many children who experience difficulties in learning in school.

c. *Ways of drawing with a Floor Turtle*

1. No previous planning by child:
   a. Direct drive drawing – free choice.
   b. Direct drive drawing – following teacher's directions.
   c. Direct drive drawing — following simple card design.
2. With previous planning by the child:
   a. Traces idea with finger before drawing.
   b. Plans a design, by drawing and then uses the 'turtle' to draw it.
   c. Judges the best starting point.
   d. Uses teacher drawn design, marking the linear movements.
   e. Draws own design, marking the linear units.
   f. Uses estimation/experience/logical reasoning to determine the key or base line for the turtle drawing.
   g. Corrects linear measurements on a design after a turtle trial.
   h. Marks in angular measurements on a design during an 'on task' turtle session.
   i. Lists the linear and angular measurements by the side of the design after the turtle session.
   j. Tests the accuracy of the list by turtle drawing with a partner.
   k. Corrects any units in (j).
   l. Makes a procedure by naming and listing.
   m. Estimates angular measurements before turtle drawing.

n. Identifies repeat patterns and sub-procedures in more complicated designs.
o. Uses the Dart (AUCBE) documentation to extend the use of overlays.

Chapter 3

Computer awareness courses

3.1 Points for course organisers to consider

3.1.1 *INSET courses*

Experience shows that short computer awareness courses on their own cannot adequately prepare teachers for making the best educational use of microcomputers. In fact, it is generally agreed that a one-day introductory/awareness course can only be 'a taster'. In no way can it ensure that the teachers can take full advantage of the educational potential of the microcomputer. Such courses can only be an introduction to a 'rolling programme'. A course organiser planning a one-day course, therefore, has to determine an order of priorities, with a view to raising wider issues for later study.

Further INSET courses must then be provided to give course members time to use and make a more thorough study of software from each of the three classifications.

After use in the classroom, the teachers will want opportunities to consider, together, the value and usefulness of each category of software. However, it cannot be over-emphasised that teachers should have regular support, INSET and continuous updating if they are to make full and effective use of the new technology. One or two day courses, in isolation, will not be enough.

3.1.2 *Duration/length of INSET courses*

Separate half-day INSET sessions are considered by many to be more effective than one or two full-day courses for the following reasons:

a. It is easier for teachers to be released from the classroom for half-days.
b. There is time between sessions to consider the information and knowledge acquired.
c. There is also time for the teachers to try out material, theories and practices with their pupils.
d. At a later stage, INSET time can sometimes be allocated to relate some programs to teaching of specific subjects.

3.1.3 *Allocation of time*

It is clear that time on short INSET courses is always at a premium and compromise in planning is always necessary. Course tutors, for example, often have to decide whether they should run courses for the computer-naïve teachers separately from those with more experience of using the micro.

In either case, it is generally agreed that maximum computer hands-on time should be provided and as much allocated to voluntary use as to time-tabled lectures and workshops. On the one hand, such opportunities, with more experienced colleagues in the background, enables some reticent teachers to overcome their inhibitions and can lead to valuable exchanges of information and skills between course members. On the other hand, experienced practitioners particularly may need to be given an element of choice. Many want time to enable them to concentrate on computer applications which they find to be particularly exciting.

The course planner has to bear these facts in mind and also be aware that a lack of structure can sometimes result in a 'free for all'. Aims and objectives of the course must, therefore, be determined at the start and clearly stated in the course literature.

3.1.4 *Inter-disciplinary co-operation*

The microcomputer provides a bridge, linking the overlapping work of teachers and other disciplines concerned in the education, health and welfare of children and young people with sensory and/or physical disabilities. Courses aimed at an inter-disciplinary audience could help co-operative work.

3.1.5 *Access to the curriculum*

Course members should consider ways in which microelectronics can further the educational (curriculum) aims which apply to all students. The importance of providing the means to enable students with specific educational needs to take full advantage of the curriculum offered will then be recognised.

Access difficulties create major problems for teachers trying to provide an appropriate curriculum for pupils with severe sensory and/or physical disabilities. The new technology offers such pupils the possibility of access to a school's normal cirriculum.

The microcomputer has become a liberating device, improving the quality of life of many who suffer from severe physical or sensory disabilities. Courses for teachers of such pupils, therefore, must

include information about the many communication aids and peripherals which are now available. Ways in which these can be used to provide access to the full range of educational software must be considered and demonstrated.

Ways in which the computer can be an integral part of the teaching of language, mathematics, science, topic work and many other aspects of the curriculum should be highlighted on courses. Greater use of the microcomputer as a flexible tool by subject specialists might encourage them to extend the teaching of their subject across the curriculum. It does seem, however, that this technique is more difficult to achieve in mainstream secondary than in special schools, possibly because in the former schools specialist subjects are often taught in isolation.

3.1.6 *Pupils with specific special needs*

Teachers of children with severe visual or hearing impairment will find parts of a general introductory course of value. However, because of the small numbers in any LEA, it may be necessary for their special teaching needs to be considered separately, possibly on a regional basis.

Teachers of the hearing-impaired suggest that many of their colleagues still have to be persuaded that the micro can offer them anything which will help them in their work. They have reservations about spending time on the computer, sincerely convinced that all the time available must be devoted to direct language teaching. In fact, the micro is a text-handling tool which has much to offer students with hearing impairments, making it possible for many to manipulate their written language without prior commitment.

It can also make it possible for students with little or no hand control or brain dysfunction to produce neat, readable written work of their own creation. Time must therefore be spent during any course establishing clearly what the micro has to offer education in general and special educational needs in particular.

3.1.7 *'Take-away Goodies'*

All courses should provide opportunities for teachers to prepare support material and files for content-free programs to use in their daily work. These might include word processors, databases and framework programs. The Blue File freely copiable software is ideal for this purpose as course members may take away copies of the original software as well as the support material they have prepared

themselves during the course.

Other freely-copiable material (for non-profit-making educational purposes) includes the MESU Briefing sheets and Occasional Papers referred to on pages 55 and 56 and in the support material to this book.

3.1.8 *User groups*

Often as a follow-up to awareness courses and activities, user groups are formed in many areas. Experience of such groups shows that members keep each other up to date with changes in the new technology. They are usually enthusiastic and stimulate each other by discussing ways they use microelectronics in their day-to-day work with pupils with special needs. Such groups often become a driving force, influencing their LEA's attitude to in-service activities for teachers of students with special educational needs.

3.2 Aims and objectives of awareness courses

3.2.1 *Possible course aims*

It must be stressed that only one or, at the most, two aims of a course might be selected from the following suggestions. More specific aims from the sample course models which follow might be more appropriate in some cases.

a. To distinguish between the three classifications of educational software referred to previously.
b. To encourage teachers to use the micro to help meet the learning needs of all their pupils.
c. To help teachers evaluate currently available resources for use with children with special educational needs.
d. To introduce and create an awareness of the educational potential of the micro, across the curriculum, for children with learning difficulties.
e. To make course members aware of the potential of the microcomputer to extend the curriculum (e.g. science, music, etc.).
f. To illustrate the opportunities offered by micro-technology to access the curriculum for pupils with learning difficulties.
g. To give teachers personal hands-on experience of easily available programs and input devices appropriate to the special needs of pupils.
h. To enthuse teachers about the value of employing the new technology in the education of children with learning difficulties.
i. To make teachers aware of the potential of the microcomputer as

a medium for storing and processing curricula and as an aid in administration and in record-keeping.

Note:
Any one of these aims, on its own, could be selected as the aim for a course.

3.2.2 *Possible course objectives*

Some examples of objectives from which a course organiser might make a selection. Course participants will:

a. be able to set up the microcomputer system in their classroom.

b. produce a report on at least one educational program for one of the three classifications. The features that make the program 'good' or 'bad' educationally for their pupils with special educational needs will be stated.

c. indicate ways they will use the micro as a resource in different areas of the curriculum for their pupils with special educational needs.

d. produce a written description of a framework program for the use of the micro in the classroom.

e. produce a report describing the way they will use the micro with an individual or a small group.

f. write objectives for use with an individual pupil or group of pupils in mind for one selected program.

g. write details of how the micro will be used to help the pupil towards these objectives and produce any additional materials required.

3.3 Reminders

When preparing a course the following suggestions may serve as reminders.

a. Establish your target audience. Make it clear, in the pre-course literature, for whom the course is intended.
b. Get your aims and objectives clear. Decide how you are going to assess the extent to which the objectives have been met.

c. Work out your resource requirements well in advance. Ensure that there is at least one complete microcomputer set available per three (preferably two) course members. Given sufficient warning, teachers may be able to bring microcomputer equipment which you will otherwise have to provide.
d. Check that there are enough power points and multiple sockets available in the workrooms.
e. Invite course members/speakers to bring samples of students work based on their use of a specific program.
f. If it is intended to demonstrate how to format a disc and make copies of Blue File programs, ask course members to bring blank discs.
g. Arrange to have handouts photocopied, e.g. Briefing Sheets.
h. Decorate the room with displays of students' work related to microcomputer programs.
i. Display appropriate books, catalogues, briefings and similar sources of information.
j. Ensure that the computers are set up and functioning well before first session.
k. Arrange to have supporting technical assistance available to ensure that course members can use all the equipment at any time.

