CENTRALLY CO-ORDINATED RESOURCES FOR TEACHING AND LEARNING

In one sense this chapter contains the case studies that do not fit neatly into the previous chapters. The number of examples and the fact that there is no simple generic title to describe them, is itself an indication of the current pace of development in this field, and its importance.

The other chapters contain examples of centrally produced resources; where radio, television and correspondence techniques have been incorporated into an educational system since they offer, in addition to their intrinsic appeal, the attraction of low unit cost.

However, recent developments in educational methodology encouraging transition from 'teaching' to 'learning' have made obvious the need for the teacher to be well supported with the 'things of learning' so that he may better assist his charges to organize their learning experiences. Whilst correspondence courses tend to produce self-instructional material; and radio and television, especially where programmes are used off-air, can only attempt to support a teaching situation, this chapter looks at cases where the main aim is to provide resources or techniques through some central organization, thus offering some significant contribution to the learning process. Some of the techniques of radio and television production and of correspondence courses have made important contributions.

Perhaps the fundamental elements of modern educational development and the current attitude towards the learning process may be summarized by the words 'self-pacing' and 'self-evaluating'. It is axiomatic that the student's motivation to learn must be high, and through processes of curriculum development every effort is made to see that the content of the materials he studies has direct relevance to his needs and his background of understanding. The student is told what he has to achieve, he is introduced to the materials that will help him get there, and he is given a means of measuring his progress.

There is perhaps nothing new in this. When the new jargon has settled, it may well be apparent that this is what good teachers have been doing through the ages. However, today's problems demand that the best teaching takes place on the widest possible scale, and the importance of the case studies in this chapter lies in the systematic way in which each is contributing to the evolution of this.

Every situation is unique; in educational development terms the main problem is to determine what is appropriate - what resources of skills, materials and money are available and what type and level of system can be made to function effectively and economically. It is not suggested that these case studies offer immediately transferable blueprints. However, in selecting them particular attention has been paid to known needs in many developing countries of the Commonwealth, where the main problems are to provide assistance in devising more effective and economic ways of teacher training and to produce and supply teaching and learning materials.

Geographically, the examples are chosen from a wide range of situations. In New Zealand the Department of Education has long recognized that the provision of teaching materials is an essential element in the process of renewal and development, and created in 1939 a Publications Branch. In 1942, a National Film Library was formed, which subsequently started a Visual Production Unit. As the educational system has developed to meet changing needs and conditions, so has the nature of the services supporting the teachers.

The Teaching Aids Centre in Tasmania evaluates, selects, supplies and maintains all the audio-visual equipment used in Tasmanian schools and undertakes the systematic development of resource materials in collaboration with curriculum research officers on a state-wide basis.

In the University of Exeter in England a research project was established to determine the pattern of resource centres which would best meet the requirement of educators in a predominantly rural region. The first three-year phase of the project having been successfully completed, it was then decided to examine a further series of requirements in a second phase.

Jamaica has provided an interesting example of specific media development to meet a well-defined need. After careful consideration, the medium chosen as appropriate to

the local situation was audio cassettes supported by print. The results obtained are encouraging and it would appear that the system could be copied in many situations for a variety of objectives.

There is one example of a regional project, which is centred on the University of the West Indies in the Caribbean and assisted by UNESCO and other agencies. The project is concerned with curriculum development and teacher training for secondary school pupils of ten to fifteen years. At its mid-run stage considerable gains are obvious and the uses made of new media are important. Closed-circuit television is being used at twenty teacher training colleges through the region in a most interesting microteaching development. A central materials production unit is also part of the project.

In the province of Alberta in Canada, there is, in all probability, a higher ratio of learning resources per student than anywhere else in the Commonwealth. The particular technique of 'quick and dirty' videotapes for continuous in-service teacher re-training has been chosen to highlight a low-cost, but effective, media use that would seem to have high potential for applications in many parts of the Commonwealth where great distances and low population densities are characteristic.

On the other side of Canada, the University of St John's in Newfoundland has developed a highly effective system for offering full university credit courses to small, isolated communities. It is an open learning development which relies on print and videotapes, in a soundly constructed systematic learning package, supported by enthusiasm and talent.

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THE TEACHING AIDS CENTRE: TASMANIA, AUSTRALIA

Introduction

The Teaching Aids Centre is part of the Department of Education. The Centre evaluates, selects, supplies and maintains all audio-visual equipment used in all (nearly 400) Tasmanian schools. In close co-operation with curriculum research officers, it undertakes the systematic development of resource materials to implement new curriculum changes and developments on a State-wide basis. It is the major source of print and non-print materials designed specifically for use in Tasmanian schools. The staff of the Centre are responsible for the development and organization of special courses in educational media both for in-service and pre-service training. The Teaching Aids Centre is staffed by a team of specialists in a variety of educational media - printed material, film, radio, television and recordings. At present the staff of the Centre number around fifty and they work in the following sections - printing, educational broadcasting, electronics, media library, photography, graphic arts and sales and despatch.

The Centre was originally created in 1937 as a very small film library employing two people and distributing black and white, silent 16mm films to a few schools throughout the State. In 1948 the film library was renamed the Visual Aids Branch and although the staff was still small - no more than seven or eight - the Branch took on additional responsibility for providing photographs and slides to the schools. Some four or five years later the emphasis of work moved on to the production of 16mm sound films. About thirty curriculum-related films were produced, but in 1954 this activity ceased. Concurrent with these tentative developments into educational resources, the Visual Aids Branch was involving itself in educational radio. In 1956 the Branch was renamed the Visual Aids Centre and then in 1962 it became the Teaching Aids Centre. Since then there has been a significant change in emphasis away from the provision of hardware and equipment to schools, and a move towards the production of materials and resources or 'software' for schools.

Educational Background

Tasmania - with the exception of Canberra Federal Territory - is the smallest state in Australia. The island has a population of almost 400,000 and covers an area of some 26,000 square miles. Tasmania has always maintained a pre-eminent position in the development of education in Australia. Indeed, in 1869 it was the first colony in the British Empire to make education compulsory. In 1946 Tasmania became the only Australian state to make attendance compulsory up to the age of 16. This position has been maintained by the government and at present it would be fair to state that developments in Tasmania are at least as advanced as those of the other States of the Commonwealth of Australia.

Education is compulsory between 6 and 16 years. Virtually all schools are co-educational and education is secular and free. Parents, however, must pay for the books, paints, materials and instruments used by their children at school. At present there are around 400 schools in Tasmania ranging

from just over 100 infant and kindergartens to around 150 primary schools, 39 district schools and some 35 high schools. The balance is made up by a few special schools and independent non-governmental schools.

The educational system in Tasmania has developed and expanded over the past few years; school enrolments have increased, expenditure on all forms of education has increased by two-thirds in the last six years; there is a higher retention rate at secondary schools and there has been development of further education facilities.

It is recognized by the Department of Education that 'education from early childhood to adulthood is a continuous process with a continuously changing demand. It is the task of an education system to assess itself, and where necessary, adapt itself to meet this demand at every level of learning'.

Overlaying the significance of change and development at State level, there was recently commissioned by the Australian Federal Government a study on 'Schools in Australia', generally known as the Karmel Report from the name of its Chairman. This Report considered the development of education in Australia, produced general guidelines and recommended that a significant amount of funding be made available to implement the recommendations. In general terms the following educational principles were put forward:

1. the needs of schools and the allocation of funds to those areas in which needs have been identified should be followed through;

2. there should be 'grass roots' involvement in decision-making, i.e. the community should be brought into the education process;

3. there should be diversity in the organizational form of schools;

4. community involvement and planning control should be developed;

5. there should be compensation for social disadvantage;

6. there should be education for the 'quality of life';

7. the importance of personal relationships should be stressed;

8. the enjoyment of school experiences should be considered important.

Within this general philosophy a whole variety of individual programmes have been devised, whereby specific sections such as disadvantaged schools, special education, library development, teacher development, can be bolstered where necessary. Perhaps the most significant proposal is that change and innovation at the individual school or system level can be fostered and promoted. It is this latter programme of 'fostering change' to promote diversity, quality and innovation within education that is of considerable interest. For this particular programme the Report has recommended that six million dollars be set aside on a national basis during the next two years to fund special projects in the organization and conduct of learning.

The method of operation and implementation of the Karmel Report is to invite teachers, parent-teacher associations, schools, professional associations - indeed, anyone interested in educational change - to submit proposals to the locally appointed Karmel Change Committee in their particular States.

Educational Broadcasting

The Teaching Aids Centre plays a very important role in liaison and co-operation with the Australian Broadcasting Commission. The Centre provides a liaison officer and studio teachers on full-time secondment. For its part the ABC employs a state supervisor of Educational Broadcasting, two radio producers, two television producers and associated technical staff. There is full representation from the Department of Education on the planning and appraisal committees for the programmes which are either produced in Tasmania or selected from other sources.

As has been stated above, the Teaching Aids Centre co-ordinates the design and production of curriculum materials to accompany the broadcasts and it organizes the printing and distribution of teachers' guides and student workbooks.

Much use is made of the radio programmes. Each classroom in both primary and secondary schools is equipped with classroom radio speakers which are fed on a reticulated system from a central source. The majority of primary schools and all secondary schools use a cassette tape service to receive the programmes. The Teaching Aids Centre records programme material on cassettes and distributes these on loan to schools.

There is a high density of television receivers in the schools in Tasmania with one receiver for every four classes at the primary and infant level, one receiver for every three classes in area schools and one receiver for every eight classes in the

high schools. Most schools, however, have been wired to provide twice as many outlets as there are receivers, so flexibility of television use is increased. As is predictable, the greatest use of television is made by the primary schools where timetables are flexible. The administrative problems caused by timetable difficulties inhibit the use of television in secondary schools. It is for this reason that the experiments with videotape recorders are being watched with considerable interest.

Since 1962 there has been an active interest in the use of closed-circuit television in Tasmanian high schools. This started on a modest scale with a simple system distributing programmes to five classrooms in one high school. After careful appraisal a further school was selected to experiment with a videotape recorder. An analysis of this work led to a larger project involving six high schools which were each equipped with ½" videotape recorders, some 20 - 30 outlet points and 10 hours of videotape. The problems of organizing recording and playbacks and every aspect of maintenance and storage of equipment and tapes were analysed. It is planned that once this evaluation has been satisfactorily completed, modified closed-circuit television systems will be installed in other high schools in the State.

Provision of Equipment

It is against this exciting background that the Teaching Aids Centre is significantly involved in promoting innovation and change. The electronics section is most involved in providing equipment and apparatus for use in schools. This section is concerned with the design, construction and installation of equipment - including radio and television equipment - in schools throughout the Tasmanian educational system. The section carries out or organizes the maintenance of all audio-visual equipment. There is no charge for this to schools under the Education Department. A further significant activity is the evaluation of all audio-visual equipment which appears on the market, prior to its consideration for adoption in schools. This section also tests and modifies all new items of audio-visual equipment purchased for schools and subsequently maintains a case history of each of these. Although staffed with only nine people, the main functions of the section are now considered to be development and advice and research, not just a basic supply, installation and maintenance operation. It is felt that these latter functions can be more effectively carried out by sub-contracting this work to commercial operators throughout the State. The budget for the service and maintenance operation is in the region of 44,000 dollars per annum - not including the time and travel of the Teaching Aids Centre staff. The estimated total cost of equipment at present within the school system in Tasmania is in the region of 1 million dollars. On this basis the annual maintenance and service costs approximate to 4½% of total capital expenditure. This is in line with general theory that 5% of total capital expenditure should be allocated annually for basic maintenance.

Although the Teaching Aids Centre is responsible for identifying, selecting and approving equipment for schools (which is provided to schools with a 50% subsidy - a $200 projector is made available at a cost of $100), this does not mean that schools are forced to buy equipment recommended by the TAC. If, however, schools do go ahead on their own initiative and purchase equipment or items which have not been approved and recommended by the TAC then they are not eligible for the 50% subsidy, nor is the equipment which they purchase eligible for free maintenance. The maintenance service attends to most calls the same day that the complaint is made. However, if equipment has to be sent from outlying districts to the Teaching Aids Centre, this period is more normally three days, which includes two for transport and one for service.

A lesson shared by most other successful systems in this field is that provision must be made for maintenance of equipment. The more efficiently organized and supervised this maintenance activity is, the better. Whatever the maintenance system set up, it is the media distribution operation which attracts the first line of complaints sent in by the schools. What is required is an immediate and effective response. Without this obvious but essential service, even well-funded and sophisticated operations are liable to fall down.

A further example of the work of the electronic section is the design of a 'library tape-maker' which is just coming into production by a commercial manufacturer. This device which incorporates a record player, a reel-to-reel tape recorder, radio inputs and microphone inlets together with two cassette recorders enables copies of material from any of these audio sources to be duplicated on to a cassette by the press of a single button.

In common with all other users of television for educational purposes within formal educational systems, the TAC is giving thought to problems brought about by the availability of videotape recorders - in both reel-to-reel and cassette form and

also by the advent of colour television. The pilot project with videotape recorders in high schools has already been mentioned.

The Centre believes that very careful research is required into the problems associated with the introduction of colour television, particularly those associated with reception and receivers. It is a belief of the Centre that the number or density of receivers in schools is important. Since the cost of receivers is high and the number of television receivers - particularly within the open-plan system of schools in Tasmania - is growing, the problems tend to be intensified. It has been found that most colour television receivers must be installed and set up in one particular place and are not easily moved from location to location, because this movement produces aberrations in the colour reception due to 'convergence'.

