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ABSTRACT

Because of the critical situation faced by higher education today and the world shortage of educational resources, it might be necessary to provide links between the traditionally autonomous universities of the Commonwealth so that they can share their resources for teaching and research. Experiences within Britain and North America have suggested that educational technology--film, television, sound tape, and satellite--can be an effective way for universities to share. Discussions at the University of Guyana and the University of the West Indies and correspondence and discussions with representatives of other Commonwealth universities have shown that exchanges of this kind would help meet the needs felt by the universities. Further discussions about the practical obstacles to the exchange of teaching indicated that the technical difficulties will rapidly become easier to solve and that costs will go down. A five-year program of research and action with technology, education, comparative studies in the social sciences, and Afro-Asian studies should be undertaken to provide more information about the potential of links between universities. (SH)

THE COMMONWEALTH FOUNDATION

OCCASIONAL PAPER
NUMBER XII

COMMUNICATIONS AND UNIVERSITY TEACHING WITH PARTICULAR REFERENCE TO THE CARIBBEAN

A REPORT FROM THE INTER-UNIVERSITY RESEARCH UNIT, CAMBRIDGE

Explanatory Note

THIS is the twelfth in a series of "Occasional Papers" published under the imprint of the Commonwealth Foundation. The aim is to ensure that the experience gained by citizens of the Commonwealth, to whom the Trustees of the Foundation make grants, becomes freely and widely available to professional colleagues working in relevant fields throughout the Commonwealth.

The views expressed in this Paper do not necessarily reflect the opinions of Trustees, whether individually or collectively.

Further copies of this Report may be obtained on application to the Administration Officer, Commonwealth Foundation, Marlborough House, Pall Mall, London, S.W.1, England.

MARLBOROUGH HOUSE,

November, 1971.

TERMS OF REFERENCE
AGREED MEMORANDUM
ON THE COMMONWEALTH FOUNDATION*

(As published following the Commonwealth Prime Ministers' Meeting of July, 1965)

A Commonwealth Foundation will be established to administer a fund for increasing interchanges between Commonwealth organisations in professional fields throughout the Commonwealth. It will be the purpose of the Foundation to provide assistance where it is needed in order to foster such interchanges.

2. The Foundation will be an autonomous body, although it will develop and maintain a close liaison with the Commonwealth Secretariat. Like the Secretariat, the Foundation will be accommodated at Marlborough House.

3. Within the broad purpose indicated above, the Foundation will include among its aims the following objects:—

(*a*) To encourage and support fuller representation at conferences of professional bodies within the Commonwealth.

(*b*) To assist professional bodies within the Commonwealth to hold more conferences between themselves.

(*c*) To facilitate the exchange of visits among professional people, especially the younger element.

(*d*) To stimulate and increase the flow of professional information exchanged between the organisations concerned.

(*e*) On request to assist with the setting up of national institutions or associations in countries where these do not at present exist.

(*f*) To promote the growth of Commonwealth-wide associations or regional Commonwealth associations in order to reduce the present centralisation in Britain.

(*g*) To consider exceptional requests for help from associations and individuals whose activities lie outside the strictly professional field but fall within the general ambit of the Foundation's operations as outlined above.

4. The Foundation could usefully develop informal contacts with the Commonwealth Parliamentary Association. To avoid the risk of duplication with the activities of existing organisations concerned with cultural activities and the Press, the Foundation should not initially seek to assume any functions in these fields.

5. The policy of the Foundation will be directed by a Chairman, who will be a distinguished private citizen of a Commonwealth country appointed with the approval of all member Governments, and a Board of Trustees who should be expected to meet at least once a year. The Board of Trustees will consist of independent persons, each subscribing Government having the right to nominate one member of the Board. These nominees, even if officials, will be appointed in a personal capacity. The Commonwealth Secretariat will be represented on the Board of Trustees by the Secretary-General or an officer appointed by him.

6. There will be a full-time, salaried Director who will be appointed, initially for a period of not more than two years, by Commonwealth Heads of Government collectively acting through their representatives in London. He will be responsible to the Board of Trustees.

7. The Director will require a small personal staff: general office services will be provided by the Commonwealth Secretariat.

8. It is hoped that Commonwealth Governments will subscribe to the cost of the Foundation on an agreed scale. Payment of the first annual subscriptions will be made as soon as the Director has indicated that a bank account for the Foundation has been opened. It is hoped that, in addition, private sources may be willing to contribute to the funds of the Foundation.

9. The accounts of the Foundation will be audited annually by the British Comptroller and Auditor-General, whose report will be submitted to the Board of Trustees. The financial year of the Foundation will be from 1st July to 30th June.

10. The budget of the Foundation will be subject to the approval of the Board of Trustees.

11. The British Government will draw up the necessary documents to set up the Trust and take any further steps needed to constitute the Foundation as a legal charity.

Introductory Note

In March, 1970, the Trustees of the Commonwealth Foundation offered a grant of £7,800 to the Inter-University Research Unit, Cambridge (an organisation established by the National Extension College). This award was designed to finance a feasibility study by the Unit, based on the Universities of the West Indies and of Guyana, into the use of television as a teaching medium in the fields of engineering, public administration and adult education.

The report which follows may prove of interest to a wider audience.

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Foreword

This report describes an enquiry into the use of educational technology as a way of linking Commonwealth universities and exchanging teaching between them. It argues that the exchange of teaching—by television, film, tape, and even by satellite—offers a new and important way for universities to share their resources. The report shows that this kind of exchange can improve the quality of basic teaching, can help universities to extend the range of what they can offer, and can bring to them teaching resources they could not otherwise afford. And it can help foster contact between university teachers working in the same field throughout the Commonwealth. It goes on to argue for an extended period of research into work of this kind.

The report was prepared at the Inter-University Research Unit under the guidance of an Advisory Group representing a wide range of educational interests. It rests on the foundations of the Unit's previous comparative work in Britain and North America.

The enquiry described in the report was made possible by a generous grant from the Commonwealth Foundation to whom the Unit, and its parent organisations the National Extension College and the Cambridge Educational Development Trust are indebted, both for the grant and for their warm encouragement of our work. We are also indebted to many universities and other official and unofficial bodies throughout the world for their help and advice: without that, and without people's generosity with their time, this report could not have been written.

Finally, I should like to record my warm thanks to Mrs. Sally Jeffery, Secretary to the Unit during this enquiry, for all her help and encouragement.

H. D. PERRATON

Cambridge.
July, 1971.

I.

Universities and their Problems

This report discusses the use of educational technology as a way of linking Commonwealth universities and exchanging teaching between them. It argues that the exchange of teaching—by television, film, sound tape and even satellite—offers a new and important way for universities to share their resources. The report suggests that further action and research in this field merits the continued interest and support of Commonwealth agencies.

Universities are by tradition isolated, proud and autonomous institutions. Since the middle ages they have been fertile in producing constitutional structures to preserve their independence and autonomy. In contrast, organisations to promote co-operation between universities[1] are a more recent development; for the most part they have been concerned with questions of administration rather than with co-operation on learning or teaching. Traditionally academic links between universities have been informal and unstructured: scholars have got to know about each others' work through the publication and exchange of books or papers, and through the exchange of people—wandering scholars—on footstep in the 13th century and by jet in the 20th. Thus there has long been a community of scholarship which crosses national frontiers, in the sense that scholars are concerned with their world reputation and know what is happening in their own field at universities across the world. This "invisible college" system, or lack of system, has worked well enough. Or at least it has worked well enough for those at the nodal points of the system, the centres of excellence in any particular discipline. But the isolation of universities from each other is a major handicap in the development of higher education in the 1970s.

I would pinpoint three weaknesses in the present situation. First, as a British University Grants Committee report put it in 1965: "Universities and other centres of higher education tend to work in isolation. Although contact between departments in different universities may be maintained where there is common interest in research, there is little exchange of information with regard to teaching. Even departments within the same university often have little knowledge of what teaching or research is being conducted in other disciplines. It is possible to obtain a fairly good grasp of current research activity by attending scientific meetings, but communication about ideas and aids for teaching is almost entirely unorganised and consists of no more than

[1] The word "university" is used here and, as the context will show, elsewhere in the text to embrace both universities and other institutions of higher education.

chance personal contacts or infrequent conferences."[2] Since that was written, student activities round the world have dramatised the importance of improving the quality of teaching within higher education.

