Education.
Prime Minister to see

Neill Mitchell
Duty Clerk 3/4/81

DEPARTMENT OF EDUCATION AND SCIENCE

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FROM THE PARLIAMENTARY UNDER-SECRETARY OF STATE

Miss Caroline Stephens
Private Secretary to the Prime Minister
10 Downing Street
LONDON
SW1

3 April 1981

Dear Caroline

MICROCOMPUTERS IN SCHOOLS

The material enclosed with Jonathon Hudson's letter of 1 April promised a brief from this Department on the Microelectronics in Education programme.

As the Prime Minister knows, MEP was launched last year by the Education Departments to develop effective ways of giving pupils and teachers direct experience of microcomputers and other microelectronics applications. The 3-year strategy for MEP to which reference is made in the draft speech which Peter Shaw sent to Tim Lankaster yesterday concentrates on teacher training and the preparation and dissemination of effective software and teaching materials. A copy of the document is enclosed.

The "Micros in Schools" scheme complements MEP and its Scottish counterpart and it is appropriate that the two should be linked at the press conference. It is important that the hardware initiative makes educational as well as commercial sense; and it is with this in mind that we have suggested ways of strengthening the draft of the Prime Minister's speech.

Yours ever,

June

MRS J D NISBET
Private Secretary

Microelectronics Education Programme

The Strategy

Department of Education and Science
Welsh Office
Department of Education for Northern Ireland

DEPARTMENT OF EDUCATION and SCIENCE

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PRESS NOTICE

PLEASE NOTE EMBARGO

NOT FOR USE BEFORE 13.00 HOURS
ON MONDAY 6 APRIL 1981

THREE ACTION AREAS FOR MICROELECTRONICS IN EDUCATION

Curriculum development, teacher training and resource organisation for the microelectronics education programme are the three main action areas proposed in a Strategy Paper* published today.

The document, published by the Department of Education and Science, the Welsh Office Education Department and the Department of Education for Northern Ireland, was prepared by the Programme's Director, Mr Richard Fothergill, in consultation with the Education Departments and with the Programme's Advisory Committee.

The Paper says that the "microelectronics revolution" can be expected to affect the school curriculum in two main ways. Pupils will need to learn about the new technology which will increasingly pervade both the factory and the office. There is also scope for using microelectronic devices, particularly the micro-computer, to assist with and enrich the study of "traditional" subjects in the curriculum such as the sciences.

If advantage is to be taken of the possibilities offered by the new technology, says the Strategy Paper, action is needed under three main heads. First, under the general heading of curriculum development the Programme will sponsor a range of development projects concerned with the production of teaching and learning material suitable for widespread dissemination. In some cases, the Programme will build on promising work already begun by existing national, regional or local curriculum development teams, while in other cases the Programme will seek

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* "Microelectronics Education Programme: The Strategy". Available free from the Publications Despatch Centre, Department of Education and Science, Honeypot Lane, Canons Park, Stanmore, HA7 1AZ.

to stimulate work in subject-areas which merit priority but may have been neglected.

The emphasis will fall mainly on the secondary curriculum but work in other fields is not precluded and some priority will be given to work in the field of special education. Some of the Programme's activities in the secondary field will be of relevance to non-vocational further education for the 16-19 age range where the work of schools and colleges overlaps.

Second, says the Paper, the development of microelectronics in schools creates a need for appropriate teacher training, including in-service training. The Programme's aim is not to meet all the needs which exist but to achieve - in close partnership with training institutions and local education authorities - a clearer understanding of the kinds of training which are most beneficial and of the ways in which such training can be best organised. Pilot courses will be promoted and evaluated, the production of training materials will be sponsored, and pump-priming support will be available for a network of regional teacher training centres.

Finally, in order to underpin the Programme's other work, the Strategy Paper recommends the establishment of a network of regional information centres. These would serve as vehicles for the exchange and dissemination of software, as a source of information and advice to teachers on the availability of materials, and as a means of maintaining liaison between curriculum development groups.