The staff of the electronics section have mostly been recruited from other government departments. A noticeable feature of this section is the low turnover rate of staff. This has been ascribed to the varied and challenging nature of their responsibilities. Training of the staff has been essentially on an in-service basis since the equipment with which they deal is specialized and varied. This technique assumes, however, a basic level of competence in electronics prior to recruitment.

The Media Mobile

The Media Mobile is essentially an old school bus which has been converted to provide a simple, workable system to help teachers throughout the State to become fully acquainted with all the implications and applications of audio-visual media. The marked increase in the quantity of resources and equipment which have become available in the schools of Tasmania has produced a reaction in the teachers, both in-service and in training. Requests have come from the teachers not only to enable them to become familiar with the range of new resources and equipment, but also to develop their own skills, and to share information about new procedures.

It was felt that the Teaching Aids Centre needed to provide the following facilities:

1. self-instructional areas where teachers could learn to operate instructional equipment and review materials;

2. workshop space where they could make their own slides and transparencies;

3. facilities to view projected materials - films, filmstrips and slides;

4. videotape equipment to replay tapes of innovative classroom techniques which have been recorded in other Tasmanian schools;

5. a display space for both written information and printed materials.

All of these had to be provided in the bus leaving the maximum floor space clear while providing storage for the safe transport of materials when the vehicle is on the move. No such vehicle had been developed in Australia before, so the resources of the technical experts in the electronic section, artists, librarians and photographers were all pooled to produce the plans for the Media Mobile.

The aim was to make contact with those teachers who in their day-to-day activities were expected to make use of equipment and resources produced or supplied by the Teaching Aids Centre - and to give them an opportunity of developing skills, competence and most important, confidence in using both the equipment and the materials. The usual arrangement is that the Media Mobile makes a visit on a pre-arranged basis to one particular school. During this visit groups of seven to eight teachers are involved in sessions or workshops in the Media Mobile. They are given training and facilities to produce their own material and to work with equipment and apparatus. The response to this project from schools both in terms of written comments submitted to the Teaching Aids Centre and verbal comments made during this study indicated that this service of bringing 'the mountain to Mohammed' is making the expenditure and cost more than worth while.

The Media Library

The Media Library of the Teaching Aids Centre is responsible for the acquisition of pre-prepared or pre-recorded materials in film, tape and videotape form - together with a limited number of overhead projector transparencies, slides and charts. The material is selected essentially to support school courses. Material to provide enrichment and stimulation is also acquired. All levels are catered for from kindergarten to Grade 12 of secondary school. The primary sector is favoured with some 60% of the expenditure, but this is essentially a reflection of the larger numbers and consequently greater use in primary schools. The Centre despatches on loan

around 900 films and over 8,000 tapes each week, with smaller quantities of filmstrips, kits, records and associated materials.

Resource Materials and Kits

A recent workshop for senior primary school teachers held at the Teaching Aids Centre was asked what the main requirement was for resource materials. This particular group of teachers who were all sympathetic towards the use of new media - and indeed who were making extensive use of films, records, cassettes, slides and so forth in their schools - after careful consideration and deliberation came up with their basic requirement. They said that they could not effectively carry out their work without considerable supplies of cardboard cut to three particular sizes. This simple requirement reflects how wide a range of resources is required in one of the most sophisticated of educational systems.

One of the main concerns of the Centre is the provision of integrated teaching materials. All developments for extending the use of resource materials form part of a systematic operation in which those educational experiences which are most relevant and valuable in the school curriculum have been identified. The most effective tools and materials to help achieve learning objectives are developed or located for replication and distribution.

Among the resource packages produced is a very interesting kit on community studies, designed as part of the primary social science teaching. This kit, to be used with a special series of television programmes produced by the Australian Broadcasting Commission in conjunction with the Education Department, contained teachers' notes, student workcards, games, records, individual research project guides for students, and was altogether a rich amalgam of materials. Other kits have included records, coloured slides, teachers' guides, student study cards and work cards for group use. Provision has been mainly in the fields of social science and social studies. Some kits are completely self-contained and rely almost entirely on print. For instance, there is a series of stimulus research cards designed on the theme of 'Australia and its People' - which is concerned with various aspects of the sociology of Australia. This has additional teachers' guides and study envelopes.

Administration

The Teaching Aids Centre has a Planning and Policy Committee chaired by the Deputy Director-General of the Department of Education which meets each month. This Committee, which consists of superintendents of subject areas, the supervisor of curriculum, the supervisor of building, the Liaison Officer with the Broadcasting Commission and representatives of primary and secondary education, is responsible for receiving proposals from teachers and subject supervisors to provide materials in their respective areas. The Committee then decides how to allocate funds to meet the requests. On the advice of the Committee, the Centre plans the production of resource materials. Very often these resource materials are designed for supplementary use with programmes produced by the Australian Broadcasting Corporation.

Having received its brief from the Policy Committee, the Centre prepares specifications for materials, based on detailed objectives and performance requirements. Prototypes of the materials are then prepared. The testing of these is carried out by research officers from the Curriculum Centre in selected classrooms. Following the feedback from the schools, modifications and developments are made. Once the material has been validated, the Centre itself handles the replication and production of enough copies to be made available free of charge to appropriate classes. This is a one-off operation. A flow sheet shows the process.

Workshops

The Centre runs workshops, seminars and in-service training facilities for teachers. The usual system, in addition to the Media Mobile operation, is to bring a small number of selected teachers in a particular subject area to the Teaching Aids Centre where they are given short intensive courses in the preparation and production of resource materials, of direct and relevant value to their work. A significant feature of these courses is the degree of pre-briefing to participants to enable them to bring with them useful materials which they can use to produce resources likely to be of lasting value on their return. An extension of this work has been the development of an intra-state telephone conference facility designed for use in in-service education. This enables link-ups of groups of teachers at three widely separated centres. Individual participants at any centre can take part in open discussion. The equipment is simple to operate and available for use by any officers of the Education Department. The advantages of using this for in-service training are considerable. The cost of the telephone link-ups is extremely economical when compared with conventional travel costs; leading authorities can address widely separated groups; teachers can share their

experiences with each other and reaction and comment can be received or suggestions put forward.

Future Developments

In keeping with its philosophy of being 'where the action is' and being able to continue and expand its full range of developmental activities, the Teaching Aids Centre will be moving into large, new, custom-built premises in 1975.

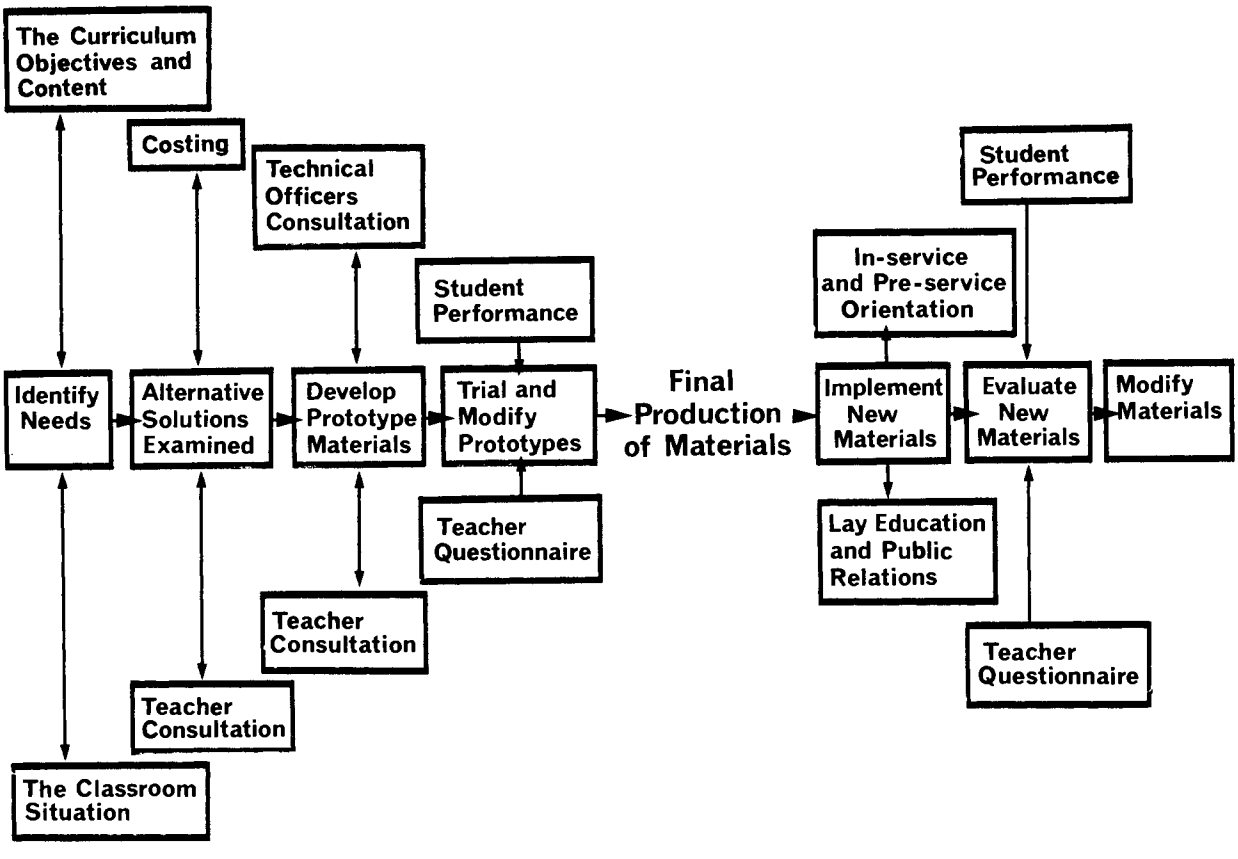
It is likely that the emphasis of its work will move towards an involvement in the innovative programmes created by the Karmel Programme. Support for the improvement of learning will be provided. Individual teachers and groups of teachers who wish to experiment with teaching methods and new equipment will be encouraged. Advice, guidance and supervision will be available as required. The narrow definition of 'teaching aids' as physical objects which a teacher can pick up or switch on will be superseded. Techniques and approaches to teaching and learning will be emphasized. It may well be time for the Centre to change its name once again.

REGIONAL RESOURCES CENTRE PROJECT - EXTER UNIVERSITY, INSTITUTE OF EDUCATION: BRITAIN

Introduction

The development of new curricula and the move towards individual discovery learning processes, which have been among the main features of British educational innovation during the past decade, have confronted teachers with a number of problems; particularly the need for more learning resources.

Teachers generally did not have the time to research, plan and produce learning aids in the quantity and of the quality required, in addition to their other tasks. Nor did schools have the funds to purchase commercially produced aids in the quantities required. To meet this need a number of teachers' centres and resource centres developed. Whilst there is no set country-wide pattern, teachers' centres tend to be located in a convenient and suitable local building where teachers with a common subject interest from a number of local schools



can meet, discuss professional matters and receive a degree of assistance which often includes help in making or borrowing learning resources. Resource centres may indeed often be located within teachers' centres or even schools, but the term generally implies a more central unit, capable of supplying a number of schools and teachers with a wide variety of relevant learning resources, and which probably also has a significant materials production capacity.

It was in this situation that the Institute of Education of the University of Exeter, as part of its 'in-service' support activities, undertook the development of a Regional Resources Centre as part of a controlled experiment to determine how best these needs of the teaching profession could be met in the mainly rural area with many isolated schools, covered by the Institute.

The project in its initial phase was supported by a generous grant from the Calouste Gulbenkian Foundation, and in its second phase the financial support to enable the project to continue has been donated by Philips Electrical Ltd. The first phase of the project is drawing to an end at the time of writing.

Project Objectives

It was considered that the Centre would need a studio, workshop and offices, and because of the isolated nature of many of the schools it was to serve, a van equipped as a workshop so that visits could be made to country schools and teachers' centres. The Centre was to provide:

1. a library of up-to-date books and other learning materials;
2. information about resources available elsewhere;
3. assistance to teachers wishing to produce their own materials;
4. assessment of materials supplied by the Centre and obtained from commercial and other sources, based on teachers' opinions;
5. training for teachers in making and using resources.

However, since a fundamental objective of the overall project was to develop an effective and relevant support service for the teaching profession, it was obviously essential that it should develop to meet expressed needs and thus, at the end of the first phase of operation which has taken three years, the main activities have been in the following areas:

1. information storage and retrieval;
2. production of materials designed to meet teachers' requirements;
3. consultancy services;
4. in-service training in the production and utilization of learning resources;
5. research. Although this item is important it has only amounted to a small part of the total work of the project, the greater emphasis having been placed on development.

Historical Development

It was clear from the beginning that the project could not serve all the schools in the South West of England and, since it was primarily a research and development project, it was decided to locate a number of pilot schools, representative of all the local education authorities within the Area Training Organization and also representative of different types of schools from infant to sixth form colleges. During the first year of operation, twenty-four schools were attached to the project. These were divided into two categories:

- Category 1 Schools were visited regularly by an adviser who worked on specific curriculum development problems with interested teachers within the school. There were seven schools in this category.
- Category 2 Schools could make the same demands upon the services and time of the Resource Centre but did not have the day-to-day contact and interest provided by the visiting tutor. There were seventeen schools in this category.