Second, the lines of communication still tend to follow the old, north-south, routes. And it is often easier for a university teacher in the third world to find out about the work of colleagues in Britain, Canada or the United States than about work in other developing countries.

Third, universities everywhere are facing similar problems—of simultaneously maintaining the quality of their teaching and research, with less funds than they consider adequate and at a time when they are being asked to assume new burdens by their host communities. There is a world shortage of university resources. Any scheme which might help with this shortage seems worth investigating. For the needs of universities are dramatic. And universities are forced to compete—for staff and for finance—not only with each other but with the rest of the educational system, and with the rest of the economy. In Kenya it has been calculated that each university student costs so much that he keeps 240 children out of primary school. The problems of staffing are familiar enough and have been aggravated both by competing demands for skilled manpower and by the rapid expansion of universities in the last quarter-century.

All this would impose a severe enough strain even on a relatively static university system. But the system is far from static and universities are meeting new pressures, of which two are of the utmost importance. First, all universities are concerned to maintain and enhance their status as members of the world community of universities. At the same time, knowledge is itself expanding and the range of subjects which a university is expected to teach is growing with it. Students are demanding opportunities to learn a continually widening range of subjects, and the range may not be the same as that which the university, or the society it serves, consider most important. For this is the second pressure upon universities—that they should meet the immediate needs of their societies, especially for trained manpower and for applied research. This demand inevitably means that universities are having to teach in subjects, and at levels, quite different from the traditional, English model, university. The two criteria by which a university will be judged are neatly summed up in the formal aims of the University of Guyana—to provide "teaching and research relevant to the needs of a developing Guyana, of a standard of excellence which will win international acceptance."

(It is worth noting that, when faced with a similar dilemma in trying to meet both kinds of need, British universities have for the last fifty years sought

[2] *Audio-visual Aids in Higher Scientific Education* (*Brynmor Jones Report*) H.M.S.O. 1965, para. 159.

academic status and respectability at the price of serving their communities. The decline of part-time undergraduate courses, first at the civic universities and more recently at the former Colleges of Advanced Technology, is one index of this. If British experience is anything to go by, the greater danger, then, is for a university to lose touch with the needs of its community. This has, of course, social as well as educational implications.)

Universities, then, are faced with a critical situation and a marked shortage of resources in meeting the twin demands they face. And yet the Commonwealth university system as a whole is enormously wealthy in resources and in expertise. (The latest issue of the Commonwealth Universities Yearbook lists 100,000 names of individual scholars in its index.) The aim of the enquiry described in this report was to see whether the newer forms of communications technology would make it easier for Commonwealth universities to share their resources. For it seems clear that the traditional ways of exchanging information, teaching and research between universities are no longer adequate to their situation in the 1970s.

II.

Can Educational Technology Help?

Before asking whether educational technology[1] can help universities to share their resources internationally, two questions pose themselves. First, has educational technology proved of value *within* universities? Second, are there precedents within a single country of universities sharing their resources in this way? In asking these sorts of questions, especially about television, one is implicitly distinguishing between two of its characteristics, for it is both a way of displaying moving pictures and a system of communication. And so television can be used both for teaching audiovisually, with words, sounds and pictures, and for carrying teaching from one place to another.

There is now considerable experience, both in Britain and North America, of the use of television to help and improve teaching at a single campus. A recent report at the University of Glasgow[2], for example, shows that, over the past five years most university departments have used television in one way or another. The departments range from agricultural botany and computer science through drama and psychology to industrial administration and pastoral theology. Uses vary from full-scale studio productions to the recording of simple insert material and case studies for use within lectures.

Examples could be multiplied from many universities on both sides of the Atlantic. Useful surveys and individual accounts of the uses to which television can be put are to be found in the *Brynmor Jones Report*[3], in *University Intercommunication*[4] and in the periodical literature, notably the *University Television Newsletter* and the *NECCTA Journal*. The case for using television, for some university teaching is already, then, widely accepted, although this is far from saying that all, or even most, university teachers are convinced of its value, or of all the claims sometimes made for it. The case rests on two findings, confirmed both by experience and by what little rigorous research has been done on educational television: first, television is a very convenient way of bringing moving pictures into a learning or teaching situation; second, students generally learn as well from television as from other teaching methods, including

1 It is unfortunate that the relatively new term "educational technology" is already used in two distinct senses: to cover both the development of systematic processes in education, and the application to it of communications technology. It is generally used in the second, narrower, sense in this report, as convenient shorthand for television, film, tape, slides, satellites and so on.

2 TV Service University of Glasgow and AV Unit University of Strathclyde, *Picture and Sound in University Teaching* (Glasgow, 1970).

3 *Audio-visual Aids in Higher Scientific Education* (*Brynmor Jones Report*) H.M.S.O. 1965.

4 *University Intercommunication The Nine Universities Research Project* (Pergamon, 1966).

face-to-face contact with a teacher, at least so far as one-way communication is concerned.[5]

The second question—can universities co-operate through educational technology even within a single country—is less straightforward. The Unit looked into this in its previous enquiry and compared British and American experience[6].

We pinpointed two difficulties; they will probably be as important internationally as they are in Britain and the USA. First, there is no strong tradition of co-operation in teaching—as opposed to administration or research—between universities. Second, universities are not used to defining their teaching activities with the precision necessary if they are to co-operate with each other. A recent Canadian study sums up the two difficulties:—

> "Collaboration in pure scholarship (i.e. in research as separated from teaching) is inherent in the scholarly associations and has been fairly well supported through special installations, research libraries, etc. The pedagogical part of the system has, however, received remarkably little attention. This could be because inter-university co-operation has little to offer to teaching programs. It may, however, simply represent the difficulties in getting the larger number of persons involved to define objectives, to agree on them, and to collaborate in reaching them. This is a triple set of difficulties. One cannot co-operate with someone until the objective has been formulated precisely and agreed upon. Yet, precise formulation of objectives is rare in university teaching. Moreover, teaching is a very personal thing and the exercise of working out a co-operative program poses threats to the feelings and the vested interests of staff.
>
> "Yet, of the various university activities which might be amenable to a co-operative approach, teaching should be the most important. It is the essential function of a university and the one on which most resources are expended. Teaching embraces most of the research which goes on. Even in the University of California, noted for its research output, a recent unpublished study showed that teaching (including individual work with graduate students) took almost twice as much staff time as did research unrelated to teaching."[7]

Despite these constraints, which shape the programme recommended in this report, there are some types of teaching material and some university situations which lend themselves to co-operation and exchange, and where experience confirms that exchanges can be of value.

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5 G. L. Chu and W. Schramm, *Learning from Television: what the research says* (Stanford, 1968), pp 6–11.
6 *Linking Universities by Technology* (National Extension College, 1969)
7 H. M. Good, *Inter-University Co-operation, with special reference to the Universities of Ontario* (Queen's University, Kingston, Ontario, 1970).

Basic Teaching and Individual Learning

Work in Britain and America has shown that it is possible and useful to exchange basic teaching material. And, of course, this is the level at which syllabuses are most likely to have common subject matter so that exchanges may save teaching time and bring the benefits of scale to co-operation through educational technology. But of course this is the kind of situation where it is of the greatest importance that the objectives of any teaching material should be clearly defined. No one will use a "learning package" unless there is a clear label on the outside describing the contents and their use.

Similarly there are situations in which it is both convenient and pedagogically desirable for students to learn individually. The use of materials for individual learning may relieve some of the heavy burden of teaching inevitably associated with university expansion. But, if students are to learn effectively on their own, the materials they use demand the most thorough (and so expensive) preparation and testing. No one university could hope to produce a large amount of audio-visual material of this quality: if it is to be done, it must be done co-operatively.

Case Studies and Illustrations

Among the first exchanges to be set up in Britain were a series of psychiatric case studies exchanged between Glasgow and Strathclyde Universities. There is a widespread demand for short illustrations to use within a conventional lecture and some of this demand can be met by exchanges between universities. Television is a particularly convenient way of bringing into a lecture room medical case histories, views of unusual or dangerous scientific equipment, or illustrations of phenomena outside the students' day-to-day experience. In many cases, films, sound tapes and slides can be used in just the same way. The potentialities of international exchanges of case study material in any subject with a comparative element are obvious.