And finally . . .

Course tutors must bear in mind the natural anxiety of computer novices and the need to 'hold their hands' until they gain sufficient confidence to be left on their own.

There should be sufficient experienced helpers and/or course members on hand to give prompt support and help.

The course should be set in the context of classroom practice, to ensure that the computer takes its place alongside a range of other resources used in the classroom. It will, obviously, focus on the use of the computer as an aid to the teaching and learning of students with special educational needs.

It is relatively easy for most teachers to accept the use of the microcomputer with structured learning programs. To develop the full potential of the micro they need to be introduced to the greater possibilities of the other two software classifications. Time and training must therefore be provided to help teachers make the best use of content-free software. Word processor and information-retrieval packages, for example, are particularly valuable.

Training will enable teachers to acquire a fund of practical ideas for related work both on and off the keyboard, with a clearer appreciation of the educational philosophy under-pinning the use of content-free software.

Chapter 4

Examples of INSET courses

4.1 Introduction

It must be stressed at the outset that each of the following examples of short awareness courses has been selected from many programmes produced by teachers attending the eight courses organised by CET in 1984 and 1985. They are not intended to be definitive and it is unlikely that they could or should be used as they stand. As they are the ideas and suggestions of practising teachers and Local Education Authority INSET course organisers, they provide a source of starting points.

4.2 An introductory course on microelectronics for teachers of children and young people with mild or moderate learning difficulties

4.2.1 *Target group*

This course is intended for selected teachers of children with mild or moderate learning difficulties. The participants will return to their schools to take an important role in determining policies relating to the use of the computer and any school-based INSET. They should be in a position to influence the progression of INSET within their schools.

4.2.2 *Staffing and equipment*

A reasonable group number is twenty with a 10:1 teacher/tutor ratio and also a 2:1 teacher/micro ratio. Sources of software and equipment can be found in MESU Briefing Sheets Nos. 11 and 12.

4.2.3 *Time allocation*

It is generally agreed that, to be of any use, an awareness course cannot be carried out in one or even two full days. Therefore this is planned as a modular course to take place on six half-days spread over six weeks. However, this format can be changed as required.

4.2.4 *Aims of the course*

a. To enable course members to disseminate advice and information to other teachers in their schools. (It is imperative that the teacher should have access to a micro.)
b. To establish a follow-up service for teachers to keep abreast of new developments and to offer advice in building up their own computer program library.
c. To create awareness and illustrate opportunities offered by the micro to pervade and enhance the whole curriculum.
d. To create an awareness of the potential of the micro for students with special needs, to enhance learning and to offer a wider curriculum.

4.2.5 *Objectives*

Course members will:

a. List an agreed number of criteria involved in software evaluation.
b. Explain an agreed number of methods of using the micro with individuals, groups and classes.
c. Give an agreed number of examples of ways in which the micro can be used as a source of practical activities alongside other resources.
d. List the sources of commercial software and devices.
e. List the sources of further information and support.
f. Each member will have practical experience of using some of the following software:
   A word processor
   A content-free program
   A database
   A turtle graphics package
   An adventure program
g. Each member will have practical experience of using some specialised peripherals suitable for pupils with learning difficulties.

4.2.6 *Programme*

Session 1 Basic awareness.
Introductory talk.

Aims of the course.

Reassure teachers regarding the lack of need for technical understanding.
Stress the need to offer students with learning difficulties a wide, varied and balanced curriculum.
Emphasise that microtechnology is just an additional teaching and learning resource.
Introduce the three-way classification.

Hands-on session.

Set up system and run an adventure program and one good computer software structured learning program.

This first session should conclude with a discussion on the implications of these programs across the curriculum.

Session 2 Word processing.

Prompt (Blue File), Wordwise (Computer Concepts), Spellcheck (LTS), Wordstopper (LTS) and Story (Daco) programs will be introduced and demonstrated to course members during the session.
Course members will use Prompt and prepare files appropriate for their own pupils.
Overlays for the Concept Keyboard will be prepared.

Session 3 Information handling.

This session will demonstrate a variety of databases with discussion on how they can be used to support various areas of the curriculum.
Lists (Blue File) – for simple categorisation.
Tree of Knowledge (Acornsoft) – for classification.
Maker/User (N. Micromedia).

Session 4 Turtle graphics and simple Logo.

This session will introduce pre-Logo activities using a turtle. This will lead into an evaluation of a hierarchy of Concept Keyboard overlays. \The TIG video could be

used as a basis for discussion. The following materials could be used:

Trundle/Nudge suite of programs (Blue File).
Concept Keyboard overlays for Dart (AUCBE).
Valiant (E. J. Arnold) and/or Jessops Turtles (Jessops Acoustics)
Star Concept Keyboard (AB European Marketing).

Session 5 Peripherals.

This session will enable course members to use a variety of peripheral devices with associated software. The following devices could be used:

Concept Keyboard
Micromike
Simple switches
Speech synthesiser
Joystick
Lightpen
Mouse
Trackerball
Touch-sensitive screen
Printer

Sources for these peripherals can be obtained from MESU Briefing Sheets Nos. 11 and 12.

Session 6 Discussion and consolidation for the future.

A final practical session will be introduced by an explanation and demonstration of the disc system, ie, copy, back-up, formatting and menu-making.

A discussion of future classroom strategies might include plans to implement staff training within a school and the development of a user group.

4.3 A school-based course involving teachers working with their pupils (mild or moderate learning difficulties)

4.3.1 *Target group*

This type of school/class-based INSET might be of particular value to

mainstream teachers working with pupils with mild/moderate learning difficulties.

4.3.2 *Questions*

Course organiser should consider the following:

a. The curricular area to be tackled, and at what stage?
b. What level of knowledge of the hardware/software is required of the teacher before using the micro to teach the particular curricular area? For example, to use Logo in some areas of the mathematics curriculum, what stage should the teacher have reached in his knowledge of Logo language and what can be done with it?
c. What this type of course might accomplish.
    1. Assuming that the teacher will have been prepared for this quite extensively, away from his/her pupils. Class-based INSET will provide an opportunity for him/her to practise skills in a supportive context. The teacher will continue to be in charge of the class, the INSET adviser being in the subordinate role of gap-filler and confirmer!
    2. Alternatively, in some curricular areas, the teacher and the students might be equals in a 'pupil' situation, especially where there is no need for complex underlying knowledge (e.g. Logo programming).
    3. The presence of students ties the teacher to practical reality and this can be good for the trainer!
    4. This model provides the opportunity to train teachers with minimal disruption for the rest of the school.
d. What is the range of possibilities for training?
    1. The introduction of 'new' software to teacher and pupils enables the short-term reaction of the learner to be gauged (workshop).
    2. New techniques can be introduced through using a familiar program (demonstration/support teaching).
    3. It provides an opportunity to explore the applicability of computing techniques to a new curricular area.
    4. It provides an opportunity for a practical demonstration of and/or reinforcement of some aspects of classroom organisation.
e. Spending the day usefully:
    It might be considered an uneconomic use of manpower and counter-productive to concentrate on one teacher/group for a

whole day. If this is so, a programme of curricular activities for a number of teachers in the school might be considered. This will clearly necessitate advance planning so that the activities of several members of the school staff can be co-ordinated for the day. This model could be used by many who have attended the CET organised five-day courses.

4.4 A course for teachers of children and young people with severe learning difficulties

4.4.1 *Introduction*

It is generally accepted that all children should be offered as wide and well-balanced a curriculum as possible. This applies with equal force to children and young people with severe learning difficulties. The microcomputer can be a valuable tool in this respect. However, although it can stimulate, reinforce and provide feedback in many learning activities, it cannot in any way detract from the importance of the teacher and the human relationships generally. In fact, evidence from schools suggest that the use of the microcomputer has helped to improve communication between adults and the child with special needs. This is particularly the case when the use of the micro is integrated with existing teaching techniques and resources.

The microcomputer offers pupils with severe learning difficulties stimulation to participate in group work and for their language development generally. It is also of value to the teacher for recording pupils' progress.

4.4.2 *Target group*

This course is designed for teachers of such pupils at the early stages of experience in using the new technology including those who are reticent about its use.

4.4.3 *Pre-course preparation*

Information should be obtained about the equipment available in each school; course participants' experience of using micros (e.g. can they set them up?); and course participants' experience of the programs chosen for further development.

4.4.4 *Staffing and equipment*

In addition to the main presenter of the demonstrations, there should be two assistants familiar with software and hardware to supervise hands-on work. Teachers of pupils with severe learning difficulties who are experienced in using microelectronics in their teaching might also be asked to demonstrate and discuss their work. Sources of hardware and software materials and equipment are listed in MESU Briefing Sheets Nos. 11, 12 and 15.