FOREWORD

The Microelectronics Education Programme (MEP) for England, Wales and Northern Ireland was announced by the Government in March 1980, and I took up my appointment as Director of the Programme in November. My first main task has been to draw up this statement of the Programme's future priorities and methods of operation, in consultation with the Education Departments and the Programme's expert Advisory Committee; the local authority and teachers' associations have also commented on an earlier draft. I am grateful to all these parties for their help.

I am conscious that many people may have been waiting for this strategy paper to appear before deciding whether to submit projects for consideration, and I hope the paper will assist them to formulate proposals in line with the Programme's aims; the priorities and criteria set out in the paper are intended to serve as a strategy and not a precise blueprint, and there may be some scope for funding projects which do not meet all the stated criteria, but I am convinced that this scope must be strictly limited if we are to devise a co-ordinated programme of work which will secure the best possible value for the available money (£8M over the period 1981-1984). I hope also that this paper may encourage others, who have not so far been closely involved with microelectronics in education, to find out about the work which is being done in their areas and perhaps become involved in it themselves.

I am also in receipt of a considerable number of proposals, some sent directly to me and some sent to the Departments. These will all be examined in the light of this strategy and the money available. Anyone who wishes to submit a new proposal, amend a previous submission after reading this document or believes he may be able to contribute to the Programme in some way, is invited to write to me at the following address: Richard Fothergill, Cheviot House, Coach Lane Campus, Newcastle upon Tyne NE7 7XA.

Richard Fothergill
Director, MEP
April 1981

Further copies of this paper can be obtained from:
The Publications Despatch Centre, Department of Education and Science,
Honeypot Lane, Canons Park, Stanmore HA7 1AZ

MICROELECTRONICS IN EDUCATION PROGRAMME (MEP)

STRATEGY FOR THE PROGRAMME

Introduction

1 The aim of the Programme is to help schools to prepare children for life in a society in which devices and systems based on microelectronics are commonplace and pervasive. These technologies are likely to alter the relationships between one individual and another and between individuals and their work; and people will need to be aware that the speed of change is accelerating and that their future careers may well include many retraining stages as they adjust to new technological developments.

2 In developing a strategy for the Programme it has been assumed that:

i schools should be encouraged to respond to these changes by amending the content and approach of individual subjects in the curriculum and, in some cases, by developing new topics;

ii with the dual aim of enriching the study of individual subjects and of familiarising pupils with the use of the microcomputer itself, methods of teaching and learning should make use of the microcomputer and other equipment using microprocessors. This may be expected to add new and rewarding dimensions to the relationship between teacher and class or teacher and pupil;

iii use should be made of the microcomputer to develop the individual pupil's capacity for independent learning and information retrieval;

iv for those children with physical handicaps, new devices should be used to help them to adjust to their environment while those with mental handicaps should be encouraged and supported by computer programs and other learning systems which make use of the new technologies.

The scope of the Programme

3 The Programme is concerned with microelectronics applications in schools and in non-vocational courses for 16-19 year-olds in further education, including GCE O and A level courses and courses leading to pre-vocational qualifications. Microelectronics and its applications will also be an important feature of vocational education and training but development work in these fields is beyond the resources available, although the Programme will seek to play a part in encouraging practical links between schools and industry. It is assumed that FE colleges and polytechnics will contribute to in-service training for teachers in schools and to the pilot courses supported under the Programme; and it will be important to ensure that MEP curriculum development projects take account of practice in vocational FE courses where the subjects are related - eg in electronics and courses preparing young people for clerical occupations.

4 It may be helpful to distinguish between two parts of the territory which will be covered by the Programme. The first covers the investigation of the most appropriate ways of using the computer as an aid

to teaching and learning, as a guide to the individual child, as a learning aid for small groups of children, or as a system which involves the whole class. In principle, software can be developed for computer-based learning across the curriculum, but the Programme will give priority to applications in mathematics, the sciences, craft/design technology, geography and courses related to business or clerical occupations. Some attention will also be given to careers education, languages and the humanities. As mentioned above, children with learning difficulties and special education needs can also benefit from materials for use with microcomputers as a teaching and learning aid and the Programme will therefore assist appropriate developments in remedial and special education.