Specialist Teaching

Many universities find difficulty in offering all the specialisms in which their students have interests. The problem is at its most severe at post-graduate level, but, in the final years of a first degree course too, universities may be able to expand their resources by bringing in specialist teaching from outside. In our previous enquiries we found three situations where university teachers particularly welcome exchange. First, if a university lacks a specialist in a particular, and narrow, field, it may be willing to import teaching by television. The Southern Methodist University in Texas, for example, uses television to import teaching in aerospace engineering from a neighbouring institution,

instead of setting up a separate faculty. Second, universities are beginning to look to television as a way of extending their range of postgraduate teaching. Thus the Biology Department at Queen's University in Ontario plans to use television in this way—recognising that research students increasingly want teaching in a wider range of subjects than any one institution can hope to offer. Third, students have repeatedly urged that television should be used to bring rare talents to their lecture rooms: everyone wants teaching from Nobel prizewinners. Where teaching is by an acknowledged specialist, on his own current research work, it is not regarded as a threat to academic autonomy.

Who Will Use Recordings?

Finally, two general points are important. First, teaching materials are more likely to be used if those using them have had a hand in their production. And co-production, of basic teaching materials at least, looks one of the more promising ways forward. Second, and conversely, complete courses produced to meet a specific teaching need at one institution have so far only seldom fitted easily with the learning situation in another university. Partly this is the familiar problem of objectives: partly it is a function of the quality of the materials offered. In both respects the Open University may give us the exception that proves the rule. For they have the resources to devote wholeheartedly to the production of teaching materials and should build up a professionalism in teaching at a distance, through educational technology. In the meantime, earlier work in Britain and America, and the first trials in this enquiry, confirm that there are situations in which it is practicable and useful for universities to share their resources by exchanging recorded teaching material.

III.

Case Studies

This chapter describes our findings at the University of Guyana, the University of the West Indies and at other Commonwealth universities round the world. And it describes the way in which a programme of research and action might be developed from 1971 on. It is based on discussions held at the University of Guyana in June 1970 and at the University of the West Indies in December 1970, on correspondence with other overseas Commonwealth universities and discussions within Britain over the last year.

A.

University of Guyana

The University of Guyana was founded in 1963 but for six years lacked premises of its own and ran only part-time courses. The University has now moved into its permanent buildings and there are plans for starting full-time degree courses in the next academic year. The University has five faculties, of Arts, Education, Natural Sciences, Social Sciences, and Technology. The University provides first degree courses in arts, sciences and social sciences and a number of diploma and certificate courses including a postgraduate diploma in education, a general technical diploma (at technician level), and higher diplomas in technology. At present it does not have a faculty of agriculture or an extension department but may set these up in due course.

The University staff make it clear that one of the key problems facing the University is the resolution of the common dilemma—to carry out teaching and research appropriate to a member of the world family of universities which at the same time meets local needs. The science faculty, for example, is now developing programmes of applied research carefully planned to meet three criteria: research that will feed into undergraduate teaching, that will meet local needs, and will command international respect. It was certainly the view of some members of the academic staff that the pressure to maintain international standards had forced other universities to neglect the needs of their host communities. The University of Guyana does not want to go the same way: if the suggested programme of exchanges helps it to keep a balance between opposing pressures it should be both valuable and welcomed. And it may be able to do so, partly by helping contact—and hence parity—between universities, and partly by alleviating the very heavy teaching load on the academic staff. A number of people emphasised that for some time to come, they would expect the University to import more teaching material than they could export.

Possible Exchanges

The teaching materials sought by the University of Guyana fall into three groups.

(a) illustrative material to fit into a conventional lecture course and to show situations of which students need experience but with which they are not familiar. (The Faculty of Technology, for example, is offering a Higher Diploma in Technology in Civil Engineering. The staff teaching the course would welcome filmed or videotaped illustrations of large-scale civil engineering works in order to show students techniques of site supervision, quality control, working to BSS, etc., on a larger scale than is yet common within Guyana.)

(b) sections of a course where the University has not got a specialist in the appropriate part of the subject. (The Department of Geography, for example, is teaching a quantitative approach to economic geography. They already provide a course of this kind on the Caribbean and Latin America but would like to be able to add six to eight comparable lectures on the economic geography of West Africa.)

(c) teaching materials from other universities in tropical developing countries. For, in a variety of subjects, it is clearly much easier for teachers at the University of Guyana to find out about developments in British or North American universities than about teaching or research in universities similar to their own. (In sociology, for example, the University would welcome recorded lectures on the class structure of other plural societies in the tropics to use alongside their own lectures on class in Guyana and the West Indies.) In many departments, therefore, there is a demand for teaching materials, not from British or Canadian universities but from other English-speaking universities in the tropics. It seems that there would be many advantages in making exchanges of this kind—around the tropics—a major part of any experimental programme. Most of the materials which, it was suggested, the University of Guyana might make available for other universities would also arise from such tropical exchanges: Guyana could provide comparative teaching on class structure in the Caribbean or on Guyanese Creole, for example. Other suggested materials for export would be of value where a British university department had a specific interest in Caribbean or tropical subject matter: the University would be able to produce recordings on geological research or on tropical education, say, which could be of interest to Britain.

Three general points about the suggestions made at the University of Guyana are important. First, they fall into four subject areas—engineering and technician training, comparative studies in the social sciences, education and Afro-Asian studies. Second, many of the requests are for use in courses at a

fairly advanced level—for students in their final year, or the year before. Experience in Britain has shown that with maturer students like this, generally highly motivated and sophisticated in their approach to learning, the production quality of teaching material is comparatively unimportant. And so it is possible to use simple techniques, like the use of sound tape cassettes with slides or film strips for the first trial exchanges. Third, the requests are at this stage modest and realistic—for bits of illustration or short sequences of lectures, not for complete courses. And more than once in conversation it was suggested that we should start by experimenting in that way: if the first exchanges go well then it may be possible to build up experience and confidence in the techniques; then, in two or three years time, it might be possible to go for the more ambitious exchange, perhaps of a complete Open University course.

Educational Technology

The University of Guyana is proposing in due course to acquire a Sony ½ inch video-tape recorder together with other television equipment. The Sony agents in Guyana have assured the University that they will be able to service the equipment, which is mainly for use by the Faculty of Education. They plan to use the equipment, at least at first, for recording teaching-practice sessions for students on the Diploma of Education course, and students on summer workshops. But the Faculty are in principle happy that other departments should use it as well. In about 12-18 months time it is hoped to set up an audio-visual service, within the Faculty of Education but for the benefit of the University as a whole, and to appoint a technician responsible for all the equipment. In the meantime the University has, in various departments, 16 mm. film projectors, 2×2 slide projectors, and Philips cassette sound tape recorders. It is thus already technically possible to exchange 16 mm. film, or sound tapes with slides. In the near future, assuming that technicians at both ends can achieve compatibility, it should be possible to exchange ½ inch Sony videotapes.

The First Exchanges

We have begun to investigate in some detail a number of the proposals made by the University of Guyana and, though the postal strike came at a particularly awkward time for us, we have already provided a small number of recordings for use at Guyana. This summary, of progress so far, intended as an illustration of the kinds of things that could be done in a programme of action-research, throws up a number of general problems as well as specific ones.

(a) *Creole Languages*

The English Department is interested in using sound recordings and

transcriptions of English-based Pidgin and Creole languages as part of a course for fourth year students on sociolinguistics.

Recordings of interest to Guyana are available at the University of York (U.K.) and at the School of Oriental and African Studies and possibly at other universities in the Commonwealth; there is also some material in United States universities, notably at the University of Hawaii. A note about Guyana's interest in this exchange appears in the current issue of the "African Languages Review".

As this type of illustrative material can be adequately recorded on sound tape with transcriptions on paper there are no technical difficulties in the way of organising the exchange. But there are three other problems. First, the process of transcribing recordings is a lengthy and skilled one and relatively few recordings are available with transcriptions. Secondly, neither York nor S.O.A.S., nor for that matter Guyana, has yet got to the point of devising a suitable catalogue of their collection of recordings. The Unit has discussed with S.O.A.S. the possibility of cataloguing their materials in a way which might act as a model for other similar catalogues and the people concerned are in principle willing for this to be done. The general information problem which this illustrates is discussed below in chapter 4. Third, the technical quality of some recordings limits their use: a recording of Julius Caesar in Krio, from Sierra Leone, which we provided to the University of Guyana proved of the most limited value simply for these technical reasons.