4.4.5 *Hardware*

10 micros complete with VDU and disc drive
1 Microvitec touch screen
1 Joystick
1 Cheshire keyboard
1 Micromike handheld
selection of switches
including 6 pedal switches
3 Epson compatible printers
4 Star Concept Keyboards
1 Light pen
1 Turtle
2 Micrex toy interfaces
1 Micromike desk top
Selection of adapted toys

4.4.6 *Videos*

The British Institute of Mental Handicap video *Switches, Toys, and Computers* is available for purchase for in-service work in participants' schools.

4.4.7 *Software* (Sources in MESU Briefing Sheet No. 15)

a. *Motor skills*
Micrex Toy Interface software including Micro-Active
Alan Nixon Switch Input Disc
Derek Harrison Compact/Kilton Hospital Collection
RCEVH Touch Screen Software.

b. *Co-operation and socialisation*
Derek Harrison Compact.

c. *Vocal skills*
Micromike disc 1 and 2

Come & Go, Nudge
Alan Nixon Switch Input Disc.

d. *Towards use of communication aid*
Derek Harrison Compact
Touch Explorer
Alan Nixon Switch Input Disc
Kelsterton College Communicator.

e. *Language and concepts*
Alan Nixon Switch Input disc
Touch Explorer
Dress Boy and Girl
Window
Prompt
Dave Biggin's Picture/Numbertouch
Alan Nixon Keyboard disc
Picture Play
Derek Harrison Compact for Concept Keyboard
Podd.

4.4.8 *Numbers*

Up to twenty teachers representing ten schools. It is suggested that consideration be given to the possibility of two teachers from each school attending so that they might provide mutual support and encouragement after the course.

4.4.9 *Time allocation*

One full day.

4.4.10 *Aims of the course*

a. To introduce and create an awareness in the course participants of the educational potential of the micro, within the curriculum, for students with severe learning difficulties.
b. To illustrate the opportunities offered by micro-technology to access the curriculum for pupils with severe learning difficulties.
c. To give teachers personal hands-on experience of easily available programs and input devices appropriate to the pupil's special needs.
d. To persuade teachers of the value of employing the new technology in the education of children with severe learning

difficulties.

e. To enthuse teachers with the notion of forming local user groups for mutual support.

f. To make teachers aware of sources of further support and information.

4.4.11 *Objectives of the course*

One or two objectives could be selected from the following:

a. Course members will list and use input and output devices which can be used with software for applications in the following areas of personal development:

Motor skills
Co-operation and socialisation
Vocal skills
Towards use of communication aids
Language and concepts.

b. Members will use an agreed selection of the following input and output devices and indicate types of disability for which they are considered most appropriate:

1. Input devices:

Toy Control Interface
Blow Switch
Squeeze switch
Micromike
Touch screen
Joystick

2. Output devices:

Pedal switch
Tilt switch
Magnetic switch
Overlay keyboard
Light pen.
Adapted toys, e.g. siren, moving doll, helicopter, etc.
Voice synthesiser
Turtle
Printer.

c. Course members will write objectives for use with an individual pupil or group of pupils in mind for a program or programs from Derek Harrison's Compact pack or Prompt.

d. Course members will describe how the micro will be used to help a particular child or group achieve defined objectives and produce any additional materials required.

e. Course members will have hands-on experience using:
   1. A range of peripheral devices which can be used to enable pupils with severe learning difficulties to communicate by using the microcomputer.
   2. A range of input devices.
   3. A selection of programs considered appropriate for pupils with severe learning difficulties.

f. Each course member will prepare notes showing the relevance of each device for their own use and detailing the stages of progression.

4.4.12 *Suggested one-day course programme*

09.30 hrs Welcome to course.
This will include a discussion and explanation of the aims and objectives of the course, the plan and timetable of the course and reassurance that course members need neither technical knowledge nor an understanding of the theories of microelectronics.

09.40 hrs Demonstrations of Software.
These should include appropriate peripherals with an explanation of the educational objectives and method of evaluation.
Opportunities for questioning should be provided during demonstrations.
Discussion of the applications of the software with individual pupils and groups, as well as the organisation in practical situations, should be encouraged.
Materials from the following areas will be demonstrated (refer to 4.4.11):

Motor skills (beginning with switch/toy only)
Co-operation and socialisation

10.45 hrs Break.

11.05 hrs Demonstrate materials from the following areas (refer to 4.4.11):

Vocal skills
Towards use of communication aid
Language and concepts.

12.30 hrs. Lunch

13.30 hrs. Course members to use the software and peripherals demonstrated in the morning.

15.15 hrs. Tea.

15.30 hrs. Plenary.
Queries and comments from course members.
Summary of local and national sources of advice, information and support.
Video *Switches, Toys and Computers* made available.
Hand-outs on sources of support, sources of devices and appropriate software.

16.00 hrs. Course ends.

4.5 A course for teachers of children and young people with sensory and/or physical disabilities

4.5.1 *Introduction*

There is a need for more INSET courses on the use of microelectronics in the education of pupils with sensory/physical disabilities, particularly for teachers working in mainstream schools. The number of such pupils in ordinary schools is likely to increase in the future. Teachers will need to be made aware of the range of hardware and software now available to meet the varied needs of pupils with different disabilities. To do this, it may be necessary to offer separate introductory, intermediate and advanced courses for teachers working with children with specific areas of disability, e.g.:

language disorders
visual impairment
hearing impairment
physical impairment.

Children and young people with physical and/or sensory disabilities have the normal range of intellectual abilities. Therefore, courses for teachers of such pupils should cover all aspects of learning. However, many will experience learning difficulties which are common to the full range of pupils with special educational needs. The causes of their problems may be different but the educational treatment will generally be the same.

4.5.2 *Target group*

Mainstream or special school teachers of pupils with physical and/or sensory disabilities.

4.5.3 *Staffing and equipment*

Three tutors supporting and advising two work stations (as defined below) each, e.g. a ratio of one experienced member of staff to six course members. One technical consultant to keep the show smoothly on the road.

4.5.4 *Equipment*

Seven work stations, three course members per station

If possible, an additional work station might be provided in case of technical breakdown.

Each station should have a micro (BBC B or B+), a VDU, a disc drive and a Concept Keyboard.

At least two micros should have a word-processing chip.

4.5.5 *Numbers*

Maximum of 18 course members.

4.5.6 *Time*

One full day.

4.5.7 *Aims of the course*

To introduce teachers to a range of electronic aids to enable such pupils to have access to the full curriculum available to all pupils.

4.5.8 *Objectives*

a. Course members will use a stated number of the following peripherals:
   1. For general use:

      Concept Keyboard (larger size)
      Microwriter
      AMX Mouse
      Joysticks
      Word processors (particularly portable)

Cheshire keyboard
Quinkey
Trackerball
Range of printers and print type
Speech synthesisers

2. For pupils with physical impairment:

Special Technology expanded keyboard
Switches with an interface box (e.g. Access 3 or Micrex Toy Control Interface)
Key guards
Touch screen
Slomo
Photonic wand
Keymaster or other keyboard emulators

3. For pupils with hearing impairment:

Micromike
Visispeech
C-Speech

4. For pupils with visual impairment:

Vincent work station
Braillewriter
Touch screen
Versabraille
Speech synthesiser

b. Course members will produce a written evaluation and cross-curricular support material for one program from one of the following:

1. For general use:

A Word processor (Prompt/Mini-Office)
A Turtle graphics pack (Come and Go, etc.)

2. For pupils with physical impairment:

Nottingham Bliss program
Going Places (Widgit)
Write-on
Derek Harrison's Compact series
Single Switch education
Beeblinc

3. For pupils with hearing impairment:

   Hands-CG (Notts ITEC)
   Catchup (esm)
   Wordweb (esm)

4. For pupils with visual impairment:

   Speech Rom (Computer Concepts)
   Talking word processor (RCEVH)
   RCEVH Match/Choose software

4.5.9 *Suggested programme*

a. *Introductory talk*
Discuss the aims of the course and the plan of the day.
Reassure nervous participants etc.
Hand out a list of the main software/peripherals to be explored.
Introduce members to aids and peripherals by taking teachers around the microcomputer work stations.
Demonstrate equipment not at the work stations e.g. Brailler, Bliss Symbolics etc. (Include the devices in the general use list above.)
Consider demonstrating a simple and enjoyable program for teachers to use in school possibly Podd (ASK).
It is essential that course participants should not feel threatened.
All instructions should be given clearly and be jargon-free. All the micros should be wired and loaded with a simple program (e.g. Podd), tested and ready for instant use before course members assemble.

b. *Hands-on sessions*
Each station should have additional software as indicated below.

Station 1 Derek Harrison's Compact (BIMH) programs, with micromike and a range of switches. Possibly also Nudge Turtle.