During the second year of operation the Category 1 schools continued as before, but the number of schools in Category 2 was increased and two teachers' centres were also associated with the project. In the final year the distinction between the schools in Categories 1 and 2 was considered to be no longer necessary. Any school might avail itself of help from an outside adviser, experience having shown that such assistance was an important factor in contributing to success.

By the beginning of the third year the number of schools with direct access to resources had grown to approximately sixty from six local education authority areas and covered the age range of 5 to 18 years. By the end of the third year it had become

obvious that there was a dual need within a regional resources centre for the provision of software resources and for a hardware consultancy service. It had also become increasingly apparent over the years that it was highly desirable to develop an experimental unit which could work on prototypes of hardware which could serve observed demands in classroom situations.

Now that further financial backing is available to promote and extend the work of the original project over a further three years, the Regional Resources Centre aims to extend and improve the services previously offered, with the following important differences:

1. the area to be covered will be limited to that of four local education authorities (this comes about through a reorganization of local education authorities' areas of jurisdiction);

2. the Regional Resources Centre will normally work through teachers' centres and not directly with schools (one exception will be within the city area);

3. efforts will be made to arrange for the secondment of teachers to work in an advisory capacity at the Centre, in order to ensure that materials relate satisfactorily to curriculum requirements. Experience has shown that a teacher does not have time to do this in addition to his normal school work;

4. the Centre will have increased staff and a greater variety of reprographic and photographic equipment.

A fundamental principle underlying all work undertaken by the Regional Resources Centre is that the background research into curriculum materials should be undertaken by practising teachers involved in the development.

Project Guidance

In its second phase, the project is controlled by two Co-Directors; one a Senior Lecturer in education, the other the Librarian in charge of the School of Education library. Their roles are complementary in this experimental pilot project which seeks to determine how best resource centres can be developed to serve the requirements of schools covering the 5 - 18 age range. These directors are guided by an advisory committee, chaired by the Professor of the School of Education, joined by twenty-three other committee members who include senior teachers, educational administrators, librarians, visual aids advisers and wardens of teachers' centres from the local authorities involved. The advisory committee is also assisted by representatives of the (national) Council for Educational Technology, specialist advisers from the University and representatives of Philips Electrical Ltd. Thus problems are discussed, priorities established and advice passed on to the executive staff.

Executive Staff

The two Co-Directors are full-time members of the University staff with many other professional responsibilities. Thus, the day-to-day running of the Centre tends to fall upon the Administrative Officer and his secretary. They also act as the first point of contact for enquiries from outside the Centre. It is perhaps convenient to think of the main operations of the Centre being carried out by two sections, one responsible for design and photography, and the other for technical and printing services. There is a senior designer, assisted by a designer and a chief technician helped by three part-timers.

The unit works in close collaboration with the library of the Institute of Education which is responsible for storage and retrieval of the materials held.

By arrangement with local education authorities, the University is able to offer a limited number of fellowships which enable selected senior teachers to be attached to the project to deal with 'editorial' problems in the selection and design of resource materials, and also with 'research' problems in the overall evaluation of important facets of the project development.

Close collaboration between the Regional Resources Centre, the wardens of teachers' centres and audio-visual advisers on the staff of local education authorities enables the limited staff of the Centre to extend its influence throughout very many schools in the area.

Range of Services Offered

1. Information: it seems that one of the most important requirements of teachers is a source of information on a variety of topics; if this is not available through a local teachers' centre a telephone call may be made to the Regional Resources Centre.

2. Reprographic: it appears that most teachers consider printed material as the most important resource. The Centre operates off-set litho, collating and binding machines. Subject to copyright law, print,

photographs and diagrams can be reproduced, enlarged or reduced according to teachers' needs. Both black and white and colour reproductions can be undertaken.

3. Graphic: the Centre has a well-equipped design studio and can offer a wide range of design services to teachers.

4. Photographic: professional photographers are backed with about £2,000 worth of photographic equipment and a large darkroom.

5. Technical: a technical consultancy service advises teachers on the purchase and use of hardware. Plans exist to develop new and cheap items of equipment, in collaboration with teachers.

6. Library: the School of Education library is associated with the Centre and can lend a large and growing range of teaching materials as well as books relating to various aspects of education.

7. Supply: the Centre collaborates with local education authorities in purchasing and supplying equipment.

8. Professional: the Centre arranges courses on resources, both at the Centre and at schools and teachers' centres.

Work Load

The work of the Centre has expanded as the project has progressed. It now aims to respond to requests from all schools within its catchment area. Requests are filtered through teachers' centres. However, in the early days of operation when enquiries came directly to the Centre, 661 separate requests were received in the first two years of operation, of which 479 were met. Others were fulfilled later, or proved operationally impracticable.

In the early days of the project it was assumed that the Resources Centre would be able to produce everything required by teachers regardless of what was available from commercial sources. It was also assumed that the Centre would be able to respond totally to all requests from teachers. Experience has shown that the demands placed on the production department are considerable and it has often been necessary and economically viable to buy materials produced commercially or by other centres. Thus economy of operation comes from making a small quantity of purchased material available to a large number of schools and by using the specialist creative abilities of the resources centre to produce materials which are not otherwise available. Generally the rationale for resource provision is provided by the teacher who is also encouraged to undertake the initial research. Often a teachers' centre will be able to help the teacher in meeting his immediate needs. However, the Regional Resources Centre is seen as a back-up to the teachers' centre in that it is able to offer a wider range of equipment and skills to produce more materials than can be done locally. Thus the Regional Resources Centre is more likely to become involved in complicated curriculum projects requiring a lot of materials and in such cases it has been found desirable to arrange for a teacher to be offered a 'fellowship' enabling him to join the staff of the Centre and act as overall editor.

Problems of storage and quick retrieval of materials have grown with the project. Cataloguing is of vital importance. Not only is it necessary to know at a glance what is in stock and what is relevant to requests, but also to know which schools were associated with the production of the materials in the first case. It is also necessary to find some simple method of letting teachers know what materials are held in the Centre. All of these problems are under active consideration, but in common with his colleagues in resource centres in many countries, the Librarian admits that he has yet to find the ideal solution.

Materials provided for schools include the following:

- large original wall illustrations;
- smaller original illustrations useful for small groups and individual work;
- multiple copies of pictures, drawings and photographs produced by off-set litho;
- slides taken from local illustrations and photographs;
- slide sequences for programmed learning;
- audio-tapes of various kinds including recordings of schools broadcasts;
- photoplay units;
- three-dimensional models and maps;
- children's booklets.

Consultancy services have, in the main, been provided through the University, using in-service funds to provide this kind of help for schools. The same University responsibility has enabled the project

directors to run in-service education courses related to the work of the project for teachers in the area. A recent development has been the provision of similar training for technicians. Many schools in the area have a technician on the staff and they, in recent years, have found themselves increasingly involved in the audio-visual fields although often their particular expertise has been in other areas. The Regional Resources Centre has been able to organize a special one-week training course for schools technicians in resource provision and the use of various types of hardware.

Financial Considerations

Much of the cost is concealed within the University budget which meets the salaries of the two Co-Directors and provides accommodation. Field consultancy assistance is provided 'in-service' by the University and through the local education authorities. However, the project has received grants to support additional expenditure:

Calouste Gulbenkian Foundation
1970/73 - £25,000

Philips Electrical Ltd.
1973/76 - £60,000

The increase in costs is partially explained by inflation and also by changing requirements. Although money from the first grant was spent on equipment, further equipment is now necessary. More staff are needed than originally envisaged. The Director sums up the experience gained during the first three years of operation by recommending the following staff structure:

Director
and Secretary

Senior Designer — Senior Technician
Two designers
one general technical assistant.

and the following equipment: (UK prices January 1974)

1. Audio

1 semi-professional tape recorder	£120.00
1 complete combination unit	£200.00
3 cassette players	£ 30.00
3 cassette recorders	£100.00
off-air equipment	£ 80.00
copying equipment	£200.00
3 slide synchronizers	£120.00
	£850.00

2. Video

video equipment	£1,000.00
Video-cassette recorder	£ 300.00
	£1,300.00

3. Photographic

2 x 35 mm cameras	£ 240.00
1 larger format camera	£ 375.00
studio lighting and flash unit	£ 65.00
darkroom equipment	£ 440.00
	£1,120.00

4. Reprographic

electro-static master maker/copier	£ 595.00
covertor model 167	£ 300.00
off-set litho printing machine with blanket attachment	£1,880.00
plate-makers (vacuum head)	£ 260.00
collator	£ 425.00
jogger	£ 60.00
Colylyn process camera	£ 400.00
	£3,920.00

5. Miscellaneous hardware

1 x 60 mm projector	£ 350.00
3 automatic slide projectors	£ 240.00
1 ethiscope	£ 90.00
1 filmstrip projector	£ 75.00
1 film loop projector	£ 95.00
2 overhead projectors	£ 160.00
	£1,010.00

6. Other expenditure that may be necessary relates to the provision of:

Workshop tools
Graphics materials
Other materials
Travel and subsistence (perhaps including the provision of a van)
Consultancy fees.

A capital expenditure of the order of £9,000 might be anticipated in setting up such a unit, excluding the cost of buildings.

Experience Gained

A sociological survey is to be published towards the end of 1974, which, in particular examines teachers' perceptions of the need for resources.

At this stage, the Co-Directors feel able to offer the following comments:

1. teachers will not automatically use a resource-providing agency until they are aware of the variety of materials which it can produce;

2. even after familiarization with the possibilities of a resource centre, using resources, particularly mixed media, not only requires greater planning and organization, but involves the teacher in more work than do more traditional methods. This the teacher can either learn from experience or by in-service training;

3. teachers should provide the rationale for all materials;

4. resource provision is directly linked to in-service education and curriculum development;

5. there is a case for the production of packages to serve a number of schools in some areas of the curriculum. One of the tasks of a regional resources centre should be the production of catalogues so that schools, through their own small resources centres, know what is available locally, regionally and nationally;

6. just as the Regional Resources Centre co-ordinates resources within its own area, so should it act as a link between its own area and other centres throughout the country. Here an interchange of materials could be arranged.

The Co-Directors are considering producing booklets, listing existing resources and resource services which could be used by teachers; the production of a termly newspaper whose aim would be to keep teachers in touch with developments in the field of resources; and a list of recommended audio-visual equipment for use in schools.

SMALL FORMAT VIDEO TAPES FOR CURRICULUM DEVELOPMENT: ALBERTA CANADA

Background Information

In this present survey, which is being conducted specifically to review new media activities which might have relevance to educational problems in low income (developing) countries, it might, on first consideration, seem anomalous to include a report from the Province of Alberta which spends more per capita on the education of its children than any other part of the Commonwealth.

The Province is wealthy in terms of money, skilled personnel and pioneering initiative. These same resources applied to the educational field are attempting to solve problems which exist in many countries, particularly where there is a widely dispersed rural population. Hence Alberta offers an important opportunity for study. Indeed it is apparent from the contribution which Canada has been able to offer in terms of advice and help to the developing world, that there is much of relevance to be learned from all parts of the Federation.

Albertans, like most people, are concerned with the relevance of their educational process. A recently published report of a Commission on Educational Planning, led by Dr. Walter Worth (then a Vice-President of the University of Alberta, and now Deputy Minister for Alberta's newly formed Department of Advanced Education), is called 'A Choice of Futures'. This 325-page report examines the present and future educational alternatives facing Albertans in a democratic society. The ultimate choice, of course, rests with the people. The facts are clearly and graphically presented and members of the public are asked to assist in completing the work of the Commission by sending in their comments on a prepared questionnaire. To get this attractive and readable report to the public, copies were placed on sale at check-out points in supermarkets. To consolidate this imaginative strategy an equally attractive fifteen-page booklet, spelling out the main problem areas examined in the report, was mailed to every home in the Province.

Albertans are also concerned with the effectiveness of their educational process. Professionalism within the Department of Education is at an extremely high level. All newly recruited teachers are graduates and the B.Ed. degree now requires a four-year course of study. Considerable encouragement is given to serving teachers to study for higher degrees and this, in turn, results in a fluid research/implementation dialogue between the universities and the educational practitioners. To give practical encouragement and opportunity to teachers who wish to develop innovative ideas, the Department of Education has established an Educational Opportunities Fund of $5,000,000 to produce materials, or methodologies, which would have wider applicability through the Province.

In this situation it was long ago realized that the value of broadcast educational programmes was largely negated by their ephemeral nature and problems of time-tabling; quite apart from the teacher's requirement to be able to use the materials instead of being used by the programme. The alternative lay in persuading School Boards to purchase an approved pattern of videotape recorder (½" compatible EIAJ format) and in making copyright clearance arrangement in schools to record the programme off-air.

Since better quality was to be obtained by a central videotape dubbing service and a physical distribution system, this capability was also offered. From this it was a logical step to negotiate with distributors of educational films to obtain the right to copy a specified number of their films on to videotape so that these could also be made available to schools.

Thus a Central Learning Resources Service has been established by the Department of Education which is available to all schools within the Province. Inter-provincial exchange agreements widen the catchment area of educational materials to include broadcast productions from the four Eastern Provinces as well as many of the CBC programmes.

In this way something of the order of an extra hundred videotaped items, in addition to audio cassette programmes and other media items, are made available centrally each year. Schools purchase their own videotapes on which these programmes and films are dubbed at no additional expense. The Learning Resources Service publishes a catalogue containing over 7,000 items.