(b) *Comparative Studies in Pluralism*

Students in the Faculty of Social Sciences take papers on the theory of class and on comparative social institutions. Much of the teaching for these courses is inevitably based on the standard British and American textbooks and on analysis of class structure in urbanised, industrialised societies. The University is able to offer a certain amount of teaching about the class structure of plural societies in the Caribbean, but is interested in bringing in recordings based on recent research work and familiarity with other areas with class structure in other plural societies in the tropics. Enquiries have shown that there is comparable interest in an exchange of this kind at the University of Papua and New Guinea, the University of the South Pacific and the University of Rochester, New York, where work is in hand on pluralism in Malaysia. All have now agreed to make sample recordings using sound tapes with slides. There is also potential interest in this field at the University of the West Indies.

(c) *Engineering Films*

Films made by contractors and engineering firms of their own engineering processes have proved to be of considerable educational value. In Britain and Canada they are widely used in university teaching and readily available, often

free of charge, from film libraries. The films are of especial value in an overseas context where they may familiarise students with engineering a larger scale than that to which they are accustomed. But in both Britain and Canada film libraries are unwilling to lend films abroad. This appears to be true for official and semi-official libraries like those of the British Film Institute, for libraries held by professional bodies like the Engineering Institutions and for libraries set up by industry itself. Their reasoning is that the delays in lending films overseas are so great, that overseas loans inhibit and restrict the work they can do at home. The problem appears to be a general one, although in some parts of the world university teachers have been more successful in borrowing films from American sources.

The Unit obtained copies of six films on civil engineering, at a nominal price, from one of the major civil engineering contractors. We sent some to Guyana by post, and some through the British Council who have a well-developed machinery for sending films overseas, using their local representatives. The films arrived promptly in both cases. In discussing their use the Professor of Technology stressed that such material was invaluable in widening the experience of his students and showing them current engineering practices which they would not be able to see otherwise: in other words the films offered him resources which he could not obtain in any other way—and to which there was no practicable alternative.

In the light of this trial, and of correspondence and discussion with other universities, there seems to be a case for the establishment of a Commonwealth engineering film library, to serve universities and technical colleges in the Commonwealth. For this is a more specialised area than is at present covered by the British Council's library, while the difficulties which prevented the University of Guyana from obtaining films are widespread. There are a considerable number of engineering films being made, partly for public relations, which might form the nucleus of such a library.

(d) *Comparative Education*

Students for the postgraduate Diploma of Education take a paper on comparative education entitled "Studies in Educational Development". This is taught by the staff of the Faculty of Education on the basis of their own first-hand experience of other educational systems and on their general reading about the subject. Inevitably their first-hand experience is more limited than the interests of their students and the Faculty of Education therefore asked us to investigate the possibility of obtaining recordings about the educational system of other countries and especially of other developing countries. First enquiries show there is comparable interest in exchanges of this kind at the University of Nairobi and the Universities of Botswana, Lesotho and Swaziland

and Papua and New Guinea. The Unit has now obtained tape recordings on the education systems of Kenya and of Papua and New Guinea. The University of Guyana is preparing similar recordings for the University of Nairobi. In the long term it would clearly be possible to develop a set of recordings from many parts of the world which would be of general value in similar courses.

(*e*) *Economic Geography of West Africa*

The Department of Geography offers a course on advanced physical and economic geography. The course aims to use quantitative techniques as applied to the geography of northern Latin America and the Caribbean. In order to introduce a comparative element to the course, the Department would like to offer a set of about six lectures on the distribution of economic activities in West Africa. Professor Mabogunje of the University of Ibadan has agreed to make a series of recordings on these lines. As the University of Ibadan is fairly well endowed with audiovisual equipment, these recordings could eventually be made on videotape if appropriate.

(f) *Agricultural Economics*

At present the University of Guyana does not offer teaching in agricultural economics and had no agricultural economist on its staff at the time of our discussions. The University would like to move into this field and asked the Unit to investigate the possibility of obtaining recordings on agricultural economics.

Enquiries in Britain show that only four universities (Leeds, Reading, Wye College, London and Cambridge) are doing a significant amount of teaching on agricultural economics in developing countries and none of these are using television for it. The Department of Land Economy in Cambridge, however, has already considered putting some of their lectures on videotape, and the Unit is investigating further with Guyana whether material in the Cambridge course on development studies might be relevant to the needs of Guyana. But it seems most probable that teaching in this field should be obtained from another tropical Commonwealth university, rather than from Britain.

A Five-Year Programme of Exchanges

The details of a programme of exchanges for some five years from 1971 depend of course on the development of the University of Guyana. But, in the first two years of such a programme, we would hope to have exchanges working in at least these six areas and to concentrate other work on two faculties—Education and Technology. We have now reached agreement in principle with a number of possible suppliers of teaching material, apart from those described above, especially in technology. Thus, in the field of civil engineering, for example, both Lanchester Polytechnic and the Cement and

Concrete Association already offer teaching, which could match with Guyana teaching in civil engineering, and would in principle be willing to provide us with recordings. And there is an increasing amount of recorded teaching material becoming available from polytechnics and technical colleges, which could be relevant to the needs of Guyana—and other universities and colleges in the Commonwealth. There are three reasons for this suggested concentration. First, these are the subject areas where there are a considerable number of specific proposals for exchange. Second, both are fields in which the staff are already familiar with audio-visual methods of teaching. Third, and most important of all, both are fields in which the University is meeting local needs of major importance which are also common to many other developing countries. Exchanges in education and in technology then should both be of value to Guyana and give us lessons about the techniques of exchange which may be applicable at other universities in developing countries in similar situations.

B.

University of the West Indies

"The University of the West Indies is a unique university, required as it is to serve and service many separate countries stretching across some 1,500 miles."[1] It has three campuses, in Jamaica, Trinidad and Barbados and has begun to establish University centres in the other territories. The largest campus is at Mona in Jamaica with 1,865 degree students in 1968, followed by St. Augustine, Trinidad (1,053) and Cave Hill, Barbados (311). Students can read for general degrees at all three campuses but teaching in some fields is concentrated at a single campus: in particular the medical school is at Jamaica, the agriculture and engineering faculties are in Trinidad and the newly established law faculty is in Barbados. There is a link between the law faculty and the University of Guyana so that Guyana students can begin their legal course there and go on to Barbados only for the later parts of it. Already there is considerable sharing of resources between the three campuses and movement between them.

Late in 1969, when the Research Unit was first in touch with the University of the West Indies, the University was already considering the use of educational technology for five purposes:—

(a) to improve internal teaching towards the usual university degrees:

(b) to draw separate campuses together into an integrated unitary university:

[1] U.W.I. Development and Planning Unit, *Reports on Education Technology and External Studies* (Kingston) 1970, p. 9.

(c) to provide tertiary education in the non-campus territories served by the university and to contribute generally towards the development of external degrees:

(d) to effect a major educational and cultural development throughout the region:

(e) to assist in pre-university and preliminary year education in the schools' system.[2]

In view of this, it seemed appropriate, both to the Vice-Chancellor and to the Unit, to explore the ways in which international exchange through educational technology might be relevant to the University's situation. And, the common regional interests of the University of Guyana and the University of the West Indies made it all the more important to see how both might fit into the suggested pattern of research.

During 1970 the University continued to explore "three separate but related subjects, viz. the feasibility of Audio-Visual support to teaching throughout the University and how much support could be applied, measures for the development of education technology on campuses, and the feasibility and techniques best applied in developing a programme of External Studies." In the light of their own discussions and consultants' advice the University decided: "It is essential to decide on priorities from the start and the planning and development of an External Studies programme claims obvious precedence for the purpose of concentrating first efforts."[3]

Discussions are still continuing but it appears that the University will soon launch a programme of external studies, using correspondence courses, provided that finance is available. There are also prospects that the university will acquire further audio-visual equipment for use within the three campuses; in time this may be used to generate material for extension teaching as well. But the complexity of the issues involved here make it uncertain, at the time of writing, how soon various university departments might be able to take part in a programme of international exchanges.