Station 2 Prompt (Blue File) with a range of concept keyboard overlays, covering a wide ability range. Use the same overlays with Touch Explorer (Blue File) and voice synthesiser.

Station 3 AMX Mouse, Quinkey, Mini-Office (Database Pubs.), expanded keyboard and keyguards with

BBC Write (ACE) and speech synthesiser.

Station 4 Keyguard, Talking word processor, touch-sensitive screen with demonstration material and software for pupils with visual impairment (RCEVH).

Station 5 Photonic Wand (Photonic Wand Co.) with Beeb-Bliss (Micro Express) and the Photonic Wand Software. Elfin keyboard emulator with Podd (ASK)

Station 6 Wordweb (esm) for pupils with hearing impairment, Slomo, Joystick and games programs.

Station 7 Range of switches, some demonstrated with Single Switch Education program (SSE) program and Beeblinc, Wipe.

4.5.10 *Organisation*

Course members to rotate round the stations using the equipment and software provided. The amount of time to be spent at each station will depend upon the needs of the participants, the composition of the course and the overall time available.

Plenary sessions to be held to discuss the suitability of the aids, peripherals and programs seen, for different pupils. Short sessions will be held to discuss the special needs of the pupils with physical and/or sensory impairments and problems they will meet in using the files prepared by the course members.

Course tutors to obtain guidance from course members as to future activities, e.g. another course for a specific purpose, the establishment of a user group with a specific task related to the problems raised in discussion, etc.

Hand-outs to be provided giving details of sources of software, devices, support and further information. Publications from the ACE Centre will be of particular relevance.

4.6 INSET courses for teachers of students with special needs in further education *(Peter Fowler, National Co-ordinator, CET/EEC further Education Project)*

4.6.1 *Introduction*

When planning INSET courses for teachers of students with special

needs in Colleges of Further Education, it is important to remember that most colleges have only recently begun to tap this potential source of students. It is not surprising therefore that the use of the microcomputer within FE special needs courses is usually limited to 'Computer Literacy' or 'Computer Awareness' sessions in the Computer Studies Department. Such lessons are often unrelated to the work being done in their own department during the rest of the week. Often, therefore, work with the computer appears to be relegated into both a physical and curriculum siding! A curious paradox thus emerges.

4.6.2 *The new approach to FE*

The curriculum of special needs courses described in the 1985 National Foundation for Educational Research/Further Education Unit (NFER/FEU) package *From Coping to Confidence* is firmly in tune with the 'New FE' approach. 'New FE' courses sprang up after the publication of a series of FEU documents, beginning with *A Basis for Choice* in 1981. This urged Colleges of Further Education to be prepared to meet the increased demand from young people with a lower than average academic background who could not find employment. The staff were asked to consider devising new courses based on skills required for living. It was suggested that a thematic approach, incorporating aspects of different learning areas, should be the norm. As much of the work as possible should be rooted (just as in real life) in a practical base. In other words, the students were to be prepared to face the realities of the world outside and their work in college should, as far as possible, be based in that world.

4.6.3 *Certificate of Pre-Vocational Education (CPVE) and the microcomputer*

The Certificate of Pre-Vocational Education (CPVE) is the culmination of the trend begun by *A Basis for Choice*. Embedded within the guidelines published by the Joint Board is the instruction that approval will not be given to a course submitted by a college which does not have the core and vocational elements built in as an integral part. Since many FE special needs courses are either based on the CPVE curriculum or are actually being run as CPVE courses, the separateness in the use of the microcomputer within many such courses is rapidly becoming both untenable and anachronistic.

Thus the paradox is that the newest of technologies is being used

in the oldest manner within courses which generally have the freshest of curricular approaches.

4.6.4 *Using the micro across the curriculum*

Admittedly, in the earliest stages of using microelectronics as an input, there is a need for an introductory module on aspects of computer awareness, familiarising the students with the hardware in question. There might also be a need for the teaching of Information Technology (IT) as a separate subject, just as there might be a need for some specific inputs within, say, the mathematics curriculum. Some colleges, however, do not progress beyond this elementary stage.

In not using IT across the curriculum and in opting for what appears to be the easiest route, they ignore the massive potential of the microcomputer which can bring alive parts of the curriculum which often appear to students to be dry to the point of actual tedium.

4.6.5 *An important teaching resource*

In-service courses for FE lecturers, therefore, should stress this aspect of work with the microcomputer. Such courses could use, as their base, parts of the special needs course curriculum to demonstrate how work with the microcomputer can illuminate any section of the curriculum. The micro should be seen as an indispensable teaching aid, as natural in the classroom setting as a pen, pencil and writing paper. It is not a peripheral activity or a fad, here today and gone tomorrow, but a permanent addition to the range of resources at the disposal of the teacher.

4.6.6 *CPVE curricular core areas*

It appears that most FE special needs courses, whilst having slightly different emphases in the various colleges, use as their curriculum something more or less analogous to the CPVE core and it is, therefore, a useful curricular base from which to work. Each of the ten core areas, or a selection of them depending on the duration of the course, could be examined to see how any given section of the curriculum might be enhanced by the use of the appropriate microcomputer programs.

4.6.7 *Communications*

If we take, for example, the CPVE core area of Communications, the aim 'to write effectively' (CPVE Communication Core Area, sub-aim 3) is undoubtedly helped by the use of the word processor. FE special needs students are accustomed to academic failure. Frequently that failure is caused by writing which is poor both in construction and presentation. The word processor allows both correction of a text without the need for crossing-out (or the ubiquitous Tipp-Ex) and the production, with a printer, of a beautifully presented fair copy.

The smile on the face of a student watching the printing out of his of her piece of work tells the story more accurately and poignantly than words. The smile is a smile of realisation that he or she can 'do it' and is capable of producing something worthy of being pinned on the classroom wall as an example of good work. The student may have made umpteen mistakes during the initial writing stage and may have had enormous help from the teacher but the sight of this perfect copy may be sufficient to break the chains of failure and produce a spark of confidence; the first flicker of a genuine breakthrough.

a. *Word processors*

There are many word processing systems which can be used by special needs students in FE and it is not necessarily the case that such students should be protected from those generally considered to be more sophisticated. For the less able students, the best introduction remains Prompt 3 (MEP Blue File) with an alternative keyboard device such as the Concept Keyboard. Lecturers should be sensitive to the age of FE students and avoid the possibility of appearing patronising.

The report of the Department of Trade and Industry (DTI) Project based at Blackpool and Fylde College of Education, *Introduction of Information Technology Awareness Programme to Assist Handicapped Persons*, noted:

> 'At the outset of the project there was very little software available for use with an alternative device ie. Concept Keyboard, Micromike, pressure switches. Students had little alternative, in these early stages, but to persevere with the use of the standard keyboard. The outcome was quite unexpected; on the whole, students actually preferred to make 'standard' keyboard inputs and were willing to accept a slower mode of use in order to access a wider variety of software.

It seems likely, therefore, that a comprehensive and yet simple-to-use word processor could well be appropriate for FE special needs students. Wordwise Plus (Computer Concepts) or

Edword (Clwyd Technics) fit the bill and can both be highly recommended.

b. *Writing skills*
Writing can be further encouraged by the use of the 'newspaper editor' style of software which has become available over the past year or so. Front Page Extra, freely available to those LEAs with a licence to use MAPE software, is a first-class introduction to the idea of students converting their writing into a page of a newspaper. This kind of work could be developed by progressing to Fleet Street Editor (Mirrorsoft) or AMX Pagemaker (AMX) which allow near-professional productions.

Other uses could, of course, be found for this software. Front Page Extra is so easy to use that an individual student could almost certainly produce one or two 'front pages' a week. The students could be asked to produce, as a series of 'lead stories', their ideas of the main 'news' of the week (either about the course itself or the world at large). The differing points of view as to what constitutes 'news' might then be used as a starting point to examine different perspectives of our national newspapers.

What is often considered to be a 'dry' topic could, as a result of work with the micro, be brought alive by kick-starting the topic with subjective and practical work.

4.6.8 *Social skills and problem-solving*

Looking at two other CPVE Core Areas — Social Skills and Problem-Solving – the Joint Board stress the need for the students 'to work effectively in groups' (Social Skills Core Area, sub-aim 1) and the need 'to solve problems' (Problem-Solving Core Area, main aim). The use of adventure programs on the micro effectively covers both these areas. Those which have proved popular with FE students include Merlin's Castle (MAPE), Into the Unknown (Tressel Publications), Mallory (MAPE) and Dragon's World (4Mation).

By the very nature of these programs, the students, working in small groups, are forced to work co-operatively and to note the information they are acquiring as the adventure develops. They have to write, think, draw maps and talk constructively among themselves. Moreover adventure programs are fun and are rendered even more enjoyable if several small groups are competing with one another to complete the task first.

4.6.9 *Numeracy*

With the Core Area of Numeracy, CPVE stresses two aspects. First, the student should '. . . develop mathematics as a communication skill to levels adequate to meet basic demands of contemporary society' (Numeracy Core Area, main aim). Second, the student should have a grasp of numerical and spatial concepts (sub-aims 1 and 2).