5 The second part of the territory with which the Programme is concerned is the introduction of new topics in the curriculum, either as separate disciplines or as new elements of existing subjects. The new topics (which may of course be taught at varying levels of specialisation) will include:

i microelectronics in control technology;
ii electronics and its applications in particular systems;
iii computer studies;
iv computer linked studies, including computer aided design, data logging and data processing;
v word processing and other "electronic office" techniques;
vi use of the computer as a means of information retrieval from databases.

6 The main focus of interest in both parts of this territory will be on the secondary school curriculum but the Programme will be concerned to assist appropriate developments in primary and middle schools.

Programme activities

7 It is proposed to support work under three headings:

A Curriculum development;
B Teacher training;
C Resource organisation and support.

The work required under each of these headings is examined separately in the following paragraphs, which identify the main issues, summarise the ways in which the Programme will respond, and set out the criteria which will be applied in judging applications for financial support.

A CURRICULUM DEVELOPMENT

8 New materials for teaching and learning are needed to meet the following needs:

i materials which make use of microcomputers and other devices based on microprocessors to assist with the teaching of "traditional" subjects;

ii materials which support the teaching and learning of the "new topics" mentioned in paragraph 5 above; and

iii supporting documentation which will help teachers make the most effective use of the new equipment and its associated curriculum materials.

9 Such resources may be developed on national, regional or local bases. Examples of existing "national projects" are the Schools Council "Computers in the Curriculum" project and the work of organisations such as the Geographical Association Package Exchange. Projects already serving schools in more than one LEA include certain LEA centres for computer based learning and organisations or units in institutions of higher education drawing support from a number of neighbouring authorities. These generate valuable resources which should be suitable for general use. Locally based projects generated by individual schools, teachers and user groups are developing materials for their own needs or amending nationally available materials to reflect their own styles. The Programme will need to identify materials of this kind which can be made more widely available.

10 It will be important to improve access to materials from all these sources. The commercial publication of materials is on a small scale at present, but the Programme may need to make increasing use of this and other methods of dissemination.

11 In the longer term it will be necessary to consider how the introduction of new topics in the curriculum should be reflected in examination syllabuses.

Programme response

12 Although much already exists, the Programme will sponsor, where necessary, the production of teaching and learning materials in the following categories:

i software and computer databases, with appropriate documentation, for use with computers to teach the traditional curriculum;

ii resources for teaching the new topics, including documentation to improve the effective use of new equipment; and

iii items about the new technologies such as pamphlets, charts, etc.

In order to ensure that curriculum materials and ideas developed by Programme projects can be successfully used by teachers, most projects will need to have a teacher training component.

13 The Programme will support:

i a limited number of curriculum development projects undertaken by national organisations;

ii a range of projects, generally involving cooperation across LEA* boundaries. For convenience, such projects will be referred to as

* Here and elsewhere, the term "LEA" should be taken to include the Area Education and Library Boards in Northern Ireland.

the work of "regional curriculum development groups". It is envisaged that most will be undertaken by groups of LEAs or by institutions in more than one LEA area.

iii a variety of smaller projects, undertaken by teachers in individual schools and by user groups.

14 The most substantial proportion of the resources devoted to curriculum development will be allocated to the collaborative "regional projects" outlined in 13.ii above. The intention here is to build on the foundations of existing work by teachers and LEA advisers and promote the cross fertilisation of ideas between one authority and another. Before agreeing to support such projects, the Education Departments will need to be satisfied that topics for curriculum development meet a known national need; and they will ordinarily look for evidence of collaboration across at least two LEAs. The directors of such projects will be expected to form links with the appropriate regional information centres, which it is proposed to establish with support from the Programme (see paragraph 37 below) in order that other curriculum development groups and interested teachers are kept informed of their progress.

15 Projects organised by teachers in individual schools and by user groups will need to satisfy similar criteria, and although the Departments will not be looking for collaboration across LEA boundaries, project directors will be expected to organise field trials in consultation with the LEA adviser for their area, or through the appropriate regional information centre. They will also be expected to demonstrate previous experience or show that they can call regularly on an experienced group for advice.

16 It is assumed that practising teachers will contribute to all curriculum development projects, and project directors will need to demonstrate expertise in at least some areas of the work. The objective will be to develop materials which can be widely used and it will therefore be essential that all development work is conducted in accordance with recommended standards for programs and documentation (see paragraph 40 below). Copyright in the materials will in most cases be vested in the Council for Educational Technology, as agents for the Programme, in order that arrangements can be made to publish them at the minimum possible cost.