I visited the University of the West Indies in December 1970 to discuss the Unit's research in the light of the University's plans. I also took the opportunity of discussing the relevance of our work to technical education at the Jamaican College of Arts Science and Technology and at the John Donaldson Technical Institute in Trinidad.

[2] ibid., p. 3.
[3] ibid., p. 4.

There are important contrasts between the University of the West Indies and the University of Guyana. In particular the University of the West Indies is much longer established: it was founded, as a University College, in 1956, while the faculty of agriculture in Trinidad dates back to 1921. As a result, the University could potentially be an important resource centre in a programme of exchanges between English speaking universities in the tropics. Assuming appropriate financial and technical arrangements can be made, it would be desirable to look to the University for teaching materials in a number of fields where it has built up important specialisms in teaching and research, including tropical agriculture, economics (e.g. the economics of resource allocation in developing countries, the economics of plantation economy, etc.) and engineering (e.g. on food technology, the curing of concrete under tropical conditions, and hydraulic transport of solids etc.). But University faculty members also expressed needs for teaching which could be met by exchanges through educational technology. And the proposals made by them—both needs and potential offers of material—fell into the same pattern as the proposals from the University of Guyana. Four subject areas are important: engineering, comparative studies in the social sciences as applied to developing countries, education and Afro-Asian studies. As in Guyana, a significant proportion of these exchanges would be with other Commonwealth universities in developing areas.

Engineering

The faculty of engineering in Trinidad confirmed that there were serious difficulties in obtaining films on loan for use in engineering courses. And they stressed the value of films in widening the professional, or pre-professional experience of students—of particular importance where students from a small island may have very little first-hand experience even of seeing a variety of engineering projects. If a library of engineering films could be set up, then, the faculty at St. Augustine would wish to use it. There are other demands in the West Indies for material on engineering at different levels. The College of Arts Science and Technology in Jamaica offers courses in various branches of engineering at Ordinary and Higher National Certificate and Diploma level. In doing so it faces the same problems of limited resources as the faculty of technology at the University of Guyana and the same need to widen the experience of its students. The College would therefore be interested in using engineering films from Britain or North America and also in obtaining recorded teaching material to fill out courses at technician level and offer a wider range of specialist teaching.

There is a slightly different request for material from the Barbados campus of the University. There is in Barbados a single professional engineering

institution which has run a number of courses for its members in association with the university extra-mural department. The institution would welcome the opportunity of using films, and more formal teaching material on new engineering techniques or practices, to start some of its regular discussion meetings whose aim is the continuing education of professional engineers in the island.

It is hoped that these various needs could be met by a section of the research programme devoted to engineering education.

Comparative Studies in the Social Sciences

University staff members in the faculty of social sciences, and in the division of survey courses and social sciences at Cave Hill, proposed a number of exchanges in sociology, economics and management. The common factor in all these suggestions is that they would aim to make available comparative material on the economics and sociology of developing countries. From the outset exchanges in these areas could be done in both directions, subject to the over-riding policy decisions about audio-visual and other developments within the University. Faculty members suggested that they could offer material on, for example, plantation economics, or the social and economic aspects of tourism. Other case study material, of the kind already in use at the University, could also be made available in response to specific demands. The intention of these exchanges would be to make case study material available both in order to supplement Caribbean material already in use, and to provide a comparative element in courses. For it is easier to find illustrative material—on social structure, or economics, or business management—which relates to industrialised and urbanised countries than it is to find material relevant to a developing country. The University teachers with whom I discussed these possibilities felt that recordings, using television or sound tape and slides, would have more impact than written documents by themselves, and might be easier to obtain, especially if they relate to research work in progress.

Education

There is a comparable interest in exchanges in education, to help the flow of information between faculties of education faced with similar problems in developing countries. Some of the exchanges proposed would be principally for the benefit of University staff members themselves—to widen their knowledge of methods of teacher training in other countries. Others could feed more directly into formal university courses. Among the subjects suggested for exchange are *Comparative Education* where there would be clear advantages in receiving material from the country whose educational system was being

studied, *Child Development in Agrarian Societies* where there is interest in African and Asian research, and *Curriculum Development* and *Methods of Teacher Education*. There is also some demand, on a smaller scale, for illustrative material from Britain or North America on, for example, techniques of language teaching at school or university level.

The problems involved in training and retraining teachers, and the potential benefits from any improvement in this field, are so large that exchanges in education should clearly have priority in a programme of exchanges.

Afro-Asian Studies

At all three campuses of the University there is growing interest in Afro-Asian studies, an interest which reflects that of Caribbean society generally. As yet, however, there are few West Indian university teachers with first-hand experience of Africa and Asia. Despite this interest, therefore, it has not yet been possible to bring into the curriculum very much teaching on Africa or Asia. There is some teaching in this field at St. Augustine and there are lectures on the development of civilisation in Africa in the first-year *Development of Civilisation* survey course. Faculty members are already interested in receiving material to fit into that course: potentially it would clearly be possible to expand a programme of exchanges in Afro-Asian studies. The University might itself be able to offer teaching on Caribbean Literature, perhaps to play a part in such a programme.

Thus, while there are difficulties in launching exchanges in Afro-Asian studies, there are strong cultural and social pressures to develop work in this area. And the development of exchanges in Afro-Asian studies would fit in well with the other exchanges discussed which would necessarily involve working closely with universities in Africa and Asia.

Educational Technology Equipment

The University already has slide and film projectors and sound tape recorders at all three campuses. In Jamaica and Trinidad the faculty of education also has some closed circuit television equipment, used mainly for teacher training. (In both cases the equipment is manufactured by Sony: unfortunately there are potential technical difficulties in exchanging material between Jamaica and Trinidad because of the difference in the electricity mains supply which is at 50 Hz in Jamaica and 60 Hz in Trinidad. Advice is being sought from the manufacturers on possible ways round this problem.) In Jamaica, too, the College of Arts Science and Technology has a closed circuit television service. In Barbados the University has no television equipment although there is an educational television service providing programmes to the schools on the island.

This position is likely to change as the University completes its investigation of educational technology. A modest expansion of existing facilities, and arrangements to permit all faculties to use them, would enable a start to be made on television exchanges. In the meantime exchanges using sound tape and slides are already possible.

A Programme of Exchanges

This summary does not exhaust the list of proposals made by the University of the West Indies. (There were, for example, important requests for materials from Europe in the humanities.) But it does show where I found the warmest interest in potential exchanges. It is striking that a relatively large, and long established Commonwealth University felt that exchanges might play much the same part in their teaching as had been suggested by the newer, and smaller, University of Guyana. The way in which their interests coincide suggests that a programme of exchanges should be launched in a limited range of subjects: by confining attention to engineering, education, comparative studies in the social sciences and Afro-Asian studies it should be possible to develop a programme which responds to the major interests expressed at both Universities.

C.

Other Universities

The Unit's enquiries have been centred on the Caribbean. It is not therefore possible to give precise answers to questions about the relevance of inter-university co-operation through educational technology to universities in other parts of the world. But such questions are important both in themselves and because the economics of this work will ultimately depend upon the scale at which it is done. What evidence we have suggests that in many ways the Caribbean situation is typical rather than unique. The evidence is of three kinds.

First, preliminary discussions and correspondence with a number of universities throughout the world has shown widespread interest in the idea of exchanging teaching. Thus, for example, the University of Mauritius is interested in what we are doing and has asked us specifically to look at the possibility of obtaining recordings on pharmacy for them; the Vice-Chancellor of the University of Dar es Salaam has invited us to discuss the project at the University; the University of Botswana, Lesotho and Swaziland are interested in participating in the research programme; the University of Papua and New Guinea and the University of the South Pacific are already hoping to develop a co-operative programme for recording case studies and teaching material. Similarly, when we have discussed exchanges in specific subjects prompted by the Guyana proposals, we have found widespread interest throughout the Commonwealth

in fields ranging from pluralism and Creole languages to comparative education. And areas like technician training are of key interest to the development of tertiary education round the world.