Whilst it is true that many available numeracy programs stress drill and practice routines, there are now several which deal with the mathematics required for everyday life. Especially useful are some programs in the Microspecial Pack (Hill McGibbon), e.g. Timetables, Coins, Bike Insurance, Clocks and Banks. They simulate real life situations and, are generally, both enjoyable and educationally valid. They therefore provide the vital mix necessary for genuine progress by special needs students.

The teaching of concepts is much more of a problem. However, the introduction of simple robotics such as the Jessop Turtle (Jessop Ralph) is beginning to prove exceptionally useful in the development of spatial concepts. One of the prime weaknesses of special needs students in FE, highlighted by many vocational teachers (e.g. those in carpentry and basic engineering) is their inability to measure accurately, estimate lengths or understand angles. The use of robotics is a superb way of dealing with this elementary problem and, if combined with work in other fields (e.g. map-reading), can produce excellent results. It is amazing how quickly an individual student can grasp what is meant by forty-five or ninety degrees when ordering the movement of a turtle.

4.6.10 *IT, personal and career development*

FE special needs students are being prepared for adult life. The Core Areas thus far mentioned are pursued to help the students acquire skills specifically needed for that life. By developing communication skills (writing and numeracy) and by encouraging them to work together co-operatively, it is hoped that the student will be able to cope more effectively and confidently with the demands made on them in an increasingly complex world.

FE courses must also be directly involved in preparing students to apply for and (hopefully) obtain a job. Here again, the micro can play its part. In the Core Area of Personal and Career Development, CPVE expects the student to be able to: 'acquire information on how to choose jobs and how to explore the range of job

opportunities' and to 'gather information on the opportunities available'. (Personal and Career Development Core Area, sub-aim 2)

If we take this aim together with that mentioned in the Information Technology Core Area concerning the 'practical appreciation of data handling' (sub-aim 3), the use of the available databases immediately becomes apparent. Lists (MEP Blue File), Maker/User (Northern Micro Media) and the more sophisticated Quest (AUCBE) are all extremely useful. Together with the work being done on word processing, the added use of a database will enable a student, or a small group of students, to produce a suitable letter of application and a neat CV and to create a data bank of local firms, businesses and other likely places of work to be approached for a job. At the same time, the students develop skills of handling data on a microcomputer which, in itself, should add to their employability.

4.6.11 *Conclusion*

All of these are, of course, mere examples. Such is the vastness of the potential of the micro that a use for it could be identified in each of the CPVE Core Areas. Using the micro against the background of a curricular base indicates one way to develop an INSET course for FE teachers which is essentially practical, highly relevant and exciting. It might also reduce the fear of many teachers who still feel that working with a micro demands some esoteric mathematical or scientific wizardry quite beyond their capabilities.

Finally, in-service FE courses might take advantage of advice and information from their regional SEMERC. The SEMERC's emphasis on the value of content-free programs is worthy of serious consideration by teachers in FE. These programs can be readily adapted by teachers to meet the specific educational needs of their students.

4.7 A course on microelectronics and special needs for support teachers, advisers and others with INSET responsibilities

4.7.1 *Introduction*

The target group for the course was staff nominated by Local Education Authorities because they are, or will be,

a. responsible for organising and/or directing in-service courses for

teachers on the use of microelectronics in the education of children with special educational needs; and/or

b. supporting and advising teachers in the use of microelectronics in the education of children with special educational needs; and/or
c. coordinators of microelectronic support groups with a particular interest in developing work in special education.

Each local authority was invited to nominate two suitable persons (education staff members, head or advisory teachers) and it was made clear that the authority's special education adviser, if not a selected representative, was welcome to attend.

The course organisers listed the aims and objectives of the course as follows:-

Aims

There is a well recognised need to extend the use of microelectronics across a wider and more balanced curriculum offered to all children with special educational needs in special and ordinary schools. There is also a need for more in-service work by LEAs to make more class teachers aware of the potential of the micro in this respect.

These courses, therefore, are aimed at providing opportunities for course members to:-

a. discuss the philosophy of, and issues raised by, using micros to provide a 'wider curriculum' for pupils with special educational needs;
b. assess the appropriateness and potential of software for use in teaching children with special educational needs.

Objectives

During the course members will

a. sample and demonstrate software to other course members
b. prepare support material for selected programs to extend their use across the curriculum, and
c. prepare, in consultation with others, INSET course programmes for teachers on using micros with children with special educational needs.

4.7.2 *Description of the course*

The course was run and administered by the Council for Educational Technology at a university hall of residence. Most course participants were in residence for the week. The accomodation was well suited for the activities with a range of rooms of different sizes, easy-chair seating and handy bar and refreshment facilities.

The course programme, as notified to participants in the pre-course material is given below.

Day 1.

Session 1. Developments in the use of microelectronics in the teaching of children with special educational needs.

Session 2. Establishing a core library of software.
During this session course members are given an opportunity to demonstrate particular programs which they have used and to show examples of children's work.

Session 3. Workshops when course members group themselves in twos or threes to discuss and select a program for further study.

Day 2.

Session 4. Content-free programs and files.

Session 5 and 6. Working groups assess a program from one of the 'Software Core Library' areas. Each group prepares a demonstration of a program, to be given to an in-service course of teachers who have little or no knowledge of micros.

Session 7. Demonstrating and sharing views on the most effective use to be made of the software studied.

Session 8. Video presentation and access to software and micros.

Day 3.

Session 9. Support material to extend the use of micro software across the curriculum.

Session 10 and 11. Working groups to prepare course curriculum support material for chosen software.

Section 12. Forum: progress report from working groups.

Session 13. (Optional) Access to software and micros.

Day 4.

Session 14. Planning INSET courses in Microelectronics for teachers of children with special educational needs:

presentation of suggested programme prepared by CET team.

Session 15. Working groups to:

a. examine and prepare comments, criticisms, suggestion for change, improvements etc. of draft 'one day course for teachers'.

b. plan an appropriate course for own use.

c. individuals in the groups to prepare support material for **one** session of the proposed INSET course.

Session 16. 'The National ACE Centre'.

Session 17. Working groups (Session 15 continued).

Session 18 and 19 Working groups. Preparing final documentation for delivery in plenary session and display of material.

Day 5.

Session 20. Group's feedback to main body results of course work.

Session 21. Final session.

A postscript to the programme stressed that the arrangements are flexible and changes can be made in response to the needs of course members.

References

A Basis for Choice, FEU, 1981.

Bradley, J., Dee, L. & Hegarty, S. (1985), *From Coping to Confidence.* NFER/FEU, Oxford.

CPVE B/TEC Publications, 1985.

Blackpool and Fylde College of Further Education (1985), *Introduction and Information Technology Awareness Programme to Assist Handicapped Persons.*

Appendix 1

Sources of information — some material available when planning a course

John Morton, CET Information Consultant

There are many sources of information available to teachers about all aspects of using the micro in the classroom. The following are of particular interest to teachers of children with special needs.

A.1.1 Special Education Microelectronics Resource Centres (SEMERCs)

The four SEMERCs in Bristol, Manchester, Newcastle and Redbridge (London) are part of the Microelectronics Education Programme (MEP), now the Microelectronics Education Support Unit (MESU). They provide advice and information on the use of microelectronics to support pupils with special educational needs. Each SEMERC publishes periodic newsletters and carries stocks of free, nationally produced Information Sheets and shorter Briefing Notes. They also hold copies of a database of evaluated software. (These are described more fully below.) Because of the large territories they cover, the SEMERCs frequently take exhibitions 'on the road'.

The huge demand for their services and limited staff resources, however, mean that the main thrust of the SEMERCs' work must be directed towards LEAs and LEA advisers, rather than towards schools and individual teachers. A major effort has been made, therefore, to establish 'contact' schools and individuals in each LEA area who will act as dissemination points for information and, especially, freely-copiable software.

A.1.2 The Aids for Communication in Education Centres (ACE Centre)

The national centre for Aids for Communication in Education (ACE) acts in a similar way to the SEMERCs in gathering and disseminating information about such aids. It provides facilities for those who wish to see and try out what is available and it seeks to identify (but not develop) new ideas for devices and associated software.

ACE maintains its own database of hardware and software, from which it produces papers on topics such as switches and micro interfaces, communication aid programs and software and equipment for children with severe

learning difficulties. These are available at prices which cover the costs of reproduction only.

A.1.3 **Briefing sheets and occasional papers**

Briefing Sheets are a series of short leaflets on various aspects of the use of microelectronics with pupils with special educational needs. As their name implies, they are short; no briefing will ever be longer than four A4 pages.

Four categories of Briefing Sheets and Occasional Papers are issued and briefing sheets are regularly updated.