Teachers in schools throughout the Province of Alberta can be kept up to date with relevant aspects of educational development through a low-cost videotape service centre in two adjacent converted offices in the headquarters buildings of the Department of Education. Relatively inexpensive small format television is used. Educationalists are in complete control of all aspects of the operation and are proud to refer to this service as 'quick and dirty' videotape productions. 'Quick' refers to the speed with which the system can respond to an educational need. 'Dirty' refers to the technical quality of the videotapes which, judged by professional broadcasting standards, is unacceptably low. However, the content of each programme is the important consideration and the quality of reproduction is more than adequate; indeed it is almost invariably superior to that of off-air reception of broadcast programmes.

The master tapes are replicated to ½" EIAJ specifications and distributed, as appropriate, to individuals within schools. Most schools possess compatible ½" EIAJ videotape recorders.

Specific Objectives

Reference is frequently made to the 'information explosion'. At a time when much is changing across the entire educational field, educational management is faced with a major problem in disseminating relevant information. Teachers, by and large, lack the time and facilities to keep up to date through conventional means. This problem is accentuated by geographical distances which reduce opportunities for personal contacts.

Professional journals meet an important part of this need. However, there is also a requirement to circulate news of specific local (i.e. provincial) developments, including ideas and materials prepared by colleagues working in the same subject areas, and in a way which leads to ready understanding and use.

'Quick and dirty' videotapes provide the Curriculum Resources Section of the Department of Education with an economical vehicle which offers significant help in the solution of this problem and also adds a new dimension to interprofessional communication. It so happens that the equipment, particularly that of the schools, serves a number of additional functions which lowers unit operation costs.

The Department of Education in collaboration with the CBC and two local educational television services (CARET at Calgary and MEETA in Edmonton) encourages and sponsors the production of educational programmes for broadcasting. However, programmes are broadcast over the television network in schools for only half-an-hour on each school day. Similarly school radio programmes are broadcast for only a quarter-of-an-hour each day. In this connexion it is also relevant to mention that the Provincial Government has recently established an Alberta Educational Communications Authority which, acting as a semi-autonomous body, can own its own transmission facilities to draw together and coordinate all aspects of this work. This new Corporation, named ACCESS, has already extended the coverage by broadcasts and will be expanding the number of Alberta productions.

In this situation, with an infrastructure of videotape recorders in schools (which incidentally are also used with portable television cameras in the creative arts

programmes where teachers and pupils come more easily to accept low-cost production techniques and black-and-white quality in a community where entertainment television is almost entirely in colour), and with a distribution network existing, it seems logical for the Department of Education to make a relatively small extra investment to create its own videotape production facility for in-service productions. In this way the 'quick and dirty' service came into being.

User Profile

In Alberta Province there are approximately 1,200 schools, 20,000 teachers and 400,000 pupils in a total population approaching 1,600,000. Education is compulsory up to sixteen years of age.

These schools enjoy a high degree of autonomy under elected Boards. A separate school system operates on the basis of religious affiliation in larger centres and some rural areas. Boards administer funds derived from general revenue and supplementary local requisitions, and make all major policy decisions.

Videotapes are distributed to local school boards requesting specific programmes from a professional resources catalogue. The service produces, on average, one specialized programme per week.

Administrative Structure

The small format videotape production centre in the Department of Education is headed by a Coordinator and an Assistant Coordinator. Both are professional educators with ETV production training and experience at a professional broadcasting level. They are responsible for the administration of the unit as well as coordinating the production of programmes (the Coordinator also has an itinerant Province-wide responsibility as a media consultant). Programme content requirements are specified by curriculum development personnel within the Department of Education and school board personnel, and programme format emerges from a collaborative effort by these two sets of people.

A technician looks after the equipment which, being small format, generally works reliably. Any major technical problems are handled by the manufacturer's organization. A secretary completes the team.

The master videotapes which this team produces are then replicated. A small dubbing capacity exists within the Department of Education headquarters but if many copies are required, this work is done at another centre which the Department has helped to create. This second section employs another technician whose main work lies in dubbing tapes of broadcast programmes, films, etc. for educational support materials in schools.

Working Method

Ideas for programme content arise in the course of discussions within the Department of Education and particularly in the Curriculum Development Section. Priorities for work are decided in the light of the overall policy of the Department and the Coordinator's knowledge of the requirements in schools. Production is a speedy process. The unit aims to convert an idea into an acceptable videotape within one week. The following week will see the replicated tapes distributed to schools. Programme outlines are developed by curriculum consultants who also often present the programmes. Scripts are then developed by the Coordinator of his Assistant who produces and directs the programmes.

Caption making is cut to a minimum by using a typewriter with a large typeface (IBM with manifold 72/006 element) typing on to 6" x 4" cards (pastel blue or orange) and using a close-up lens on the television camera.

Studio movements are reduced to a minimum so that acceptable standards of lighting and sound quality are more easily achieved.

Utilization and feed-back are attended to by the Coordinator as he travels round. Formal evaluation cards are also distributed with each programme.

Costing

In terms of capital investment and apart from buildings, the small format studio contains:

3 x 1" VTRs on which master tapes are made;
4 x ½" ELAJ VTRs on which limited copies can be made for distribution;
3 small format television cameras;
mixing (switching) panels;
lights, microphones, etc.

The total cost of this capital investment amounts to approximately £4,500.

In terms of recurrent expenditure and ignoring the salaries of the staff, the following items are significant: production materials cost approximately £3,500 annually; travel costs associated with the production, £1,000 annually; utilization and feedback , £1,000 annually.

It will be appreciated that schools have purchased their own small format VTRs and, often, cameras, representing a cash investment of under £500 for a recorder and monitor to £1,000 for recorder, monitor, camera and accessories.

NEWFOUNDLAND CANADA 'OFF CAMPUS' COURSES

Introduction

The Memorial University has introduced part-time university education at a distance through a learning system incorporating educational television videotapes. The small communities in the Province of Newfoundland are remote from the main centres of population in Canada and the population is sparsely distributed, mainly in small fishing ports around the coast of Newfoundland and Labrador. Communication between these small communities is difficult. The capital of St. Johns with the Memorial University is at the eastern end of the 600 mile Newfoundland section of the Trans Canada Highway, and is approximately 800 air miles from the most distant of the communities needing university level education for its adult population.

Whilst the University was created to serve the needs of all the people of Newfoundland (its population 522,104 in 1971) its geographical location combined with transportation/communication difficulties has tended to restrict its part-time (Extra Mural or 'Off Campus') activities to people living in its proximity. In 1969 it was decided to offer the opportunity of full university courses to remote students through a special programme of activities.

The main need for this type of assistance has been in the teaching profession where a very large number of teachers in the remote schools were underqualified by Canadian standards. The Memorial University through its Department of Summer Sessions and Extra Mural Studies has evolved a system to meet this need, based on the concept of a multimedia package. The printed word, personal interaction and educational television all play mutually supporting roles. Techniques and methods are being constantly refined.

Practising teachers and many other individuals can now, through part-time study, acquire university credits, equivalent to those obtained by the full-time students attending the University.

Essentially the administrative design and responsibility rests with the Division of Summer Sessions and Extra Mural Studies within the University; the academic content comes from faculty members in the various specialized departments of the University and the supporting educational television component is produced by the ETV Centre of the University. Each of these can only treat the 'Off Campus' involvement as a part, although a significant one, of his total responsibility within the University.

Background

During 1969-70, the first year of the operation of the new service, university courses were offered at twelve centres with a total enrolment of approximately 600 students for 963 courses. Of these some 200 took the psychology course offered through educational television, with the remainder registered in thirty-one other courses, which were taught by locally recruited instructors.

In the next academic year (1970/71) the number of 'Off Campus' centres was increased to nineteen and 3,180 student-courses registered between twenty-seven courses, four of which were offered via educational television with the rest being taught by local instructors.

In 1971 the number of centres was increased to twenty with three courses offered by educational television and fourteen by local instructors.

In the 1971/72 academic year an additional seven centres were added bringing the total to twenty-seven with eight courses offered by educational television and thirty-nine by local instructors. By this time the total student-course enrolment was 4,651.

In the 1972/73 academic year the location of some of the centres was changed, as it was felt that this would be beneficial to the users and one extra centre was added. This, it is felt, gives an adequate network to cover the requirements of the Province at present and it is not envisaged that this will be increased significantly in the foreseeable future. Fifty-six live courses and six educational television courses satisfied a student-course enrolment of 4,829.

Looking back over this period of development (four years) it is interesting to note that whilst the number of 'live' courses offered (139) is greater than the number of educational television courses (19), the number of students benefiting from educational television (total 6,581) is comparable with, and indeed has in some years exceeded, the number benefiting from live courses (total 7,042). This, of

course, arises from the fact that each 'live' course can be given only in one centre whilst the educational television courses have been offered in roughly half the centres in operation at any particular time.

User Profile

The types of people taking 'Off Campus' courses have changed as the scheme has developed. At first almost all the students were teachers seeking to up-grade their qualifications. The salary scale applicable to the teaching profession encourages teachers to acquire better academic qualifications, by generous salary increments. Also more qualified graduates were applying for teaching posts and the security and promotion prospects of unqualified teachers were diminishing. However, in a recent and typical enrolment about 86% listed their occupation as teaching, 3% housewives, 4% school administrators and others listed their occupations as welfare officers, businessmen, Royal Canadian Mounted Police officers, tradesmen, sales clerks, bank tellers and clergymen. Some of the students register for courses after they have completed their high school education, and whilst they are trying to decide whether they are suited for university.

The Evolution of the Educational Television Component

There is a deep-rooted feeling in the faculty of Memorial University that personal contact is necessary between students and staff. During the planning of the new 'Off Campus' courses it was realized that Memorial University had a great potential asset in the largest and most sophisticated university educational television centre east of Montreal. Fully equipped to broadcast standards, the ETV Centre had been producing programmes for broadcast and closed-circuit use since 1967.

However, to broadcast educational television lectures to distant students imposed immediate unacceptable limitations as the broadcasting services did not cover the entire population, particularly in the more remote areas. Added to this the signals were often of only fringe quality. These considerations, coupled with the obvious advantages of group viewing, particularly with a tutor present, led to the decision to use videotapes. Six centres were chosen for the experiment, all in remote areas and separated by enormous geographic distances, but where there were suitable physical facilities and personnel able to operate a 1" videotape recorder. Each of the chosen centres served a population large enough to make the experiment valid and economic.

The first course chosen for educational television treatment was educational psychology. Within the University, a faculty member designed a course which included a series of lectures which he gave in a television studio, and which were recorded on videotape. There were thirty-three separate presentations each lasting approximately half an hour and followed by a number of questions which the viewers had to answer. Separate copies of each videotape were produced and distributed to each of the six centres. Print material was also produced and this will be described later.

Each centre was equipped with a conference telephone and on alternate weeks the remote groups would be connected to the faculty member in the University in St. John's. The telephone portion of the experiment was a failure, principally because of the technical unreliability of the system. It is reported that this caused tensions beyond normal shyness which inhibited the students from using the equipment.

The aim of this technique was to generate discussion between the instructors and students in different centres. In practice it proved impossible and the telephone calls degenerated to questions for the instructor to clarify as 'authority' and this, it was felt, could be more effectively and economically handled by other techniques.

The following year the telephone conference technique was discontinued. In its place audio cassette recorders were issued to each centre. After each educational television lecture, question tapes were prepared by the students and sent by post back to the University. The course instructors then tape recorded answers and mailed them back to the centres. However, a careful evaluation of this technique showed that it was not producing the desired result, particularly since the time lapse between the questions being asked and the answers being received was regarded as unacceptable by the vast majority of students.

The latest development is to recruit a 'tutor' who watches each educational television programme with the class. He leads the discussion afterwards and has the responsibility of noting any points of difficulty and obtaining an explanation from the course instructor in the Memorial University in time for the students' next meeting. This he may do by a normal telephone call.

The growth of the number of centres to twenty-eight and the increase in the number

of educational television courses to six has necessitated the development of a video replication facility in the University, and the investment of approximately $240,000 in videotape.

This growth has added to the videotape recorder maintenance problem. However, a satisfactory solution has been found by placing stand-by recorders at strategic centres so that the courses can continue uninterrupted whilst repairs are effected.

Administrative Structure

In the Department of Summer Sessions and Extra Mural Studies the following staff are involved in the 'Off Campus' courses as well as their other duties: the Director, who is responsible to the Vice-President of the University for the overall success of the operation; an assistant director; a secretary; a stenographer and two clerks.

The assistant director is also a producer and has carried out a major research survey concerning attitudes towards the 'Off Campus' courses.

Three other producers assist in turning out a total of about 200 hours of educational television programmes per year for all faculties of the University including the 'Off Campus' courses. There are also seven technicians, four photographers and three graphic artists. A dozen students work on studio crew duties on a part-time basis. The educational television unit organizes workshop sessions for interested faculty members and trains each local co-ordinator in the operation and maintenance of his videotape recorder.

There are four University Liaison Officers - each responsible for a number of 'Off Campus' centres in a particular geographical area. Apart from this he also performs certain tasks for other Divisions of the University.