Secondly, in many parts of the world there is already interest in regional co-operation in teaching as well as in administration and research. In the Caribbean itself the Association of Caribbean Universities has been working for two years on precisely this kind of question. Similarly in South East Asia the Association of South East Asian Institutions of Higher Learning has been looking at ways in which universities can usefully co-operate. Examples could be multiplied from many parts of the world, all tending to show acceptance of the doctrine set out in the Ashby Report on Higher Education in Nigeria that education should be explicity viewed as an international undertaking.

Third, universities in many parts of the world are facing similar problems. Some of these are essentially local in the sense that they can be solved only at the university and not by setting up links with other institutions (even though such links may be of indirect help in sharing experience). Among these local, but universal, problems are the establishment of proper relationships between universities and government, responding to student unrest, and integrating university education with local cultural patterns. Other universal problems, however, like those involved in university teaching, might at least be alleviated if links between institutions made university resources more widely available. Three problems are particularly important. First, the rising population and increasing demands for higher education are forcing universities to expand at an unprecedented speed. Second, many universities are, if anything, even more concerned to raise the standard and quality of their work.[4] Third, throughout the world there is a new impetus to university extension work as a direct consequence of the extension of education. In the Caribbean, in East Africa, in India and in the Ontario Province of Canada, for example, there are already active discussions on starting university extension work on the open university model.

These three problems—of university expansion, of the quality of education and of new forms of extension work—are all in part problems of resources. While the need to raise standards seems to have an especial significance in the Far East, there are clear points of comparison between the situation touched on in other parts of the Commonwealth and those faced by universities in the Caribbean. It therefore seems reasonable to assume that in many parts of the

[4] cf. for example ed. Choh-Ming Li, *Asian Workshop on Higher Education* (Chinese University of Hong Kong, Hong Kong) 1969, pp. 7–20, and *Proceedings of 44th Annual Meeting* (Inter-University Board, New Delhi) 1969 (Inaugural address by Shri Shriman Marayan, Chancellor Sardar Patel University).

Commonwealth the climate is right for developing work comparable to that begun in the Caribbean.

Thus, in thinking about a five-year programme of action it seems appropriate to build in plans for developing from the Caribbean to other parts of the world It is not at this stage possible to produce a detailed blueprint but the following lines of development deserve early investigation.

(a) There are a number of subject areas where it is worth investigating the possibility of developing Commonwealth-wide programmes. In particular these should clearly include three areas of major importance at the University of Guyana and the University of the West Indies—education, especially curriculum development and the retraining of secondary school teachers, engineering and technician training, and the social sciences. But the Unit should also look into the possibility of developing work in quite new areas, where these are of clear importance: tropical agriculture and the training of those in the para-medical professions suggest themselves.

(b) One of the most promising techniques for producing teaching materials of wide value is to set up a team who will together produce the material. This has proved a useful way forward within a single country and we would like to seek separate finance to experiment with the international co-production of teaching material, probably in physics. If successful, a project of this kind should produce not only useful teaching material but also valuable experience in the co-production of basic teaching material.

(c) It would obviously be valuable to develop links with other specific areas. These might be with universities with which we are already in touch like Mauritius and University of Botswana, Lesotho and Swaziland. But a number of suggestions have been put to the Unit that at an early stage we should seek to develop a research programme in the Indian sub-continent and it may well be that this should have a high priority after the launching of work in the Caribbean.

IV. The Organisation of Exchanges

We can identify certain general issues which are of key importance in the development of exchanges through educational technology: they concern information, software, hardware and logistics. Behind all of them lie questions of personnel and manpower. For, while links and exchanges can make extra teaching resources available, they will also make new demands on the time and skill of university teachers, administrators, librarians and technicians. Beyond this, the issues are of four kinds. First, there are questions of information—about finding and distributing information on teaching material. Second, there are problems about the teaching materials themselves, especially about the way needs for material can be matched with what is available. Third, there are questions about hardware—about the most appropriate equipment and techniques for exchanging teaching. Fourth, there are questions about logistics, about the practical difficulties involved in moving teaching material from one country to another.

The problems involved in these four areas are set out in this chapter. None are insuperable obstacles to exchange but they define the limits within which an experimental programme must work.

Information

We have seen that for centuries universities have jealously guarded their autonomy and have survived with relatively little information about each other's teaching. As a result there is no easy way to find out about the teaching needs at any particular university. And, similarly, there is no easy way to find out about teaching materials already in existence, leave alone about teaching which could be recorded. Although the production of teaching materials has developed rapidly in the last few years, cataloguing has not kept pace with production. There are both national and local problems here. In Britain, as in Canada or the United States, there is no one national institution responsible for cataloguing non-book materials. At a local level many universities which have begun to produce teaching materials—on videotape for example—have not provided the facilities to catalogue them as they are produced. Similarly, there are many semi-private collections of audiotape recordings, held by individuals or departments which have never been catalogued adequately or at all. Then, standards for cataloguing non-book materials are only now being established. And there are particular difficulties in preparing suitable catalogues: in the case of films and videotapes British and American experience suggests that to be of value a catalogue must contain an evaluation as well as description of the materials listed. Apart from the problems of evaluation there are difficulties in

preparing a catalogue which will meet the varied needs of quite different users who may want to use a particular piece of film or videotape for quite different purposes.

It is not necessary to elaborate the point further here: even with the establishment of a national information service on non-book materials for higher education in Britain, the National Council for Educational Technology's HELPIS scheme, it will be a very long time before it is a simple or straightforward matter to search for teaching materials throughout the English speaking world. But there are signs of hope, and many different organisations, concerned about the lack of contact between universities, especially on research, are trying to improve the flow of information between them. Some of these moves are on a subject basis, as with the newly established Commonwealth Geographical Bulletin while others, like the Caribbean Educational Bulletin, are planning to circulate information about research on a regional basis.

In view of these, and parallel activities, it is suggested that the exchange of information about research should not form a major part of the Unit's work in its next phase. But in the field of learning and teaching it will be faced with a number of information problems. Many of these are essentially the same as those faced by the Unit within Britain in 1967 when the lack of any vehicle for exchanging information about the Unit's work, about learning and teaching in higher education, and about the use of educational technology in universities led us to start the *University Television Newsletter*. There seems to be a need for something similar on a Commonwealth-wide basis which might be met by starting an appropriate newsletter or by co-operating with one or more existing journals. Or it might be met by setting up a system to produce and distribute information on index cards. And so it looks as if the informational role of the Unit in a five-year research programme should include these different activities:—

(a) to keep up to date with the activities of production and cataloguing agencies, in the Commonwealth and elsewhere, so that the Unit has as much information as possible about teaching materials that are available;

(b) to publish information about the Unit's activities in appropriate scholarly and educational journals in order to spread knowledge about particular exchange proposals to appropriate subject specialists;

(c) to consider setting up a Commonwealth newsletter on learning and teaching in higher education.

Software

One of the major problems affecting software has already been touched upon: when teaching materials have been prepared without clearly defined

objectives, it is very difficult to describe them with such clarity that a borrower can tell how well they will meet his needs. And to wait till most university teaching was planned, with its objectives defined in advance, would mean deferring the suggested research programme for generations. There are two, more short-term, ways for the Unit to make progress. First, it would be valuable to develop some teaching materials, in modular form, designed for use at a number of universities, and with the objectives clearly defined in advance. Second, it will be necessary for any university wishing to receive teaching material to define its needs with some precision. It would be unrealistic to expect university departments to do this with the expensive sophistication of the better American university learning resource centres. But preliminary work with Guyana is making it possible to define fairly clearly the kind of documentation needed on students' background knowledge and on the nature of the course into which material is to be fitted.

The other key question about software concerns the relationship between needs and offers. Although much teaching material, especially on television, has now been made in British universities alone, we found that few of the Guyana requests could readily be met by existing material. It remains an open question as to how far teaching needs can be met by material already in existence, and how far material will have to be specially made. The financial implications make the question crucially important. Experience in Britain and America suggests that illustrative and case study material can fairly often be used in a variety of different places: it is more difficult to take complete courses from place to place.