A.1.3.1 *Briefing Sheets*

a. *Core Library (Support across the curriculum)*

No.	*Title*
1.	MESU and Children with Special Needs (including Index to Briefing Sheets)
2.	Core Library for the BBC Micro
3.	Core Library for the RML 480Z
4.	Core Library — Developing writing skills
5.	Core Library — Information handling
6.	Core Library — Links with the real world
7.	Core Library — Adventure programs and simulations
8.	Core Library — Logo and turtles
9.	Core Library — General framework programs

b. *Lists*

No.	*Title*
10.	Software support packs
11.	Peripherals for special needs for BBC Micro
12.	Peripherals for special needs for RML 480Z
13.	Books and videos
14.	Suppliers

c. *Resources for particular groups*

No.	*Title*
15.	Severe learning difficulties
16.	Visual handicap
17.	Hearing impairment

d. *Software to support particular curricular areas*

No.	*Title*
18.	Mathematics
19.	Music
20.	Art and design

A.1.3.2 *Occasional papers*

No.	*Title*
85/1	Changing the Microspecial program 'Eating for Health'
85/2	Changing the Microspecial program 'Food for the Family'
86/1	Flicker Induced Epilepsy
86/2	Using the Master 128
86/3	Using Databases for Information on Special Needs
86/4	Software for the Microvitec Touch Sensitive Screen
86/5	Using Word Processor Programs to Support Low Attainers

A.1.4 Database of evaluated software

Each SEMERC holds a copy of a nationally-produced, electronic database of software suitable for children with special educational needs. At present it contains something approaching 300 one-page reviews of suitable programs (or suites of programs). These provide the essential facts (titles, publishers, prices, hardware etc.), short descriptions of what the programs do and some critical comments. They also include the age ranges, the learning difficulties and the curricular areas and teaching objectives for which the programs have been found most useful. The database can be searched for those reviews which satisfy almost any combination of these factors. No program has been included unless it has been commended by at least one class teacher or by a reviewer in one of the well known magazines. Programs that have not yet been so commended, or have so far received only adverse comment, have been omitted for the time being.

The views expressed, whether complimentary or critical, are those of the teachers/reviewers concerned, *not* those of MEP.

The reviews have three distinct (and important) features which we believe are unique. These are:

a. The reviews are written in English throughout, avoiding codes, and are therefore easily readable.
b. All the programs have been evaluated by at least one teacher/reviewer.
c. To avoid ambiguity, the terms used in the areas most likely to be searched have been drawn from a controlled search vocabulary or thesaurus. A list of keywords and a guide to searching are given.

The SEMERCs can supply printed copies of these reviews free on

request. However, pressure of work makes it necessary to limit the number of reviews to ten at any one time.

Also, a copy of this database is available from the SEMERCs (at cost) on a double-sided 80 track disc suitable for the BBC micro and updated versions will be available from time to time on a free exchange basis. However, using the disc requires the appropriate database program. This is available on ROM (called SupaStore) from esm, Duke Street, Wisbech, Cambridgeshire PE13 2AE. It is simple to use, being operated mainly by cursor and return keys from a series of menus.

The data are also available to any subscriber to the Times Network for Schools.

A.1.5 The Times Network for Schools (TTNS)

By arrangement with TTNS, a 'Special Needs' section of their database has now been established. It is intended that this will become an increasing source of information to LEAs and schools.

Subscribers can find all the data in the MESU database in the Special Needs section of TTNS database. This enables them to search very easily and quickly for those reviews which satisfy almost any combination of criteria and take such copies as they wish.

A.1.6 Prestel Education

The Prestel Education Service, a joint venture between CET and Prestel, provides a comprehensive service to educational viewdata users. Starting on page 888, the Education Service carries specialised information on areas of interest to all educationists. It provides some information itself and links to a range of other databases, each concerned in some way with education and containing information on some topic or service via A–Z indexes (CET Information Sheet No. 2, October 1985).

A.1.7 Prestel Special Educational Needs Database (SEND)

Starting on page 515, SEND contains over 3000 screen pages of information, including details of:

a. Microelectronics hardware, e.g. specialised equipment and add-on devices for a variety of microcomputers.
b. Software database which includes over 350 programs written for, or found useful for, special needs.
c. Publications, e.g. relevant magazines, newsletters, books, information sheets/leaflets and audio-visual material.
d. Developments in the field, e.g. details of projects.

e. Contacts and sources of advice, e.g. individuals and organisations in the UK with an interest in the use of micros for special needs.
f. A 'newsfile' of items of interest e.g. special offers, overseas initiatives, recent research, sources of funding, etc. (*Scottish Council for Education and Technology News Education* No. 33, Autumn 1985).

Appendix 2

Evaluating computer software

A.2.1 Special education software

Comparatively little software has been written specifically for children with special educational needs, although the position is improving. It can often be a matter of discovering what mainstream material is suitable for, or can be adapted to, their particular needs.

A.2.2 Reviews of software

Computer programs are not like books; you cannot glance through them quickly to see whether they have what you want. There are no short cuts, you have to plough most of the way through to find out what they are all about and that takes time. Reviews of software are therefore of crucial importance in helping to short-list the possibilities.

A.2.3 Practical issues

The practical issues that a review should deal with are pretty obvious, e.g.:

a. What hardware is needed?
b. What type of machine?
c. Does it need a disc drive and/or printer?
d. Is there an overlay keyboard, light pen or other alternative input option, etc.?
e. How much does it cost?
f. Is the program accompanied by adequate documentation – not just instructions but also suggestions as to associated classroom activities, preferably with sample worksheets?
g. Are there any problems in actually running the program, difficulties of control and pace or insufficient foolproofing?
h. Is the screen display easy to read, uncluttered, with minimal, large-character text and a sensible choice of colours?
i. How loud is the sound and can it be controlled? (An important factor in a crowded classroom.)
j. How can the program best be used in practice – with a single student, small groups or the whole class?

k. What is the teacher's involvement, bearing in mind that if only a few pupils are using the computer, someone has to be looking after the rest of the class?

A.2.4 Educational issues

The basic educational questions should also be obvious – though reviewers sometimes seem to forget them in their enthusiasm for the programmer's animated graphics!

a. What are the aims and objectives of the program?
b. Are they made clear and how relevant are they?
c. More precisely, for what teaching objectives might the program be used and in what way (if any) does the micro make a special contribution towards achieving them?
d. What teaching style is employed? All too rarely do programmers make this explicit.
e. For what kinds of students (development ages, learning problems, etc.) is the program most suitable?
f. How flexible or adaptable is it to meet a variety of such needs?
g. How likely is it that any skills acquired will be transferable to real-life situations?

Clearly, not all of these points can be dealt with explicitly in every review, if it is to be of manageable length. But we should be able to rely on the reviewer to pick out those features which are not satisfactory or which need to be drawn to our attention.

Even then, however comprehensive a review, only the teacher can assess the usefulness of a program for particular purposes. He/she will have his/her own stylistic preferences and will know which suit a particular student or group of students. Above all, it will be for the teacher to use the programs, either within the context of the existing curriculum or in order to extend it.

A.2.5 Conclusion

When considering what software to buy with a limited budget, therefore, teachers should first think very carefully about their own classroom situation and the precise objectives they have in mind.

As many reviews as possible should then be read. Reference to the previous section on sources of information (see Briefing Sheets listed on page 55) will help.

If at all possible, programs should be seen before ordering. A growing number of LEAs are providing viewing facilities at resource centres.

Finally, good software is not cheap, and costs seem to be rising. However, there is now a useful body of freely copiable software available through contact schools or individuals. If a teacher does not know his LEA contact school or person the regional SEMERC can advise.

Appendix 3

Evaluation of the CET/MEP course on microelectronics and special education

This appendix provides details of the procedures used and the findings of Project Impact's evaluation of the CET-MEP course described in section 4.7 (p 50).
Readers interested in the methodology of this evaluation, or wishing to evaluate their own courses, are referred to the companion volume to the Impact INSET packs *In-service Training and Special Needs: Running Short School-Focused Courses* especially to the section on approaches to evaluation. It is appreciated that a research project is able to devote much greater time and resources to an evaluation than is normally feasible for the person wishing to evaluate his or her own course. The companion volume gives realistic suggestions as to what might be done in these circumstances.

A.3.1 Procedures

It was made clear to all participants both in writing and verbally, that while it was hoped that they would participate fully in the evaluation to assist in developing the course, such participation was entirely voluntary. The evaluation for this course followed what has now been established as a standard pattern by the project team. This comprised:

a. *Pre-course interviews* of a subset of intending course participants in their own schools or other work setting.

b. *Participants' perceptions and current practice sheet.* All participants were asked to complete a sheet on registration for the course at the beginning of the week. This covered their reasons for attending the course, their views of the course objectives and aspects of their current practice, particularly in connection with microelectronics.

c. *Content evaluation sheets.* At the first session of the course all participants were given a content evaluation sheet and were asked to complete this after each session during the week. This covered their ratings of the usefulness and interest of the sessions, their previous knowledge of the

topic, their expectations about whether or not the session would change their approach in school and gave an invitation to comment more generally.

d. *Information sheets.* Halfway through the course, participants were asked to complete the standard Project Impact information sheet giving details of their background and experience.

e. *Participants' perceptions and future plans sheet.* At the end of the course participants were invited to give their views on the contribution of the microcomputer to their work, their present view of the course objectives, what they would do differently in school as a result of the course and also to comment on various general aspects of the course.

f. *Follow-up sheet.* All participants were asked to complete a follow-up sheet approximately three months after completion of the course concentrating on ways in which the course has affected their practice.

g. *Follow-up interviews.* On receipt of completed follow-up sheets a subset of participants were interviewed and/or observed in school.