17 For all curriculum development work MEP will meet the cost of materials, travel and field trials. Where necessary, the Programme will meet in full the salary costs of project teams for regional projects (although it will be an advantage if LEAs are prepared to share some of this burden). The Programme may also be able to contribute to the salary costs of projects undertaken by individual schools or user groups.

18 The Schools Council has been invited to assist the Director of the Programme in assessing the merits of proposals for curriculum development projects. The Council's role will be to advise the Director whether the proposed topic or application is likely to support good educational practice in the teaching of the given subject rather than to offer an opinion about the technical competence of the particular individuals or institutions. It is also envisaged that Schools Council Field Officers will be available to assist with the arrangements for field trials of materials developed with support from MEP.

Other activities

19 In order to advance general understanding of microelectronics applications, the Programme will commission a number of supporting documents, including case studies and examples of good practice throughout the curriculum (it is desirable that as many pupils as possible should have freedom of access to computers for developing their personal skills and for creative work over and above their more formal work within the classroom).

20 It is intended that the Programme will stimulate informed comment to the examination boards on ways in which the examination syllabuses might reflect the introduction of new topics and the application of microelectronics across the curriculum.

Resource allocation: priorities and timing

21 In 1981-82*, priority will be given to the continuation of current regional and national curriculum development projects; to the initiation of regional curriculum development projects; and to the initiation of a programme of curriculum development in the field of special education. In 1982-83 and 1983-84 a wide range of development projects will be supported, closely monitored and co-ordinated to avoid duplication.

B TEACHER TRAINING

22 Teachers require both information about microelectronics and professional skills to apply the technology effectively in the classroom. The training of teachers, both in-service and pre-service, must therefore be organised in such a way as to support the curriculum changes envisaged in paragraphs 4 and 5 above. Training is required at a number of levels:

i courses aimed at improving general awareness and familiarisation (of 1-3 days' duration or their part-time equivalent) are needed for teachers of all kinds, but in particular for headteachers and their deputies and for teachers of subjects such as languages and the humanities where microelectronics applications may be less apparent, and for careers teachers.

ii short specialist familiarisation courses (of up to one week's duration or its part-time equivalent) are required for teachers who have been enthused by the awareness courses and for those wishing to modify their subject teaching to include new topics, for example teachers of commerce requiring knowledge of word processing and biology teachers requiring knowledge of data logging.

* References to particular years, here and elsewhere in this paper, are to financial (not academic) years.

iii longer specialist courses (of up to three months' duration or the part-time equivalent) aimed at teachers requiring additional training in particular fields. Examples would include science or craft/design teachers wishing to expand their knowledge of electronics; and teachers wishing to acquire the skills needed to develop computer-based learning materials.

iv for these courses to be effective, resources also need to be devoted to the training of trainers and to refresher courses for LEA advisers.

v the Programme will also be concerned with the advice which should be given to agencies wishing to design longer diploma and degree courses in microelectronics (eg of one year's duration or its part-time equivalent). Some attention must also be given to the changing needs of BEd and PGCE courses.

Existing provision for training

23 Several agencies are already involved in providing open learning courses available to all. The BBC is preparing such a package on computing and this will be supported by learning materials developed by the National Extension College. One Open University course is already available and others are in preparation. Commercial publishers are offering book series and some manufacturers are supporting their products with courses. None of these initiatives is, however, at present linked with local tutorial support.

24 A small but increasing number of national courses leading to further education qualifications is on offer in the HFE sector, for example in computer studies.

25 A growing number of colleges, universities, teachers' centres and even some schools are offering microelectronics courses for teachers. They now include pilot courses supported centrally from funds allocated under the first year of the Programme. The courses are not evenly spread throughout the country and their range and content vary considerably.

Programme response

26 It is proposed to ascertain the curriculum implications of the new technology, continue discussions on the range of courses that are needed and seek to reach agreement on their scope and content. The role of the Programme is to stimulate an effective pattern of provision and develop materials for training in order to strengthen what already exists and assist the training institutions to make appropriate provision. The role of local education authorities, through their training institutions and specialist advisers, is central to this development and the Programme will only succeed if it works in partnership with them.