Finally there are questions of copyright. Here, there is already guidance from British experience and university codes of conduct have been drawn up in consultation with the University Grants Committee, the National Council for Educational Technology and the Association of University Teachers. Two separate issues are involved, one financial and the other academic. First, it is clearly proper that university teachers preparing teaching materials should be properly rewarded for their work. Second, there are situations in which university teachers wish to keep some measure of control over the materials they have made—to ensure, for example, that they are not still used after they are out of date. At the same time, if university exchange develops on any scale, it will be quite impractical to consult university teachers every time a recording is used. The British Medical Association have set a useful precedent here by allowing all involved in their exchange of sound tape cassettes to copy them freely. The best policy for the Unit, which seems to be generally acceptable, will generally be to pay a fee, or negotiate terms, so that teaching material can be used without further consultation or payment for a stated length of time. This period will, of course, vary according to the nature of the recording.

Hardware

Most of this report has concentrated on the exchange of recordings, because this is the area in which progress can most readily be made. But live exchanges are possible—by satellite, by telephone, by data link, and by slow scan television over telephone lines. Recordings can be exchanged through film, television recordings and sound tape. Data links and slow scan television links have not yet been used (in Britain at least) for educational exchanges: an assessment of the merits and drawbacks of the five other techniques appears on Figure 1.

Medium	*One or two-way*	*Advantages*	*Drawbacks*	*Comparative Costs**
Satellites	two	Live communication with sound and vision Potentially an open communication system: important for extension work and eavesdropping audiences	Prohibitive cost Many countries lack necessary ground stations	£5,600
Telephone links	two	Live colloquia possible Cheaper than satellites	Sound only Without expensive music circuits, distortion can be a problem	£50–75
Film	one	Sound and vision 16 mm film is compatible everywhere Much software already exists	Comparatively elaborate and expensive to make	£15–110
Television recordings	one	Sound and vision Comparatively cheap and easy to make TV cassettes will make exchange easier in 3–10 years	Serious compatibility problems Many universities/colleges have little or no equipment	£12–40
Sound tape and slides	one	Very cheap Very easy to make and exchange No serious compatibility problems Can show colour	Cannot show movement Less dramatic	£1–5

*Simply to illustrate the range of costs, these figures are estimates of the cost of a one-hour transatlantic exchange. They exclude production costs but include costs of materials. Figures for film and TV assume that recordings are rented (lower figure) or bought (higher figure)

Figure 1: Techniques for exchanging teaching

Satellites are discussed in more detail in the chapter on future technical developments.

Telephone seminars may be economically feasible: they will probably be of greatest value if they are used as a follow-up to an exchange of recordings, involving the same people: in that way expensive telephone time will not be spent on the straightforward transmission of factual information but rather on a dialogue between the participants.

Data links. Universities and other educational bodies are beginning to develop data links so that they can share computer facilities. Once links of this kind are in existence it will be possible for universities to share library catalogues, if these have been computerised, computer programs, or computer assisted instruction. But, at this stage, it looks as if data links will be of greater value for sharing information about teaching than for sharing teaching itself.

Slow scan television. It is possible to send television pictures of *still* objects over ordinary telephone lines. Further information on the process is being sought in case it is of value in sharing teaching.

Film. It is usually cheaper to record teaching on videotape than on film. But film has the advantages of cheap colour and of compatibility: 16 mm film equipment is available throughout the world. And existing films are often of major value for background illustration.

Videotape. At present the exchange of videotape can be maddeningly inconvenient. Britain and North America work on different television line standards, and different frequency mains supplies. Thus it is not always possible to exchange recordings even across the Atlantic: some manufacturers' equipment is designed to cope with this problem while others is not. Although there is an international standard for the expensive 2 in. quadruplex head videotape recorders used by professional broadcasting agencies, there is none for the 1 in. and ½ in. helical scan machines adopted by most universities. As a result it is generally possible to exchange videotapes only if both institutions have equipment from the same manufacturer, or if they are made on a higher quality machine and dubbed off on to the appropriate model of recorder. These technical problems are a major constraint which will become very much less serious as television cassette recorders (discussed in chapter 6) come into use. Once they are in use, the convenience and comparative cheapness of exchanges on videotape will probably make this the standard way of distributing teaching material.

Sound tapes. In the meantime one other technique is important because of its cheapness and simplicity. Teaching which does not involve movement can be successfully recorded on sound tape and illustrated with appropriate written material or slides. With highly motivated students, as at postgraduate level or in the final years of a first degree course, the technique has proved useful and effective. Although it lacks the dramatic impact of television or film, this

technique enables recordings to be made cheaply, even casually, when it would be much more difficult to get a university teacher to provide a written paper. And so it enables universities to make resources available to each other when older forms of communication are inappropriate and newer are not yet adequately developed.

Logistics

Finally important questions of logistics are involved in setting up a programme of inter-university co-operation. Some of these arise simply from the practical difficulties of sending teaching materials from one country to another. British film libraries, for example, have found that delays are common in sending films overseas: some arise from delays by customs, others because users do not always return materials as quickly as the libraries had intended.

Other problems of logistics occur within a university where materials are to be made or used. For the setting up of an exchange is likely to pose new burdens on university administrations which are already under other, severe, pressure. The need to store and catalogue teaching materials may impose new jobs on university librarians. And the use of material from another university is, inevitably, going to add new, possibly unfamiliar tasks to the teacher concerned. In all this, there is a danger that a programme of exchanges will hang fire, not for educational reasons, but because of logistic difficulties. One way of avoiding this danger may be to ensure that on any campus involved in exchanges, there is one person who is in touch with *all* proposed exchanges, and can be a point of contact for the Research Unit and for other interested universities. The location of such a person will obviously vary from university to university.

If there is one member of a university staff with a general interest in all exchanges—as contrasted with the specific interest of the subject specialists involved—this may also ease the problem of sending materials between universities. For the British Council has found, in supplying films overseas, that it can get them to and fro by using its local representatives as agents, responsible for receiving and for returning films. The British Council uses the diplomatic bag for this purpose; they are in principle willing for their machinery to be used, on a limited scale, for the distribution of teaching materials on behalf of the Unit. This should be of great value in distributing materials originating in Britain although not, of course, for those going between two overseas Commonwealth universities. More generally, the resolution of these problems of logistics must await further experiment and experience.

V.

Economics and Cost-Effectiveness

The exchange of teaching through educational technology will develop only if it can be done at a cost that universities can reasonably bear. This chapter is an attempt to see what sort of costs are involved. It is based mainly on British experience and considers, as an example, the costs of providing teaching material from British universities to universities elsewhere in the Commonwealth. We assume that costs involved in exchanging teaching between universities in the third world will be of the same order of magnitude and so it is hoped that this example will serve as a guide to the Unit's proposals generally.

Economists distinguish between cost-benefit analysis, where both costs and benefits are computable in money terms, and cost-effectiveness analysis where the benefits or output cannot be priced in monetary units. Cumming and Dunn have argued persuasively[1] for the use of cost-effectiveness techniques in considering educational technology. If a university wants to introduce teaching in a subject outside the capabilities of its own staff then it must, at present, recruit somebody else to do it, on either a long-term or a short-term basis. And so it seems reasonable to compare the cost of exchanging recordings with the cost of sending a teacher overseas—either on a short contract of a few weeks or months or on a contract of two or three years. Unfortunately there are many difficulties in making this sort of comparison. In order to make the assumptions behind this chapter clear, these difficulties are set out in some detail.

Before considering them, it is important to note that the techniques discussed in this report may make resources available to a university which they could not otherwise obtain. If, for example, a university wants to bring in a series of six lectures it may not be able to find—leave alone finance—an appropriate visiting lecturer who can come at the right time. In a situation of this kind, the real choice lies between using recordings and doing without the teaching. And so the comparison between the costs of recordings, and the costs of face-to-face teaching, is inevitably an artificial one. At best it can give us some idea of the orders of magnitude involved.

The Difficulties

(a) *The cost of expatriate staff*

The costs of sending staff from one university to another will vary widely according to the distances involved, the staffing policies of the universities

[1] C. Cumming and W. R. Dunn "The Application of Cost-effectiveness Techniques to Educational Technology" in ed. A. C. Bajpai and J. F. Leedham, *Aspects of Educational Technology IV* (Pitman, London) 1970.

concerned, and so on. And there are at least three different ways of calculating these costs: first, it is possible to work out a hypothetical example and discover the costs of sending a particular lecturer to a particular university for a long or short term contract. These costs would include some or all of the following elements: costs of recruitment; salary; superannuation; travel for appointee and family; baggage allowance; British expatriate supplementation scheme (BESS) or equivalent; local assistance with housing; laboratory/office/secretarial services; education allowances; passages for home leave.