In each centre there is a part-time co-ordinator responsible for direct administration. Where centres have a hundred or more students there is also an assistant co-ordinator. The co-ordinator needs a forceful, dynamic personality with a strong interest in educational matters and above all the respect of the local people. One of the important elements in the success of the system is the selection of a local tutor, who assumes a responsibility with a group of students in a particular centre for a particular course. Indeed, before a particular course is offered in any centre it is essential that such a tutor can be identified. The availability of tutors of this calibre has often dictated the type of course which a centre is able to offer. In the identification of such a suitable local personality the centre co-ordinator plays a leading role.

Working Method

The initiative for the production of educational television courses originates with the Division of Extra Mural Studies and may follow one of several procedures. There may, for example, be a demand for a particular course from educationalists in the field (district superintendents, supervisors, principals, as well as teachers, may often focus the need for a course).

A Provincial Department of Education sometimes has a need to help teachers with particular difficulties (for example, the education of exceptional children) and the Extra Mural Division has responded to this approach. The changing pattern of educational practice requires teachers to be brought up-to-date with certain conceptual skills and a specific course is being developed to meet the need.

Finally, there is the broad band of elective courses that students can take at all levels to satisfy their own interests and to contribute towards the credits they require for a degree.

Once it has been decided to produce a particular course, the appropriate faculty member, the Director of the Educational Television Unit and the Director of the Extra Mural Studies Department discuss responsibilities and working relationships. It is particularly important that the faculty member should understand the immense amount of work involved in his undertaking this project - not just in writing scripts and preparing the course manual but in preparing and recording the lectures on videotape and in the administration and support of the course once it is going out. The remuneration for this type of work is generous as a matter of policy, since it is felt that this is more likely to attract the most able people to come forward and offer their services. When agreement has been reached all round, the Educational Television Unit allocates a producer director to work with the instructor and their work begins on the development of course scripts and production of videotapes. Other specialists are employed as required.

Materials

The course manual generally outlines the course structure and then gives a synopsis of each of the videotapes and the main teaching points contained in each tape. For each videotaped lecture a selected reading list is given and diagrams relating to the visual presentations in the educational

television lectures. Series of practical exercises are included for the student to work on at home. In courses requiring laboratory work the manual includes an additional laboratory section.

In addition to the manual, there may be a book of readings including articles from well-known journals in the subject area. This may involve additional expenses in hiring a research graduate and in obtaining permission to use copyright articles. The book of readings is then published by the University with a foreword by the instructor and offered on sale to students as an extra textbook. It is interesting to note that there is a brisk sale of these books among the students taking 'On Campus' lecture courses as well. The instructor may prefer to prescribe a textbook as background material for his course of lectures. These are purchased in bulk and shipped together with the other materials out to each centre and sold by the coordinator to the students at the same price as would be paid in the University.

The course designers are concerned by the scarcity of reference material available at the centres. It is clearly impossible to duplicate the University Library's holdings in each of the centres, but a compromise has been effected by the production of a library box of relevant reference material which can be shipped out to the coordinator at each centre. At the same time the 'Off Campus' students have the same rights as their 'On Campus' counterparts to borrow materials from the main University libraries, although they must, of course, plan well ahead.

About a year is required to produce, assemble and prepare all the elements of an 'Off Campus' course. Whilst no budgetary restrictions are imposed upon any particular programme series, the unit has developed a series of effective audio and visual communications at low cost.

Utilization

In the early days a student from each class of the 'Off Campus' credit courses was paid a nominal fee to operate the television equipment. However, it was felt necessary to have someone in charge of the class to organize discussion groups and able to answer questions arising from the television lectures. Where possible an attempt is made to obtain an individual with a master's degree in the subject area although there have been occasions when an individual with a bachelor's degree has been successful. It is assumed that students will attend the centres two nights a week for a period of seventy-five minutes, during which the educational television tape will be played for about thirty minutes and the remainder of the time will be devoted to answering questions, conducting classroom discussions, conducting laboratory sessions if required and noting any particular points of difficulty which the students have experienced. The tutor is able to phone the educational television instructor on the main University Campus with problems or questions which must have an immediate answer. Thus the tutor not only provides an invaluable service for the students, but is also a means of feeding back information from the study groups to the University.

Administrative machinery ensures that supplies of all necessary materials are delivered to the centres in time and that an adequate staff exists to see that all logistical requirements are met. The Educational Television Unit technicians visit each centre during the summer period and service all the educational television equipment. This preventive maintenance has paid off well and in four years of operation very few problems have arisen which can be attributed to technical breakdowns. Nevertheless standby equipment is located at strategic points and should a fault occur, replacement equipment can be installed with very little interruption to the learning process whilst the defective equipment is taken away for repair.

Evaluation

Apart from the routine feedback obtained from the tutors working with each study group and the usual type of 'evaluation' found through the examination system, two separate evaluatory exercises have been conducted on aspects of two of the educational television courses. The first looked in particular at the academic results and attitude ratings of the 'Off Campus' television course in psychology offered in 1969/70 to 177 students in six separate locations 'Off Campus', to 124 students in day-time courses 'On Campus' and seventy-eight students at night-time courses 'On Campus'. It became clear from this that the degree of motivation was higher in the part-time students than in the full-time students, and that the former were, by and large, a far older and more mature body. In all cases the drop-out rate was extremely low (5% or less) and in the final marks there appeared to be no significant difference between the performance of the various groups. Attitudes to various components of the course are examined carefully. The report finished with the following conclusion: 'it is felt that on grounds of both academic results and attitude ratings the 'Off Campus' television course was

amply justified .... and there is every reason for supporting and predicting an increasing offering of 'Off Campus' ETV courses in subsequent years'.

The second survey, conducted in 1973, surveyed attitudes towards a geography course taken by 'Off Campus' students. This is a careful and detailed piece of research which examines various components of the course in depth. Interesting hypotheses may be drawn from the results.

This system is effective, economical and provides an important social service to people who could so easily feel isolated and neglected.

Adaptability

This is a delivery system for academic courses which is particularly well suited to the requirements of tertiary education. The production techniques can meet a wide range of educational and instructional situations. These two aspects are, clearly, capable of adaptation to meet the needs of other parts of the Commonwealth where problems arising through isolated distant communities and educational need have to be met with limited resources. However, the strength of the Memorial University system appears to lie in the way in which each course package has been specifically designed to meet identified local needs, particularly in terms of the relevance of the academic content. Growing support from extra mural students shows the value of this careful preparation.

Economic Considerations

An outline has been given of the manpower requirements. It is impossible to quantify these meaningfully in cash terms but it is important to emphasize the high degree of professionalism manifest in all aspects of this operation. Again to attempt to quantify capital costs is unlikely to be useful. The electronic system was installed many years ago and anyone designing such a system nowadays would undoubtedly use newer and possibly smaller and cheaper format equipment.

The immediate benefit is enjoyed at twenty-eight remote centres where about 2,000 adults (out of a total population of just over half a million) are, each year, able to enjoy the opportunities that further university study offers. Again, how can this be quantified in cash terms? But few would doubt that Newfoundland and her people will derive great benefit from this activity.

Costs will need to be examined carefully in any attempt to reproduce elements of this system elsewhere, particularly if there is a possibility of distributing the signals satisfactorily by means other than the physical distribution of videotapes. Newfoundland, with twenty-eight centres, has, possibly, reached the optimum level of development of the present system. In a larger operation economies might be effected by micro-wave or even satellite distribution; even then the small videotape recorder at the classroom end will remain critically important.

Future Plans

There will be a growing requirement for the in-service training of teachers on a continuing basis, perhaps to introduce a new approach to the teaching of a particular subject, perhaps to produce specialized materials for groups of teachers in workshop sessions and short seminars in remote parts of the Province, perhaps to offer second degree courses. The pioneering work of the Memorial University in Newfoundland has shown that educational television has a tremendous potential to assist in solving these problems effectively and efficiently.

NEW MEDIA IN CURRICULUM DEVELOPMENT AND TEACHER TRAINING : CARIBBEAN

Introduction

This is a regional project (UWI/UNESCO/UNICEF/UNDP RLA 142) designed to achieve full implementation over a period of five years. At the mid-run stage (January 1974) significant educational benefits have already been achieved.

The broad objective of the scheme is to expand and assist in improving the facilities for teacher education and curriculum development at the 10-15 year level. Activities are mainly based on three University campuses, and channelled through twenty teachers' colleges.

Integrated use of modern technology has been made. Low-cost closed-circuit television equipment has been issued to the teachers' colleges, for microteaching amongst other purposes. Other forms of media support made available to teachers' colleges include overhead projectors, slide-cube projectors, tape recorders, battery-operated slide projectors, Zufra biocopiers and spirit duplicators. In addition a central materials production capability is being developed to support the curriculum development work.

The fifteen countries participating are: Bahamas; Barbados; Belize; British Virgin Islands; Cayman Islands; Jamaica; Leeward

Islands (Antigua, Montserrat, St.Kitts-Nevis & Anguilla); Trinidad and Tobago; Turks and Caicos Islands; Windward Islands (Dominica, Grenada, St.Lucia, St.Vincent). Overall co-ordination is provided by the School of Education of the UWI, with a UNESCO team based on the Mona campus (Jamaica) and supported at the St.Augustine campus (Trinidad) and the Cave Hill campus (Barbados). Additional UNESCO staff are based in Antigua, Bahamas and St.Lucia.

Objectives

Within the fifteen countries in this project, there are twenty teachers' training colleges. It was considered necessary to establish firm links between them and to initiate a common approach to training activities; increase the output of specialized teachers for the 10-15 year age group; contribute to the upgrading of serving teachers in the junior secondary levels, as well as school principals, education officers, administrators and teacher trainers, particularly in terms of developing teaching skills and professional attitudes; increase the cadre of supporting personnel - teacher librarians, audio-visual and laboratory technicians, graphic artists, etc.; develop and renew school curricula, geared to the economic and social needs of the region, through the increasing involvement of teacher educators and teachers in these processes; make appropriate application of modern technology to teaching and learning and to increase the capability of teachers' colleges and the region as a whole for the production of relevant educational materials, and ensure, through a system of counterpart training, that the region would maintain on sound lines the activities generated by the project after UNESCO staff had departed.

In planning this project a fundamental consideration was that techniques involving 'New Media' should be seen as a means to the solution of educational problems within the overall strategies of curriculum development. The Caribbean situation imposed its own particular constraints of finance and skilled personnel. Hence, it was decided to concentrate on proved low-cost techniques, including in particular portable videotape recorders and cameras (rover packs); overhead projectors with machines for copying and making transparencies; slide projectors and audio-tape recorders. Strategies for the use of these pieces of equipment were and are being worked out through a series of regional workshops based on the principle that 'teachers are capable of finding solutions to all problems which exist in their educational systems'.

Historical Development

This project originated in a Caribbean Regional UNESCO/UWI seminar held at St. Augustine, Trinidad in 1966. The following year the UWI submitted a formal request to UNESCO on behalf of the governments concerned. In October 1970 a team of five was appointed by UNESCO to work from a Project Office in the Institute of Education (Mona). This team consisted of specialists in language arts, science, mathematics and educational materials, led by the Chief Technical Adviser. The team consulted with Ministries of Education and teachers' colleges as part of a survey of regional developments in teacher education and curriculum development. Working with the Institute of Education (now the School of Education), they drafted a plan of operations which was submitted to UNDP.

On the basis of this plan, UNDP then submitted specific proposals to governments which led to final agreement in June of 1971 by the UNDP (Special Fund) Governing Council. Additionally UNICEF approved additional funds for the production of educational material and equipment.

The project thus became ready for full operation from September 1971. During the pre-project phase experts were recruited, the identification of counterparts began and equipment and materials were ordered. Further recruitment and appointment of specialists took place between September 1971 and June 1972 to cover specialized fields of language arts, educational technology, science, mathematics, curriculum development, administration, graphic art and librarianship.

In-service training of teacher-educators in the development of specialized curricula and teacher training programmes has been undertaken. Microteaching techniques have been developed on a wide base in the twenty teachers' colleges spread through the region. There has been a comprehensive examination of microteaching techniques developed elsewhere, accompanied by an extensive regional research programme to determine which applications are most appropriate in the Caribbean context.

Progress has been made in the development of materials in mathematics, science and language arts, and in co-ordinating this activity with those of the teacher trainers and materials production units. A Materials Production Centre has been established in the St.Augustine Campus and has already been able to offer valuable support to the general development of the project. However, early problems with the delivery of

equipment delayed development of this important Unit. Supplementary material production capabilities are being built up on the Mona and Cave Hill Campuses.

Administration

The project is a joint venture of UNDP and the fifteen participating governments. The UWI acts as the co-ordinating agency of these governments; UNESCO is the executing agency; UNICEF is a co-operating agency. The successful outcomes of the project reflect the steps taken by the Ministries of Education of the individual governments to assess their potential for supplementing development plans and to facilitate the project's operations in accordance with obligations specified in the Project Agreement.

The project is directed by the Dean of the School of Education of the University of the West Indies from headquarters on the Mona campus in Jamaica. He is assisted by the UNESCO Chief Technical Adviser with a staff of fifteen internationally recruited experts and eight locally recruited staff. The international staff are deployed in Project Headquarters in Jamaica (4), the Materials Production Centre in Trinidad (6) in Barbados (2), in St.Lucia (1), in Antigua (1) and in the Bahamas (1).