Note: Project Impact staff were present at virtually all sessions of the course throughout the week on a semi-participant basis. Informal discussions with both tutors and participants were held throughout the week.

A.3.2 **Findings**

The central message from this evaluation is that the course is well received by the participants, who consider it to be both useful and interesting. It appears to have had a substantial effect on their subsequent practice. (Details on this latter aspect are presented in the full evaluation report which is available from Project Impact – address at the end of this summary.)

A.3.2.1 *The course sessions*

a. Working groups

While differentiated tasks for the different sessions devoted to working groups were listed in the course programme, the participants tended to view these sessions as something of a seamless web with a continuing activity. This activity was usually related to content-free software, typically to a single program.

The working groups were all very highly rated on interest and

usefulness (mean in all cases over 4 on a 5 point scale) and showed high expectation of change (over 70%) in all cases. The flexibility of this aspect of the course, with in the extreme some participants continuing to work as individuals, was generally viewed very favourably with a few dissenting voices.

It might be argued that participants would tend to vote for flexibility as enabling them to get on with what they wish to do, rather than with that from which they would derive maximum benefit in line with the course objectives. This is obviously a fundamental issue in education and, given the balance in the course (i.e. substantial number of tutor-led sessions) and the maturity of the participants, this is not regarded as a valid criticism here. However, and tentatively, *consideration might be given to strengthening the expectation that all members take part in the group tasks.* The subjective impression was gained that those working individually tended either to be the most experienced (who could have contributed to colleagues in the group) or least experienced (who were possibly 'hiding' and would have benefited from the group's experience). However the high degree of informal discussion which took place across groups and individuals appeared to fulfil an equivalent function.

Note:
The group session on planning an INSET course is considered separately below.

b. *Tutor-led sessions*
With two exceptions, the tutor-led sessons were favourably received by participants and can be seen as fulfilling a clear role within the course programme. The sessions causing problems are detailed below.

a. *Videos* In a sense this is a minor issue, as this evening session was made optional and few people attended – most preferring to continue working with software. However it was clear that several members were, very reasonably, interested in the potential contribution that videos could make to their work (particularly on INSET courses) and that the inclusion of a video regarded by the presenters as of controversial content was not well received. *It seems appropriate to continue this session on an optional basis but only using videos considered to be of the best practice by the course presenters.*

It is tempting to try to relate this session more closely to the

in-service theme of the course but this would probably mean making it non-optional, which would be likely to be poorly received by participants who would see it as peripheral to their main concerns.

b. *The National ACE Centre* *The nature and place of this session needs consideration.* The considerable interest in the hardware covered in the session suggests *this should be handled by changing the style of the presentation*. However, it does not appear to have an obvious or comfortable niche within the programme. If it is felt to be valuable for participants to have knowledge about the centre, then consideration might be given to the suggestion that the material could be covered through a display and hand-out rather than by a tutor-led session.

The following points deserve consideration, though they represent points of view put forward by small groups of participants rather than majority views.

c. *Content-free programs and files* Although this session was well received and satisfactorily rated, and indeed had a major impact on the work subsequently carried out in groups, the specific examples chosen to illustrate the use of content-free programs clearly alienated several participants. *It is suggested that examples should be in general geared towards use by the child with special needs rather than directly by the course participants.*

It is recognised that this may represent a point of pedagogical principle and if the suggestion is resisted, a compromise position whereby the idea is briefly introduced at participant level, followed by extended examples at child level, might be considered.

d. *Planning INSET courses (and associated group task)* This aspect of the course received quite satisfactory mean ratings for interest and usefulness and a high seventy per cent expectation of change. The INSET theme is clearly seen by participants as an important part of the course. It is, in general, a strong element in their own professional concerns and, when asked in general terms what they are going to do differently as a result of the course, INSET is mentioned many more times than anything else.

Nonetheless, several articulate participants were clearly unhappy with these sessions. This does not so much apply to the tutor-led session, although the impression is gained that some participants were looking for a more prescriptive account, as to the group sessions. Again, several participants appear to have got a great deal from the group sessions but with others unease and frustration is clear. The following factors appear to have contributed to this:

i. *Group size* Whereas the working groups for other tasks typically had two or three members the thirty participants were split into four groups (special-need-related viz, 'severe', 'moderate', 'mild' and 'sensory'). The groups, based on members' professional interests, were of unequal size and some members in larger groups expressed concern about this.

ii. *Model suggestions for a one-day course* The starting point for discussion was provided by printed 'sets of suggestions' for a one-day course for teachers, either of children with mild and moderate learning difficulties or with severe learning difficulties. These tended to be reviewed critically by participants, largely on the grounds of over-ambitiousness. There was also some confusion about the nature of the group task and its link to these guidelines.

iii. *Heterogeneity within group* Groups tended to include members with widely varying experience of micros and of children with special needs. Negative comments tended to come from experienced teachers who felt that the discussion was hogged by school-inexperienced computer specialists.

It would be unwise to over react to these worries, bearing in mind that there is a very strong message that the course has helped participants with their in-service responsibilities. It might also be noted that, to a semi-participant observer, the group had a good (though typically rambling) discussion of priorities and issues in in-service, producing an interesting course programme. However, it *may be of advantage to deal with these sessions in a fluid manner in later runs of the course, possibly with group size limited to, say, six and with the course programmes generated on this field trial as a starting point.*

A.3.2.2 *Aims and objectives*

There is, in general terms, a healthily close correspondence between the presenters' stated aims and objectives, the participants' pre-course view about the course they are coming on and the participants post-course view about what the course had been about.
Such discrepancies as there are, are of interest and are detailed below.

a. *Allows participants to meet colleagues with similar interests and exchange ideas*
This type of objective was not included in the presenters' list. However, it was mentioned by several participants pre-course and was the second most commonly perceived objective post-course (after 'To prepare INSET course programmes'). The general ambience of the course, the weighting given to group tasks and the setting, which encouraged after-hours informal interaction, are clearly conducive to the realisation of such an objective. Hence *it is recommended that this should be stated as an explicit course objective.*

b. *To demonstrate one program to other course members*
Although stated as a course objective, to all intents and purposes this appeared to have been invisible to participants as an objective. In fact, several, though by no means all, course members did demonstrate a program to others. It is tentatively suggested that this 'invisibility' is likely to be a matter of nomenclature, i.e. that, particularly after the course, participants clearly knew that this was part of the course but didn't regard it as an objective. While this is not regarded as of any great moment, *the course team are invited to reconsider their meaning of the term 'objective'* and subsequently to reassess whether this objective should continue to be included.
note: Very similar points can be made about the course objective 'to study one program in depth'.

c. *To prepare support material for program to extend use across the curriculum*
Superficially similar, although probably more important, points can be made in connection with this course objective. While it gets four mentions pre-course, it is not mentioned post-course as a perceived objective. It is this decrease, together with the feeling that this is regarded by the providers

as quite an important achievement for those on the course, which gives rise to some concern. Participants did prepare such material (in the sense of files to support a piece of software) so this may be to some extent a matter of nomenclature but *it is necessary to clarify the distinction between creating files to support a piece of software* (which is part of the course) *and developing non-computer support materials* (which is possibly suggested by the objectives but referred to rather than carried out on the course.)

A.3.2.3 *Procedures for, and timing of, contacts with potential course participants*

The evaluation of the pilot trial revealed some problems in this area. It is pleasing to note that the procedures then proposed appear not only to have been used but to have generated a set of participants who had a clear concept of the course requirements and nature. The invitation to local authority special education advisers to attend such parts of the course as they were able to was taken up by several such advisers and appreciated by them.

A.3.2.4 *Target groups of participants*

The pre-course literature to Local Education Authorities gave a clear specification of the target groups. This specification appears to have been adhered to quite closely and, while this in itself generates a group heterogeneous with respect to microcomputer experience and special needs experience, this appears to be adequately acknowledged in the approach taken in both tutor-led and group sessions.

A.3.2.5 *Overall organisation and loading of the course*

The course does demand considerable expenditure of time and effort on the part of the course members (including the tutorial team) but there is now little or no indication that it is overdemanding. By comparison with the pilot trial, the group tasks appeared to be carried out in a somewhat more relaxed manner. The balance between tutor-led and group sessions does not attract critical comment. There are isolated requests for some form of social event either earlier in the week or mid-week and/or a 'getting to know you' introductory session.