Regional centres of in-service training

27 It is intended to offer pump-priming support for the establishment of a regional network of in-service training centres which will arrange the provision of a variety of subject courses. The location of these centres will be a matter for agreement with the local education authorities whose

teachers they will serve and the discussions will be arranged by members of the Director's team. The object of the exercise will be to enable groups of authorities to co-ordinate their resources for in-service training and it is intended that the centres will provide a focus for developing and evaluating different methods and materials. If the network of pilot centres proves successful it is hoped that it will be supported wholly by local education authorities beyond the life of the Programme.

28 It will be necessary to

i identify appropriate centres and trainers;

ii provide, where necessary, a small amount of supplementary equipment for training in computing or electronics;

iii provide some teaching and learning materials, and, in some cases, arrange for their production;

iv identify needs for new teaching and learning materials and ensure their preparation;

v evaluate the work of the centres and, where appropriate, negotiate their continuation as local problem-solving and referral organisations for teachers in the region.

29 To qualify for support, regional training centres will need to have adequate staffing at an appropriate level of expertise and be suitably equipped. They must also offer a reference and support service to teachers who have taken the courses and those sufficiently qualified not to require them.

30 In the case of the courses which it supports, the Programme will contribute towards the salary costs of tutors and the cost of teaching materials, and in 1981-82 it may also assist with the cost of equipment and software. As far as possible the Programme will try to ensure that courses bear no cost to those attending, and some money will be set aside for their travelling expenses. However, LEAs will be encouraged to meet part of these and other incidental costs which would otherwise fall on trainees and it will not be normal Programme policy to contribute towards the cost of replacing teachers who attend the courses.

Open learning courses

31 The Programme will also liaise with national providers of open learning courses to see if there are benefits to be gained from co-operation. For example, it may be helpful if group study sessions, and local tutorial support, could be arranged for individual participants through the regional information centres which the Programme is seeking to establish (see paragraph 37 below).

Initial training

32 With regard to initial training, the Programme will discuss with appropriate bodies the changes and adjustments which may be necessary in teacher training courses. These discussions will be informed by the experience and materials emerging from the proposed network of in-service

courses and close contact between the proposed regional in-service training centres and initial training departments will be encouraged.

Resource allocation: priorities and timing

33 In 1981-82 priority in the allocation of resources for teacher training will be given to:

i the work necessary to reach agreement on the scope and content of in-service courses in this field;

ii the identification of pilot regional in-service training centres, the recruitment of suitable trainers and where necessary the provision of extra equipment and materials for teaching and learning;

iii the cost of running those courses which are established (subject to what is said in paragraph 30 above); and

iv the cost of liaison with open learning courses available nationally.

In the following year priority will be given to the running costs of in-service training centres; to discussions on the changes and adjustments which might be needed in pre-service training; and to the incorporation of teacher training elements in curriculum materials. These priorities will continue in 1983-84.

C REGIONAL RESOURCE ORGANISATION AND SUPPORT

34 Access to information, materials for teaching and learning, and advice are important for teachers and their work in schools. Knowledge about technological developments and about the range of supplementary materials which are available must be made as accessible as possible and they should be able, as far as is practicable, to explore and experiment with equipment and materials with a minimum of difficulty.

35 Currently, learning materials relating to microelectronics and computing are being developed in three ways:

i within national programmes;
ii by regional or local project teams; and
iii by individual teachers in their own schools.

Information about these materials, samples of the software and guidance on their most effective implementation have to be available for inspection and practical experiment within reasonable distance from schools.

36 These developments must build on the foundations of the LEA advisory services. The Science and Technology Regional Organisations (SATROS) and bodies like Computers in Education as a Resource (CEDAR) and Microcomputer Users in Secondary Education (MUSE) will also have a part to play. The most effective way of distributing new software nationally will have to be considered. Advice on the specifications of equipment depends on the formulation of appropriate standards.