Communication between these posts is vitally important yet difficult owing to the unreliability of postal services between the islands. Telephones and cables are expensive but necessary. Travel is an important element. It has been suggested that a teletype link between the three main centres - Jamaica, Trinidad and Barbados - to which the UWI would have access, would be a sound investment for regional co-operation.

Thirty-two local counterparts have been identified and 'released' on full pay from their positions in Ministries of Education, in the School of Education, in teachers' colleges and in secondary schools to work with the UNESCO experts. In addition, about 150 co-tutors selected from the ranks of teacher educators and teachers, have been associated with the UNESCO personnel in field work exercises concerned with developing classroom and college curriculum materials and the practical forms of training. It is a fundamental concept of the project that training for all counterparts and co-tutors takes place within the region through in-service involvement and specialized workshops.

Consistent with long range objectives, the School of Education has already created permanent posts in educational technology at two of its Centres.

Implementation

Early benefits derived from the introduction of new materials and techniques can soon lose effectiveness in traditional systems. There appear to be three interrelated requirements for a successful teacher education programme: expertise in academic disciplines, inter-disciplinary relationships and professional skills needed in an increasingly technological school environment.

The planners had to note the social aspirations of each contributing country and its economic situation. Indeed, universally, there is a demand for greater economy in all activities. In teacher education this requires an approach giving good results in a short time. Thus strategies were evolved which:

1. Examined the content of training programmes to determine what was necessary. Course objectives were specified and 'core themes' identified.

2. Reinforced the understanding of concepts and learning of skills by inter-relating a number of themes.

3. Introduced teaching staff to the benefits of an integrated approach through the concept of systematic team teaching based on matrix techniques.

4. Utilized the microlessons, with a portable television camera and videotape recorder.

5. Harnessed the creative and technical abilities of the students.

6. Recognised that teacher education is a life-long process.

The tools developed to implement these strategies are:

1. Workshops - Groups of about 30 to 40 teachers, organized in sections, are given carefully designed stimuli, appropriate cues and questions, and so come to more effective conclusions than could be achieved in any formal lecture session. It follows that the subject of, and reason for, holding the workshops must be relevant to the immediate requirements of the educational situation and that the climate of official opinion, at all levels, must be favourable to the implementation phase which will inevitably follow a successful workshop. (In principle, this is assured

by the initial agreement on the plan of operation.)

In its first full year of operation the project conducted workshops, offered specialist materials, contacts and training for on-the-job upgrading of personnel serving in Ministries (14), teachers' colleges and schools (10), UWI School of Education (8), and in the fields of language arts (5), mathematics (3), science (5), teacher education (1), administration (5), educational technology (3), graphics (3), audio-visual techniques (3) and curriculum development (3). Valuable documentation supported these activities.

2. Educational media are matched to the instructional task.

3. 'Job card' format has been devised as a framework for self instruction and evaluation which is an essential basis of a systems approach to organized learning/teaching experiences. The job card specifies and relates performance objectives, the activities selected to achieve them, and the evaluation measures by which progress towards them is to be assessed.

4. A recognition that all processes and skills in the educational system have to be co-ordinated. Thus training, curriculum development, media production, media usage, administration are regarded as different facets of a total, integrated system.

5. A cadre of local counterparts and co-tutors participating with the experts in the project's development and training exercises to ensure that, given adequate support in other directions, the momentum of development can continue after the withdrawal of the UNESCO personnel.

Videotape recording systems and other equipment were issued to the twenty teachers' colleges following training in the operation and educational use of multi-media. It was then appreciated that existing training systems would have to be reorganized and reorientated to integrate the new media into the programmes.

The pattern of training encouraged centres in an open-ended approach to the solution of problems. Whilst all teachers' colleges introduced the use of VTR equipment in proven microteaching methods, independent variations are developing which suit the particular requirements and conditions of different local situations.

The usual microteaching objectives of the systematic development of component teaching skills are the core of the operation. After only one year many useful examples have been recorded and are being evaluated. The production of tapes which can be issued to all teachers' colleges as stimulus material is being considered.

This project has carried out possibly the most comprehensive survey of microteaching yet undertaken in relation to teacher training in low income countries. This work and the problems of developing appropriate microteaching models, in the Caribbean area, are being carefully documented and evaluated.

The Multi-media Production Centre has been established by the project as a regional facility at the St. Augustine Campus. Here a disused school building has been converted into a mini-studio at moderate cost. This can produce and reproduce educational materials ranging from simple illustrated cards to master audio and videotapes. Silk screening and photographic production are currently being developed, including 16mm and 8mm cine film production.

Early in the project design, it was appreciated that it was immensely important for low-cost illustrated print material to be put into the hands of every Caribbean pupil at the 10-15 age level.

The Centre is also able to undertake all media production training requirements for the area served by the project - an essential element in the strategy of the project.

A multilith duplicator has also been installed at the Mona campus in Jamaica and another ordered for the Cave Hill campus in Barbados. At present existing facilities can just cope with demands and a recent order for 45,000 mathematics booklets and a set of 900,000 illustrated language arts cards was successfully fulfilled.

Linked with an electronic platemaker, modern typewriters and composers which offer a selection of typefaces, and with graphic support, the Centre will offer a production potential of 60,000 sheets of good cheap copies a day.

Another function of the MPC is to deal with maintenance and servicing problems of media equipment used in the project. To date the exact extent to which this will

be required is unknown, since the equipment is new and has, in the main, performed satisfactorily. Thought is being given to routine preventative maintenance schedules.

Finance

The videotape recording system made available to each of the twenty teachers' colleges is the 'Video Rover' costing approximately sterling £800. This equipment, which is simple and reliable to operate under conditions of heavy use, appears to have a good service record. Servicing and back-up facilities are provided by the Materials Production Centre in Trinidad and at the Jamaica campus.

The other multi-media equipment issued to the teachers' colleges costs approximately sterling £500 per college.

The Workshops are mounted with UNICEF fundings of approximately £15,000 per year. Necessarily much of this has been consumed in travel, but it is clear that this is an essential element in helping educators in isolated positions feel that they are abreast of current thinking and practice.

The cost of materials used in the biocopiers can be high (transparencies can cost £1 equivalent for four sheets). Central bulk buying can reduce this but the cooperation of teachers in discriminating usage is imperative.

Future Plans

Whether the project is continued totally or in part as an international scheme, or whether the work will be carried on on a local basis after the formal closure of the international phase remains to be seen. Recommendation on these questions must await the report of the formal evaluation process in February 1974. Extension costs to all parties - the international agencies, the governments and the School of Education - will be projected in these recommendations.

JAMAICA: CASSETTE PROGRAMME IN MATHEMATICS

Nature of Service and Objectives

The cassette programme has become an important element in an inexpensive project which seeks to improve the quality of mathematics teaching in grades 1-9 throughout the island of Jamaica. A structured series of messages recorded on audio cassettes and accompanied by printed reference notes has been produced to help familiarize teachers with new techniques and materials, and increase their professional self-confidence.

Initially a pilot project, the cassette programme has been developed by the collaboration of the School of Education at the University of the West Indies, the Ministry of Education, an outside consultant from Central Connecticut State College, USA, and with financial support from a local industrial concern (Alumina Partners of Jamaica).

The introduction of a modern mathematics curriculum in Jamaica began in 1967 and has proceeded according to plan through seminars, workshops and other forms of personal interaction. However, various problems were identified as this work proceeded. In particular, there were not enough qualified staff to service the needs of all schools needing help. Supplementary support to the textbooks offering teachers self-instructional materials was required. A cassette programme was designed to meet this need and to offer:

1. a flexible resource for teacher in-service training programmes;
2. a mechanism for the in-service training of teachers in geographically remote schools unable to participate in the ordinary training programme;
3. a core of reference material in schools which would help to overcome problems caused by the turnover of staff, and which would accelerate and consolidate the introduction of the new curriculum in primary schools;
4. support for the mathematics programme in teachers' colleges;
5. a reduction in the per capita cost of in-service education;
6. a model for the introduction of new programmes in different subjects at other levels in the system.

User Profile

In Jamaica there are approximately 800 primary schools. Through normal in-service training methods some 600 of these schools have been guided in the introduction of the new mathematics curriculum between 1967 and 1973. The cassette programme to supplement this activity was introduced into twenty schools in 1971 and offered to two teacher training colleges. This was a pilot project in which the materials and the system were carefully evaluated. This phase of the

operation has now ended and Ministry approval has been given to making the material available to any school on the island.

Historical Development

The development of this project must first be considered in the context of a collaborative venture involving principally the Senior Research Fellow of the UWI (Mona) School of Education concerned with the teaching of mathematics in schools and the Senior Education Officers in the Ministry of Education responsible for the teaching of mathematics. All were professionally concerned with the introduction of relevant new mathematics material in Jamaican schools. Each, through his overlapping set of responsibilities and the wider circle of professional colleagues, was able to involve the assistance of others. The marshalling of human resources has been one of the outstanding features of this development.

The team having first resolved the difficulties of developing an appropriate course of material, faced the major problem of familiarizing teachers with the new materials and giving them confidence to use them effectively.

This was achieved from modest beginnings by a series of weekly, sometimes fortnightly, workshops and seminars held in schools over a two-year period. The objective during the first year was simply to give the teachers an increased competence in mathematics. During the second year emphasis was placed on using the new materials with children. Teachers were released from their duties, with Ministry approval, for one hour a week to attend the seminars, each of which lasted for two hours.

Peace Corps Volunteers (PCVs) from the United States came to assist with the project, having first been trained in the precise requirements that they were to meet, by the Jamaican officers responsible for the programme implementation.

Gradually, more and more schools asked to be included, and a steady supply of PCVs arrived each year to help with the work and to replace those who had returned home. At the same time, outstanding Jamaican teachers were selected for special training. Those who measured up to the required standard were designated 'Resource Teachers' and given the responsibility of helping other teachers in their schools to use the new materials. Resource Teachers were then released to go to other schools to conduct seminars where no PCVs were available and have now, gradually, assumed the functions which the PCVs were originally asked to undertake.

With this activity, good progress was made in introducing the new mathematics curriculum and by about the beginning of 1973, 600 of Jamaica's 800 primary schools had received considerable training.

However, at this stage there were special problems to be solved. Approximately 150 schools were so isolated that the standard training programme was uneconomical. Added to this, staff turnover in these schools was particularly high, and because of their isolated position, recruitment of satisfactory replacements was difficult. Thus, teachers awaiting training tended to be posted to these schools and mathematics education suffered accordingly. In seeking a solution to these problems the concept of a cassette programme was examined and appeared to fill many of the requirements. The advantages of the cassette programme are:

1. Availability - the package of material and the player are available to all teachers in a school for use by a group or by an individual at any time.

2. Flexibility - once the materials have been prepared, the teachers may choose from the set what they need to study or review. They may use the audio-tape and the visual materials together or separately. Some teachers may use the material in a lesson on a topic which is unfamiliar to them. Some may use the material to assist other teachers who are new to the programme. In some cases the material may be suitable for use with children. The material is within the control of the teachers.

3. Low cost - the main expenditure for this programme is on the production of the master tape and the visual material and in the purchase of cassette players. The use of television instead was considered and it was seen that the expenditure in the same two categories - production and machines - would be very much greater.

The proposal for the pilot project was submitted to the Minister of Education in June 1970 and received his approval. At this stage two important pieces of assistance arrived. The first was from ALPART, a large industrial concern which had long been interested in problems of educational development in the island. They offered to meet the cost of the pilot project excluding salaries of the government officers and the University personnel already employed.

Secondly, a member of the staff of Central Connecticut State College, USA, with exceptional experience in new mathematics, programmed learning and materials preparation, offered his services as a consultant during periods of the University vacations. Thus, not only was Jamaica spared the expense of a full-time appointment, but was able to obtain uniquely valuable advice at a pace which enabled the programme to progress satisfactorily. (While the introduction of the new curriculum materials was, and is, a continuing operation, its administrators decided not to force the pace beyond the natural speed which was acceptable to the teachers concerned.)

Thus, over a period of three years, fourteen units of materials with a total of seventy-five audio-tapes, each lasting for fifteen minutes, together with fourteen books of accompanying reference notes (averaging fifty pages each) have been produced, distributed and evaluated in the pilot project.

The stage has now been reached where the materials are to be remade, incorporating the lessons learnt from the evaluation process, and offered to all Jamaican schools. Ministry of Education approval has been given for this and budgetary provision made.

Staff Involved

Prime responsibility rests with two Senior Education Officers in the Ministry of Education responsible for mathematics education; the Senior Research Fellow in the University of the West Indies, School of Education.

This is a team operation, particularly in so far as the planning of the overall strategies has been concerned. The Education Officers have taken the main responsibility for the production of the material in close co-operation with the consultant, and the Senior Research Fellow has been particularly concerned with all aspects of the improvement of teaching standards in schools and with the design of the evaluatory system.

Additional assistance has been given in production matters and in equipment selection by a Canadian International Development Agency technical expert, working at the University. A PCV, who happened to have some publishing experience, also helped in organizing the production of the reference notes.

Any such venture could not possibly succeed without the enthusiastic co-operation of the teachers concerned and their head teachers.

Working Method

The partners in the project design have regarded a sound agreement more important than a speedy decision. When differences of opinion have arisen they report that they have patiently waited for a solution to emerge. The original initiatives arose in consultation and were jointly submitted to the Permanent Secretary of the Ministry of Education for approval. In day-to-day activities, the partners' long period of professional collaboration has built up an atmosphere of mutual respect, which in turn makes discussion, decision making and implementation an easier task.