A.3.2.6 *General*

Both in writing and informally, many participants comment favourably upon the helpfulness and relaxed professionalism of the course leader and tutorial team, with particular plaudits to the Manchester SEMERC staff. The hope was commonly expressed that some means could be found of permitting the group to continue in some fashion to capitalise on the work done during the course and to maintain the contacts.

A.3.2.7 *Published materials*

Discussions with the course team and SEMERC manager has lead to the specification of sets of materials to be published within the 'Impact' series by Manchester University Press. They will cover many of the areas dealt with on the course with an extended range of examples of different kinds of in-service courses suitable for work in relation to severe and moderate learning difficulties, physical and sensory handicaps both at initial or introductory level and for those with some previous experience. Extensive suggestions for the use of Touch Explorer, Prompt and adventure games will be provided, incorporating files produced on this course and on other similar courses.

Arrangements have been made with two course members to produce a video showing a range of examples of the use of microcomputers in relation to special needs including content-free software. It is anticipated that the video will be available as support material for the printed material referred to above.

Colin Robson and Judy Sebba

Further details on these materials and on the rest of the series can be obtained from:

Project Impact
Hester Adrian Research Centre
University of Manchester
Oxford Road
MANCHESTER
M13 9PL

Appendix 4

Book list

Reference books

New Information Technology in the Education of Disabled Children and Adults, David Hawkridge, Tom Vincent & Gerald Hales, 1985, Croom Helm. ISBN 0-7099-1272-2.

Micros for Handicapped Users, Peter Saunders, 1984, Helena Press. ISBN 0-9507930-2-7.

Computer Help for Disabled People, Lorna Ridgeway & Stuart McKears, 1985, Souvenir Press. ISBN 0-285-65009-2.

Information Technology and Further Education, Brieda Vincent & Tom Vincent, Kogan Page. ISBN 0-85083-569-5.

With a Little Help from the Chip, Fred Heddell, ed. Anna Jackson, 1985, BBC. ISBN not known. Orders to 'Chip', BBC TV, London W1Z 8QT.

Microfair – Electronic Aids for the Handicapped (Exhibition Catalogue), 1983, Handicapped Persons Research Unit.

The Concerned Technology – Electronic Aids for those with Special Needs, 1984, Handicapped Persons Research Unit (supported by the DTI).

Concerned Technology in Education Conference Edinburgh, Sept 3–7 1984, Ed. J. G. Morris, 1985, Department of Trade and Industry, ISBN 0-85605-308-2. Orders to John McCann, 29 Bressenden Place, London, SW1E 5DT.

Computer Evaluation Study, Rita Jordan, 1984, National Autistic Society. No ISBN.

Computer Evaluation Study, Software Description and Evaluation, Rita Jordan, 1984, National Autistic Society. No ISBN.

Electronic Devices for Rehabilitation, ed. John G. Webster *et al.*, Chapman & Hall Ltd. ISBN 0-412-26100-6.

Descriptions of use

Microtechnology in Special Education, Andrew Rostron & David Sewell, 1984, Croom Helm. ISBN 0-7099-2234-5.

The Magic of the Micro – a Resource for Children with Learning Difficulties, ed. Mary Hope, 1986, Council for Educational Technology. ISBN 0-86184-157-3.

Greater Manchester Primary Contact – Special Issue No. 3, Microcomputers, ed. Roland Fairbrother, Didsbury School of Education, Manchester Polytechnic, 1985. ISBN 0-263-3548.

Wordwise and Less Able Pupils, Lisa Blunt (as part of the Reports from the Classroom series), RESOURCE at the MEP Regional Information Centre in Doncaster.

Micro-Explorations 1 and 2, Frank Potter & David Wray, United Kingdom Reading Association. No ISBN.

Special Technology for Special Children, Paul E. Goldenburg, 1979, University Park Press, Baltimore. ISBN 0-8391-1441-9.

Computers and Reading Instruction, Leo D & Olga P. Geoffrion, 1983, Addison Wesley. ISBN 0-86184-102-6.

Philosophical/Interesting/Research

Mindstorms, Seymour Papert, 1982, Harvester Press, Brighton. ISBN 0-861-841313.

Young Learners and the Micromputer, Daniel Chandler, 1984, Open University Press. ISBN 0-335-10578-5.

Computer Experience and Cognitive Development, Robert W. Lawler, 1985, Wiley & Sons, Chichester. ISBN 0-470-20194-0.

Computers and Reading Instruction, Leo D. & Olga P. Geoffrion, 1983, Addison-Wesley. ISBN 0-201-10566-7.

Computers and Literacy, Daniel Chandler & Stephen Marcus, 1985, Open University Press. ISBN 0-335-15031-4.

Microcomputers in Education – A Critical Appraisal of Educational Software, John Self, 1985, Harvester Press. ISBN 0-7108-0946-8.

Microcomputers in Special Education, Freddie Green, Robin Hart, Colin McCall & Ian Staples, 1982, Longman, for the Schools Council.

Magazines and journals

Learning to Cope, Educational Computing Ltd.

Special Education: Forward Trends, National Council for Special Education.

Remedial Education – Journal of the National Association for Remedial Education, Longman.

Journal of Computer Assisted Learning, Professor R Lewis, Blackwell Scientific Publications. ISBN 0-266-4909.

Report-type documents

The School Psychological Service (Bridgewater Area) and Microcomputer Aided Learning, Michele Hitchcock, at the Health Centre, Mount Street,

Bridgewater TA6 3ER. No ISBN.
Also available *Using a Light Pen*, *Micromike* and *Using the Concept Keyboard*.
A Basis for Choice, FEU, 1981.
From Coping to Confidence, J. Bradley, L. Dee and S. Hegarty, 1985, NFER/FEU.
A Discussion Document: 'Microelectronics Education in Initial Primary Teaching', CET, 1984.
Information Technology in Initial teacher Training, D. Hawkridge, 1984, CET.
Introduction of Information Technology Awareness Programme to Assist Handicapped Persons, Blackpool and Fylde College of Further Education, 1985, CPVE B/TEC Publications, 1985.

Videos

By MEP – All available on loan from the SEMERCs.
Concept Keyboards – An Anthology
Micros – What do they do with them?
Talking Programs
First Turns of the Turtle
Micros in the Wider Curriculum
Tig and Concept Keyboards
Open Forum – A Sound Alternative from the Open University, Tom Vincent.
Starting Point, MEP, Elston Bray Video Services, 54 Crofton Road, Camberwell, London SE5 8NB.
Take Control, a film about primary-aged children using control technology, MEP primary project, Videotext Educational Publishing, Orders House, Eagle Star House, New North Road, ExeterEX4 4HF.
Decisions, Decisions, intended to accompany the in-service education pack called Posing and Solving Problems with the Microcomputer which has been produced as part of the MEP National Primary Project, Wilkinson-Brown, Nestfield, Cacketts Lane, Cudham, Sevenoaks, Kent TN14 7QG.
Switches, Toys and Computers, a one-hour video, Manchester SEMERC and BIMH. The video is in the form of a resource catalogue and is intended for staff training and information. The programme is aimed at staff working with people with profound/multiple handicap and also young people who are physically disabled/speech impaired. Available with documentation from British Institute of Mental Handicap (BIMH) Wolverhampton Road, Kidderminster, Worcs. DY10 3PP

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IMPACT

This is a new series of publications under the direction of Colin Robson of Huddersfield Polytechnic and Judy Sebba of the Hester Adrian Research Centre, Manchester.

All the titles in the **Impact** series are designed to improve the professional skills, expertise and understanding of teachers and other professionals with responsibility for children with special educational needs. Some publications in the series will also be appropriate for educational psychologists, social workers, staff of adult training centres and social education centres, staff in residential facilities, and nurses.

MICROELECTRONICS AND PUPILS WITH SPECIAL EDUCATIONAL NEEDS

John Garrett and Bob Dyke

Microelectronics and pupils with special educational needs was developed from courses organised by the Council for Educational Technology as part of the Microelectronics Education Programme. The package consists of two books: a tutor's manual and support materials, and a videotape. The tutor's manual provides starting points for courses for teachers of children and young people with special educational needs on how to use microelectronics in their teaching. Examples of support materials for use with content-free software make up the second book in the package. It is a practical guide which will help teachers make more effective use of microelectronics in their work. The videotape provides illustrative material on the use of some of the software and peripherals described in the text.

The complete package will be of particular interest to local education authority advisers responsible for in-service courses for teachers, co-ordinators of microelectronics work in special education, teachers responsible for supporting and advising teacher colleagues in their schools, leaders of special education micro-user groups and those with responsibility for staff development in the social and health services.

John Garrett is a part-time consultant in teacher training for the Council for Educational Technology.

Bob Dyke was Manager of Manchester Special Education Micro-Electronics Resource Centre.

Published in association with the Council for Educational Technology and the Microelectronics Education Programme.

Manchester University Press
ISBN 0 7190 2489 7