Programme response

37 It is proposed to set up a network of pilot information centres serving groups of LEAs. It is intended that these should serve the same catchment areas as the network of regional training centres, and it will be for groups of LEAs to propose collaborative arrangements which are geographically and demographically appropriate; to agree on the location of the centre for their region; and to formulate appropriate proposals for the management of the centres. The responsibilities of the centres will be to provide information on hardware and software and other materials. They will

i exchange information, materials and computer software with the other regional centres in the network;

ii exchange information and materials with in-service training centres within the region;

iii form links with LEA advisory services in their area and with SATROS;

iv provide some facilities for in-service training, eg in general awareness and such specialist topics as may be appropriate;

v provide an information service to the region covering:

- a materials and equipment available
- b places where they may be seen
- c evaluations of materials and equipment
- d known developments in teaching materials etc
- e a small collection of reference texts and any publications specially prepared for the centres
- f a software library

vi keep in touch with curriculum development projects within the region so that the network can be kept informed;

vii disseminate software developed by regional curriculum development groups and by individual schools and user groups;

viii provide access to any "debugging" facilities required for computer programs;

ix organise local group sessions and individualised support for those teachers following distance learning programmes;

x form links with manufacturers of hardware and employers making use of microelectronics to aid their business.

It is envisaged that each centre will have a national responsibility for particular topics or applications.

38 Staff of the Council for Educational Technology will assist the Director to identify appropriate centres for each region and negotiate arrangements with the LEAs concerned. It is envisaged that each information centre will cover a region of not less than four LEAs and that

the average number of participating authorities will be seven or eight. The centres must be sited in a sensible geographical position and based in institutions, organisations or units which are already involved in microelectronics for education.

39 The Programme will provide pump-priming support for the regional information centres; this will take the form of an appropriate contribution towards their staffing and running costs and (in the first year of operation) towards the cost of equipment.

Software distribution and standards

40 The Programme will investigate and promote different methods of software distribution, including commercial publishing, telesoftware by both teletext and viewdata systems and through the network of regional information centres. The Programme will define and encourage the adoption of standards in program languages and routines, documentation, the layout of packages, equipment specifications, and telesoftware. The National Computing Centre has already been commissioned to begin work on the definition of standards for software and documentation and the Council for Educational Technology is to prepare a glossary of terminology for adoption by all participants in the Programme.

Resource allocation: priorities and timing

41 In 1981-82 priority will be given to:

i the setting up of the network of pilot regional information centres;

ii the collection of information on current activities;

iii work on the formulation of appropriate standards;

iv the investigation of different methods of software distribution.

In 1982-83 and 1983-84 resources available under this heading will be devoted to the cost of running the pilot regional information centres and to undertaking or stimulating different methods of software distribution.

THE PROVISION OF MICROCOMPUTERS FOR SCHOOLS

42 It will have been evident from this paper that, while the Microelectronics Education Programme is concerned with action of various kinds to promote a wider understanding of the potential role of microelectronics in education, the acquisition of equipment for general use in individual schools falls outside the Programme's scope. To complement the Programme, however, and also with a view to providing added opportunities for the UK microcomputer industry, the Department of Industry is to make funds available to assist local education authorities with the provision of microcomputers in secondary schools; the aim is that every secondary school will have direct access to at least one microcomputer by the end of 1982.

43 Under this scheme the Department of Industry will match funds provided locally towards the purchase of a microcomputer package for eligible schools. LEAs wishing to take advantage of the scheme will be responsible for finding the matching contributions and it is hoped that in addition to drawing on their own resources they will be able to look to schools and PTAs and local industry for assistance in raising funds.

44 Initially, priority will be given in the allocation of funds to those secondary schools which do not already possess a microcomputer.

45 It is envisaged that the scheme will be extended to other sectors of the education system and details will be announced in due course.

46 To ensure that good use can be made of the microcomputers provided under this programme, the Government will look for evidence from the LEA that at least two teachers from every school preparing to take advantage of the Department of Industry funding scheme have undertaken, or are about to undertake, a period of suitable in-service training.

47 Local education authorities are being asked to submit applications to MEP on behalf of maintained secondary schools in their area and are being given details of the way in which the scheme will operate and of the microcomputers which will attract Department of Industry support. Schools wishing to take advantage of the scheme should approach their local education authority.