Writing scripts and accompanying reference notes has been primarily the responsibility of the Senior Education Officers.

The consultant has visited the project during his college vacations and these periods have therefore been used for intensive programme outline design, script writing and revision, apart from general observations on the overall progress of the work. The polishing of draft scripts has then continued by correspondence until agreement on an acceptable form has been reached.

Programmes are recorded from the scripts in a studio hired from the University, with technicians' services included. The CIDA technical expert, however, has also helped with quality control and the subsequent duplication of copies from the master tape to supply all schools and both training colleges taking part.

Printing, including typing, graphic work and lay-out collating and binding has been undertaken in the University. A PCV has helped with this work but it has on occasions, been necessary to pay for extra work.

Utilization

Twenty schools and two teacher training colleges were chosen to take part in the pilot project. The schools received cassette players, tapes, sets of the reference notes and a complete set of the manuals, entitled Teaching Mathematics We Need, supporting the new curriculum. At the same time a control group of four schools was issued with the manuals only.

Schools reasonably close to one another were chosen in consultation with the Education Officers for the area. Preliminary discussions were held with principals of these schools inviting their participation in the project and they, in agreeing, designated a member of their staff who could 'facilitate' the work of the project by

promoting the idea amongst other members of staff. Meetings were held with 'facilitators' to demonstrate the use of the cassette recorder and to discuss administrative details.

Facilitators have remained the main channel of information feedback about the progress of the pilot project in each school, and it is clear that several ways of using the materials have been developed. Indeed, some reports indicate that frequently the players are taken home by the teachers for individual study. (Microphones were not issued with the players and they cannot be used to make recordings.) Many of the facilitators attended a special course for resource teachers and it is reported that this has added additional impetus to their work.

Evaluation

Within the School of Education a plan was prepared for evaluating the cassette programme in two sections: the first through a series of pre-tests and post-tests aimed to measure the amount of learning attributable to the taped lessons; the second through a series of attitudinal scales aimed to assess the effectiveness of the programme as a medium of instruction and to record the opinions of the participants about education in general and mathematics in particular. The collection of this data and the analysis of the results is still being undertaken.

Nevertheless, results so far returned have been sufficiently encouraging to persuade the Ministry of Education to extend the availability of the materials to all schools in the island.

Financial Considerations

Capital investment in this project is minimal. The total expenditure incurred over a three-year period in excess of the salaries of University and Ministry staff has been covered by the ALPART grant of Ja.$12,000. In this the major items of expenditure have been in connexion with the visits of the mathematics consultant.

Other expenses have been incurred in: local travelling; additional secretarial help; hire of University recording studio; overtime paid to technicians; expenses connected with evaluation and analysis; purchase of audio-tapes (reel-to-reel masters and cassettes); purchase of tape replication machine (for the pilot project replication on a limited scale was required and a four bank machine was adequate. Should a large number of tapes be required, as will happen with the expansion of the scheme to cover all schools on the island, the purchase of an adequate replication machine could be a relatively large item of expenditure); purchase of paper and other materials; purchase of cassette players for schools and teacher training colleges; provision for repair of recorders.

Here it must be stated that the cassette player has proved exceptionally reliable and there have only been two cases of malfunction among the twenty-two recorders in this project over a period of three years.

Future Plans

Immediate plans have been devised to extend the coverage of the project to all primary schools in the island. A proposal has also been submitted and agreed for the extension of the cassette programme in mathematics to the post-primary level (junior secondary schools). In this it is intended to prepare and produce for testing, audio-visual materials for the instruction of teachers in pre-service and in-service mathematics programmes at grades 7-9 as an extension of the pilot project which concentrated on grades 1-6.

Considerable interest has already been shown in this project outside Jamaica. At the request of the Education Department of the Cayman Islands, the cassette programme is being tested by their teachers to assess the extent to which the programme can stand with a minimum of support from resource personnel.

The consultant has been invited to advise on the introduction of a similar system in Peru in an educational situation which differs fundamentally from that in Jamaica. A modification of the Jamaican reference notes with a locally recorded version of the audio-tapes is being tested at this time. It is likely that Jamaican staff will be invited to visit and advise.

From this, it is clear that others who are familiar with the project's effective simplicity consider the concept to be capable of transfer. Materials, of course, may have to be revised considerably to meet local requirements. But in considering the transfer of a hardware system it is vital not to overlook the personal element. A major factor which has led, perhaps, to the Jamaican success could lie in the quiet, but efficient, sympathetic, professional attitude of the project leaders. They have deliberately made haste slowly and have carried teachers' opinions with them. They have seeded an idea and waited for a demand to grow; and at that point they were ready to begin to lead

the teachers to develop a new attitude to their responsibilities through involvement with the mathematics cassette programme.

PROVISION OF EDUCATIONAL RESOURCE MATERIAL: NEW ZEALAND DEPARTMENT OF EDUCATION.

Introduction

The Department of Education in New Zealand has evolved, over a considerable period of time, a range of services to provide educational materials of various forms to all schools in the country. From about 1935 onwards, in the words of Clarence E. Beeby 'there had been a resurgence of educational thinking and practice throughout the country and the school system that had been relatively static for a decade or two was enthused with a new, if often vague, sense of purpose '. In the ten years or so following 1935, the curricula of both primary and secondary schools were completely overhauled - 'the new prescriptions were based on very different educational assumptions from the old'.

It was during this time with the realization that the provision of teaching materials was essential to the process of renewal and development, that two very significant but related developments took place. In 1942, on the personal decision of the then Minister of Education, a National Film Library was created. Prior to that time there had been in New Zealand a collection of 16mm films in possession of the British Council. This had begun to evolve into some form of film library, but initially it contained films of general appeal rather than of instructional value. The first Supervisor of Teaching Aids was appointed - a man who was to remain in the position for twenty-one years and under whose personal guidance the National Film Library developed into the significant resource which it provides today for the New Zealand educational system. It was only comparatively recently that the National Film Library was split to form the Visual Production Unit and the Library as separate entities.

The other development which arose out of the vigorous move for educational reform in the thirties was the creation of the School Publications Branch of the Department of Education in 1939. Very soon after its inception Clarence Beeby was appointed its Director and under his guidance it soon assumed considerable value and importance within the New Zealand educational system.

Within the Department of Education there are a number of agencies offering materials and resources for teachers and schools. The National Film Library provides films, largely 16mm, tapes and recordings; the Visual Production Unit is responsible for the provision of filmstrips, slides, charts, pictures and overhead projector transparencies; the School Publication Branch provides bulletins, handbooks, journals and pictures; the Curriculum Development Unit is responsible for planning and selection of material and for in-service training; the Inspectorate also provides in-service training.

Provision of Equipment

Primary and secondary schools have somewhat different arrangements for acquiring audio-visual and other teaching equipment. For State primary and intermediate schools there is the provision of a standard quantity of basic equipment; schools receive filmstrip projectors, daylight screens, overhead projectors, tape recorders, a radio with extension speakers and microphones. Schools are given a $200 subsidy to purchase 16mm film projectors. Cash grants are available for new schools to buy records, filmstrips and additional visual aids and equipment.

Secondary schools are initially set up with a radio with several speakers, a record player, a filmstrip projector and a micro-projector head. In addition, they receive a grant of $800 for additional equipment selected by the school itself.

Educational Radio & Television

Although almost 95% of schools in New Zealand are equipped to receive educational broadcasts transmitted on the national network (but only during the limited period from 9.45 a.m. to 10.00 a.m. for four days of the week and from 1.20 p.m. to 2.00 p.m. for five days of the week) it is not generally felt that the radio service is making a serious impact on the educational system. It has been suggested that one of the major reasons for this is that the programmes are prepared and supervised by the Schools Broadcast Section of the New Zealand Broadcasting Corporation, and although this is done in consultation with a Schools Broadcast Advisory Committee, the lack of control and involvement by the Department of Education has not made for the establishment of a successful service.

The Correspondence School which also uses radio, has a rather different system of operation. (See the separate case

study.) The programmes put out as part of the Correspondence School are produced and presented by the staff of the Correspondence School in the studios of the NZBC. Here only the facilities are provided by the broadcasting organization - the human resources are those of the Correspondence School.

There is at present no educational television service in New Zealand, although for the past few years consideration has been given to the possibility, and a Committee of Enquiry was set up to report into television in education. This Committee reported in February 1972 and at present the initial planning for the establishment of an educational television service is just getting under way.

National Film Library

The National Film Library should be considered against this background. One of the most important features of the NFL is that it is a branch of the Department of Education. It lends 16mm films free of charge to schools and any other organization which has some educational purpose. The main Library is in the capital city, Wellington. There are also two branches, one in Auckland and the other in the South Island at Christchurch. There are some 6,504 regular borrowers from the 16mm film library; about half are schools and colleges. The other borrowers include other Government departments, churches, YMCAs, the armed services, adult education groups, young farmers' clubs, political clubs, film societies and so on. Films are not lent to private persons nor for entertainment purposes. In 1972, some 338,662 reels of film were issued and of these approximately 80% went to schools, teachers' colleges and universities. The 16mm Library contains some 9,277 titles with an overall total of 35,547 prints. As well as providing 16mm films, the NFL has a gramophone record library which provides records free of charge to almost 1,521 schools, colleges and universities. It has some 3,649 titles in circulation with a total of 7,586 records. During 1971 nearly 13,300 records were borrowed.

The NFL also provides a tape duplicating service for educational institutions. A library of master tapes is being built up in the NFL, and schools, colleges and universities are invited to send in blank tapes for dubbing from the particular programmes they require. During 1972, some 6,829 dubbings of tapes were made for schools. Most of these were for foreign language teaching but there is an increasing range of tapes now available for other subjects. The catalogue of master tape recordings now in preparation contains some 683 titles.

The loan output of the NFL has been increasing quite significantly with a 5% increase between 1969 and 1970, an 8% increase between 1970 and 1971 and an 11% increase between 1971 and 1972. The NFL tends to increase the number of copies or prints rather than the number of titles. The number of prints ranges from a maximum of around eighty for a New Zealand history film - used in social studies - to a minimum of three prints (one for each Branch) for specialized films, depending on the target audience. The average print number is around thirty five to fifty. Films are now more related to syllabuses.

The selection of films for the Library is generally at the discretion of the Manager of the Library who acts on the advice of specialist Curriculum Development Officers. Some films are acquired on the recommendation of the Film Library staff themselves. Films are selected from catalogues (generally from overseas); prints are then previewed by the Curriculum Development Unit's specialists, with or without outside help. It has been found that about 70% of all previewed prints are accepted for the Library. The number of prints of each film is generally decided by the Film Library Manager and purchases are made on an annual basis.

A further peripheral activity is the collection and preservation of New Zealand films of historical interest as part of a film archive collection. This work is undertaken in conjunction with the National Archives, and, it must be noted, consumes a considerable proportion of the time of the Manager.

Initially the accommodation for the NFL was ad hoc and unplanned in nature, but it is significant to note that at every stage of its subsequent development and change there has been growth. The final design of the existing buildings was to the specification of the present Manager of the Film Library and was based upon long experience.

There are fifty-one members of staff, with twenty-five in the head office, fifteen in the Auckland office and eleven in the Christchurch branch. Staff are normally recruited from young married women teachers who have left the teaching service, and who are then most often employed as 'booking clerks'. The turnover of staff is no more than average and since the career prospects within the Library are comparatively slow and very much dependent on internal promotion, this reflects a considerable degree of satisfaction with the job. There is of course the danger of 'getting out on a limb' in terms of career development by working in such a specialist service.

For the year 1972/73 the NFL had a budget in the region of $300,000 which was for above-the-line expenditure only and did not include salaries, rent and similar overheads. The money was essentially used for the purchase of films, records, tapes, and related specialist equipment. The printing of catalogues is also paid for from the budget. There has been a very significant increase in expenditure on audio-visual materials by the Department of Education, ranging from $180,000 in 1968/69 to $460,000 in 1972/73 with an estimated $713,000 for 1973/74.

There is no charge for membership of the NFL, nor for the despatch of films. The NFL does reserve the right to charge for films which have been damaged, although in practice this has only happened two or three times in the last twenty-five years. It is interesting to note that where regional libraries were established, damage to films decreased. Automatic threading projectors are not encouraged by the NFL since they are felt to contribute significantly to film damage.

A significant part of the work of the NFL is in training projectionists. This training is carried out by some 758 volunteers at present, although it used to be part of the work of the NFL staff themselves. This system of training now extends throughout the country and last year thirty-one new volunteers came forward and were able to meet the NFL standards for training and examining. Over the fourteen years of the scheme's existence 11,086 certificates of proficiency have been issued. Most of the examiners are teachers.

There are some 3,000 16mm projectors in about 3,300 educational institutions in the country. Servicing these projectors is the responsibility of the school or the institution. The NFL does not now operate a projector loan service, although it did so on an ad hoc basis in the past.

The Visual Production Unit

The Visual Production Unit of the Department of Education undertakes a major proportion of the production of audio-visual materials for education. This Unit originally formed part of the National Film Library and only became a separate organization some five years ago. It still shares the funds allocated for audio-visual materials with the National Film Library. Its annual share is approximately one-third of the total vote. The Unit has an established and recognized function of filmstrip production, filmstrip purchase and filmstrip distribution. Since 1971 the VPU's scope has expanded to include the production of overhead projector transparencies, wall charts and posters. All these items, together with the filmstrips are likely to be accompanied by teaching notes; in addition the filmstrips may have a commentary on record or tape (both reel-to-reel and cassette). However, a major proportion of the finance available to the Visual Production Unit is devoted to the purchase of filmstrips from overseas and their subsequent distribution.

The staff of the Visual Production Unit numbers only six. In such a small Unit the career prospects are not particularly good nor are the grades of salary related to the teaching profession - there is only one single salary scale in operation ranging from a modest $1,500 to some $6,400. In spite of these difficulties - often staff members receive less than they would if they were in a teaching situation - the situation is generally stable and the average length of service considerable. There is no major problem in recruiting replacement staff; the high degree of job satisfaction may be significant.

There is a tendency for the VPU to make use of more and more colour materials in production - both in filmstrips and in wall pictures. This change from black and white to colour is probably the most significant recent development. Another noticeable evolutionary pattern is that records (which accompanied filmstrips) and their distribution, which a few years ago formed a significant element in the work of the VPU are now being phased out completely by the introduction of sound tapes and more particularly, cassette tapes. These developments are also reflected in the purchasing activities. Further diversification into the production and purchase of overhead projector transparencies, charts and the increase in the quantity of teaching kits and packages reflects changing requirements and desires of the educational system.

Of the $713,000 available for audio-visual materials in 1973/74 (the highest ever allocation) about a third is devoted to the Visual Production Unit budget and the remainder to the National Film Library. The VPU's expenditure of about $228,000 represents only the cost of materials. It does not take into account salaries, rents or other overheads. 60% - 70% of the budget is spent on overseas filmstrip material. This material is either resold or used for stocking the ten filmstrip libraries throughout the country. Any material which is resold has a heavy government subsidy, for example, the cost of

a colour filmstrip which is on sale to schools through the catalogue at NZ£80 may have been bought at NZ£125 representing a government subsidy of around 30%.

The rest of the budget is spent on the production of filmstrips and slides, apart from a small proportion, which is used for the purchase of specialized equipment for use by the Unit - cameras, enlargers and so forth. The purchasing policy of the VPU reflects the major changes in the educational policy as and when they occur, and is carried out on a somewhat ad hoc basis with no established or overall agreed policies. This is perhaps a measure of weakness. The commissioning of production materials is also on an ad hoc basis.

The School Publications Branch

Although a service unit within the Department of Education, the School Publications Branch is not directly comparable to either the National Film Library or the Visual Production Unit. Its position and organizational structure is such that it does not have the same close relationship to the Curriculum Development Unit. It is classified as one of the Department's Special Services. The Branch has a budget of some NZ$500,000 which does not include salaries or overheads. Although most of the editorial staff have been teachers, the salaries which are paid within the Branch - like those of the VPU - are on Government service and not teaching scales. No off-the-job training is given to staff members joining the Branch, although applicants for posts have to take tests devised by the head of the Branch. These are aptitude tests concerned with the correction of manuscripts, the editing of stories and the selection of material. This care in selection and recruitment is considered to be essential for an effective publishing unit. As part of in-service training all the editors spend at least three weeks during each year in the field and on in-service teacher training courses.

One of the main activities of the School Publications Branch is the production of The School Journal, for primary schools. This journal is something of an institution within the educational system. Recent research conducted in one region of the country showed that some two-thirds of all teachers in primary schools make substantial use of it. In addition to providing a valuable teaching resource, the journal acts as a vehicle for curricular change and dissemination of information.

Although the School Publications Branch produces work of a very high standard indeed, there may be some doubts about its structural position within the framework of the Department of Education as a whole. The present relationship between the Branch and the Curriculum Development Unit is rather tenuous for approximately two-thirds of the work. However, the other third is developed in close consultation with curriculum officers.

One of the reasons for the undoubted success of the Branch is that it has always had strong and active support from senior officials. This began in the early years of the century with a Director of the Education Department and was strongly reinforced by the internationally-known New Zealand educationalist, Clarence Beeby, from the late 1930s onwards.

The local production of filmstrips and other materials can be initiated in a variety of ways. The Visual Production Unit officers may themselves initiate action or any individual teacher or group of teachers or subject specialists may offer the VPU a set of slides on a specific topic or even an idea for the production of slides on a topic. Curriculum officers also may initiate the production of a filmstrip in any subject area which they know to be lacking in supporting materials or resources.

In 1972 - the last year for which full statistics are available - the VPU provided some 31,000 filmstrips in colour and 8,000 in black and white. These were accompanied by 15,000 sets of notes, 2,000 sound filmstrips and 750 sets of materials. Overhead projector transparencies, 73,000 charts, 2,500 records, 400 tapes and 85,000 wall pictures were produced by the Unit as well as ten separate filmstrips with a total of around 8,500 prints in all. The Unit is already involved and will become more so in the production of the social studies kits which the Department of Education is currently producing for distribution to schools. These kits, which contain a wide range of visual material of various types, will have an estimated distribution of 24,000.

One of the strengths of the VPU is its flexibility to modify and change to meet needs. Although acting as a support service to the Department of Education, the Unit can, and does, co-operate with other Departments such as Health, and with the police. The statistics show a significant annual increase in demand.

The Visual Production Unit has never attempted any serious evaluation nor organized any research into the effectiveness of its operation nor the effectiveness of the materials which it provides for the educational system. However, the flow of

materials through and from the Unit can well be considered to be a good guide to the 'success' of its activities. More significantly, there is no research or development unit responsible for testing and evaluating equipment and hardware. In theory the Audio-Visual Curriculum Officer is responsible for this but the pressure of other commitments means that he cannot devote any significant time to it.

A gap in the total coverage of materials and resources provided by the Visual Production Unit and the National Film Library is the lack of provision for 8mm films.

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There are two basic ways of considering the central production of educational support materials. The commercial view is that to make quality products available on a wide scale, mass production techniques are required and research and development costs are spread over a long production run. Unit costs are accordingly reduced. In going for the wider target audience it is inevitable that the user becomes isolated from the creative processes and this tends to prevent his understanding the purpose of the materials.

The other view recognizes that teachers teach themselves best by the simple process of teaching others and particularly by being called upon to create something that is significant and useful in their work. It follows that as large a number of teachers as possible should be encouraged to join the creative processes of curriculum development and resource production. This is happening on a significant scale in many countries. However, consideration of a teacher's work pattern shows that the time available for an individual to research, design and create support materials is strictly limited. Team teaching recognizes this difficulty and offers groups of teachers an opportunity to prepare and deliver key presentations to larger groups of students. In Teachers' Centres something of the same pattern often happens, with teachers cooperating in the production of resource material. In both cases it is sometimes argued that for so much work a relatively small gain is derived, and that it would be more rational to make the materials available on a wider scale; and so the argument continues in circular fashion.

The pattern of activity developed in New Zealand and evolving in Exeter attempts to draw the best from the two approaches. In New Zealand the imaginative concepts of local teachers are developed into educational resource material by a team of professionals employed by the Ministry of Education. In Exeter a satisfactory result has been achieved by this same method, and also by arranging for outstanding teachers to be seconded for periods of up to a term to the Resources Centre. Here they team with professional designers and producers to make high quality material. These materials are then made available to a wide circle of teachers, and yet have a local flavour and direct relevance to the locally originated curriculum developments. In both centres most of the material on offer is bought from commercial companies; this is economical because a small amount of material can serve the needs of a large number of schools. The production capacity of the centre is reserved for those items which are not commercially available and for which there is an educational need.

In Tasmania, in the Teaching Aids Centre, experienced educators develop and test prototype materials which can then be replicated and distributed on a large scale through commercial channels. The work of the Media Mobile contributes to the involvement of teachers in the schools.

The two Caribbean case studies exemplify different strategies. The Jamaica cassette programme meets a specific educational objective in a limited geographical area. The decision to use print and audio cassettes was made after a careful study of available alternative approaches. What resources were available, and what combinations were appropriate in this particular circumstance, were the two basic criteria. The result is a deliberately limited, yet extremely effective operation. The Regional Project, on the other hand, is far more ambitious; both in terms of the range of objectives and the range of locations. It demonstrates the importance of a carefully designed and systematic approach to the solution of a range of interlocking problems. It attempts to make substantial progress on a broad front and in doing so has to ensure that there is synchronization and integration in a complex matrix of activities. Again it illustrates the supreme importance of conversion by willing consent. Change involves people and their attitudes and is brought about by leadership. The media then offer a most valuable supporting role. However, if the media are to preserve their credibility, constant, sensitive monitoring is required. Research, evaluation, feedback, are various names used to describe this process, which is of very great importance.

The Regional Project re-emphasizes the importance of print as a medium of instruction, especially the off-set litho facility which can respond to local demands quickly, economically and exactly. There is an abundance of evidence to indicate that in many low income countries this is the item of expenditure most likely to yield the highest education benefit, for the cash and skills invested.

The Newfoundland example illustrates a system in which a package of resource materials is designed and produced by a team. The material is specifically tailored, in form and content, to meet the requirements of a unique local situation as exactly as possible. However, the mechanics of the system for the production and delivery of materials would seem to be adaptable to the requirements of many situations where educational services have to be brought to isolated communities in an economical way.

The Alberta case study exemplifies the use of a relatively inexpensive, portable small format, television system. Materials are produced which may be distributed by post, or by other physical means to individuals or groups at a distance. The educational requirement was to find a method by which the continuing, in-service professional updating of teachers could be carried out. The system, however, would be equally relevant to the needs of small groups of, for example, farmers, agriculturalists, literacy workers, or family planners. In these situations it is possible to envisage the videotapes being used, perhaps, by an itinerant specialist. The necessary equipment, together with a small electric generator will fit into the boot of most cars. It is a system that would seem capable of development in many situations.

An important point which emerges from these case studies, as a common factor, is a relatively high level of feedback from the user to the central coordinating body. New Zealand does not, it is true, use terms such as 'research' or 'evaluation', and claims that its productions are 'pragmatic'. Nevertheless it is clear that a sensitive attitude has been developed by the staff who have, over the years, modified their policy and output to respond to the requirements of practising teachers. In Jamaica an independent evaluation of the cassette programme is being conducted concurrently. The Caribbean Regional Project has associated with it an on-going research project which is monitoring the developments in microteaching techniques. In Tasmania particular attention is paid to the testing and validation of the prototype materials, before they are passed across to commercial publishers. The Exeter case study describes a research and development project, within which a number of themes are being examined by individuals as separate research topics. Alberta tends to use concepts such as 'accountability' to describe a process whereby any educational operation is expected to produce an effectiveness commensurate with the level of investment. In Newfoundland, the degree of success results largely from the high degree of sensitivity which the planners have developed to the needs and reactions of users, and to the methods used to obtain this information. From the combined experience of these projects we must surely conclude that a high level of built-in evaluation, combined with a sensitivity that reacts appropriately to this evaluation, are essential ingredients of their success.

Other conclusions of a general nature which can perhaps be drawn from these studies are:

1. It is important for teachers to be given the opportunity of involvement in creative processes related to the production of materials which support their work.

2. It is necessary to devise a system in which a teacher's expertise may be drawn on, without disrupting his work pattern. An answer lies in seconding teachers for limited periods, or more permanently, to production centres where their professional advice is used in the course of editing and guiding craftsmen. It is very difficult for teachers, particularly at the higher educational levels, to carry a normal teaching load efficiently and to be responsible for all aspects of support material production.

3. It takes time for teachers to become aware of resources available and the mechanism whereby they can be obtained. It is also necessary for teachers to familiarize themselves with these new materials, and this again takes time. Efficient use of materials increases with familiarity. Patience, and sound organizational ability are needed by those responsible for media support services.

4. Whilst mediated teaching and learning processes can be more efficient, and frequently are more entertaining than conventional methods of instruction, the organizational demands on a teacher who takes the trouble to integrate resources into his lesson plans are considerable.

5. There is a danger that teachers will become remote from innovatory activities, in both the psychological and the physical sense, unless particular attention is paid to the problems of continuing professional up-dating. This is part of an enormous problem of information dissemination. The lack of awareness, not only by teachers but often by those with an innovatory responsibility, of related and important developments elsewhere, often results in considerable wastage. Information is not, generally, readily available in an assimilable form and existing channels for the dissemination of relevant information need to be examined critically.

6. The identification of the basic educational problem should be followed by an examination of the means available to help solve that problem and the determination of what is appropriate in the situation.

7. Broadcasting, as such, offers little of value to the educationists in many countries unless facilities exist to capture and store the message for use at an appropriate moment unless there is a strongly centralized educational system. Thus recognition is growing that in most situations the production facilities of broadcasting studios are of much greater value to educational planners than the broadcast distribution facility. As small format equipment becomes capable of higher quality production and offers greater compatibility the move is away from broadcast standard studios. Less capital intensive facilities are being assembled and increasingly controlled by a new professional genre - people disciplined to the requirements of education and communication. These new specialists tend to choose media appropriate to the task and increasingly advocate a variety of materials presented in different ways.

8. The importance of new media in teacher training and other situations, whether self evaluation of behaviour or personal interaction,is an element of significance. Audio and videotape recordings seem to have a longer, relatively untapped potential.

9. It is perhaps salutory to remember that even in the relatively different and well equipped educational environment of Tasmania, the main resource requirement of primary teachers was for sheets of cardboard.