Second, it is possible to base the costs on the experience of organisations which send academic staff overseas.

Third, in 1969 the Duncan Committee calculated the costs of sending British diplomats to various posts for a week, and for a year. Following the Duncan Committee, we have assumed that the cost of employing an expatriate lecturer on a contract of a year or more is of the order of £10,000 p.a. This figure is higher than that produced by a number of calculations done by the first or second method discussed—mainly because these tend to omit the university's own overheads. It has been assumed that these should be shared among university staff generally. This is a necessarily crude exercise but it suggests that the Duncan figure is of the right order of magnitude.[2]

(b) *What are teachers for?*

A university, and its staff, is expected to carry out many different functions, and teaching is only one of the duties expected of a university staff member. Figures showing the breakdown between teaching, research and administration are not available for overseas universities; neither are figures showing teaching loads. We therefore assume that British figures would apply—or at least be a starting point for the calculations—at overseas universities.

(c) *What do teachers do?*

It is no part of our argument that teachers can, at all times and in all circumstances, be replaced by television, or any other aid. Teaching in a face-to-face

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[2] E. M. Godfrey's elegant article "The Economics of an African University" *Journal of Modern African Studies*, 4,4, (1966), pp. 435–55 based on the finance of Ibadan University suggests that this figure is a plausible one. He shows that in 1963/4 the current opportunity cost of teaching there was £763,000 of which £554,200 was attributable to teaching and the rest to earnings foregone by students at the university. At that time the university appears to have had 279 teaching staff and Godfrey, following Robbins, suggests that 47–49 per cent of their costs should be attributed to teaching. This gives us an annual cost per university teacher $\frac{£(554,200\quad)}{(48 \text{ per cent of } 279)}$ or £4,136 (and the equivalent cost of capital expenditure of £1,252 p.a.) all at 1949 prices. Leaving aside capital expenditure, and reflating to 1963/64 prices, this gives us an annual cost of £6,543 per teacher. The equivalent figure at 1969 prices would be £8,144. This figure omits any expenditure in Britain (e.g. I.U.C. recruitment costs or BESS) and includes both local and expatriate staff so that it is an underestimate of the real cost of an expatriate teacher. It is necessarily a crude estimate, based on changes in purchasing power in Britain not Nigeria, but for what it is worth does confirm that the Duncan figures are an appropriate starting point for university costs.

situation may, in fact, involve a whole range of activities and recordings cannot take over all of them. Where comparisons have been made, however, between television teaching and face-to-face teaching they have almost invariably revealed no significant difference between the two methods.[3] We must therefore assume that television teaching, and face-to-face teaching, are equally effective, and that, in the situations where recordings are used instead of a visiting lecturer, the recordings are as good teaching.

(d) *The costs of good software*

The costs of teaching material vary widely—it may cost £120 to buy a half-hour film or as little as £5 to record a lecture using sound tape and slides. Much depends upon availability: if recordings already made can be used overseas they will probably be cheaper than recordings made specially in Britain for an overseas university. Much depends, too, on the overheads of the organisation making the recordings: in the case of television, the larger university installations are so expensive to run that their real costs, per hour of production, are likely to be far higher than those of smaller institutions. At the same time, they can, of course, produce more complicated or elaborate recordings. If the cost of raw videotape is excluded, the cost of one hour's recording could vary between £30 and £700. Where videotape recordings are essentially unelaborate records of an act of teaching, costs should be much nearer the lower than the higher figure.

To these costs should be added any remuneration to the lecturer concerned: here the current A.U.T. recommended figure is 10 guineas for 1–1½ hours. It is an open question, on which there is little British experience as yet, how far that figure should be increased to allow for the extra time necessary to make a recording, as compared with the delivery of a lecture.

In practice, over the next five years, production costs are likely to be relatively small in comparison with the total cost of the Unit: in launching a new idea the entrepreneurial energies and costs involved will be very expensive in relation to the output; the direct costs of teaching material will therefore look unrealistically low. Thus the exchange of teaching material may make economic sense only if it can be done on a large enough scale to justify the administrative costs involved. And, as with television at a single institution, costs may look reasonable only when each recording is used several times. This, of course, is the point at which comparisons between recorded, and face-to-face, teaching break down. For the costs of re-using a recording are so low as to be almost negligible.

[3] cf. G. C. Chu and W. Schramm, *Learning from Television: What the Research Says* (Institute for Communication Research, Stanford University, 1968) pp. 6–11.

The Cost of an Hour's Teaching

If we know the cost of sending an expatriate teacher to an overseas university, and assume that he works in much the same way there as at home, then it is possible to calculate the cost of a single hour's teaching. Our estimates suggest that if we take into account time spent on research, leave and other non-teaching activities, and assume that the real costs of an expatriate teacher is £10,000 p.a., then the cost of a single hour's teaching from a lecturer on a three-year contract probably lies between £15 and £24.

It seems worth comparing these costs with those of teaching done on a very short visit. Again using the Duncan committee figures, we can take the case of a university lecturer visiting Nairobi for a week. The 1970 costs would then be of this order:—

	£
Fare, subsistence etc...	350
One week's salary, including superannuation costs etc.	50
Recruitment and administrative costs of finding appropriate teacher etc.	100
	£500

At these levels the cost of an hour's teaching will depend very heavily on the amount of teaching done by the lecturer during the week. (It is assumed that a visiting lecturer is invited solely to teach and I leave out of account any benefits he may bring to the research work of the overseas university.) If he works for 15 hours the cost per hour will be £33.3 and if he puts his teaching hours up to 20 the cost per hour drops to £25. It seems unlikely that the number of contact hours would rise above four per day; if it never dropped below two this would give us a range of costs between £25 and £50. Costs for a more distant university rise sharply: for a university in a town as distant, and expensive, as Tokyo the comparable range would be between £39 and £79.

Estimates of similar costs for visits of one month, and visits of three months suggest that these will yield higher figures for an hour's teaching than those for an expatriate sent on a longer term contract.

Conclusions

Firm conclusions are impossible until we know more about the exchange of recorded teaching material. If, in five years time, the Unit is running on a budget of £20,000 p.a. (on 1970 prices) is devoting ⅛ of its resources to the

organisation of exchanges and ⅓ to research, and is providing 200 hours of teaching to universities in the course of a year, then the cost of one hour's teaching would be £66.7 *if the recording were used once only*. (There would also be fairly modest costs at the receiving university in using recorded material, organising follow-up sessions and so on.) This seems a reasonable objective. It is worth noticing in passing that this is an area where costs are likely to decline as time goes on: as the idea of exchanges through educational technology becomes part of the normal practice of higher education, it will be easier (and so cheaper) to set them up. And it is clear that the cost of television equipment, too, is declining sharply over the years.

These figures suggest that, where a university can keep a teacher employed in teaching his own specialism throughout the year, and knows that the research he will undertake is in their interest, it will still be cheaper for them to appoint a teacher from overseas rather than to bring in recorded teaching material. But there is a strong case for costing very carefully the use of outside specialists for short periods of time—and for considering the use of recordings as an alternative to bringing in specialists who cannot be employed for the regular amount of time in teaching their own subject. If, for example, a university wants to offer a course in logamachy but cannot efficiently employ the lecturer to teach this for more than a third of the normal teaching load, then the real cost of his teaching is going to be very high—probably reaching or exceeding £70 per hour. And the university might feel obliged to support a programme of research it may not want, the expense of which could double this figure. Similarly, if a university would like to offer, say, six to twelve lectures on a particular specialism spread over two to six weeks, then the use of recordings, instead of a visiting lecturer, could show dramatic savings. When, as will often be the case, recordings can be used a second or a third time, another term or another year, or at another university, the savings will be even greater.

The economic argument for our work is therefore threefold. First, and foremost, there are some circumstances in which the exchange of teaching material can make available resources which could otherwise not reach the university. If educational technology can provide resources of that kind, then, from the economic point of view, it may be enough to show that the costs are not out of proportion with the costs of more traditional teaching methods.

Second, where a university could choose between bringing in an outside lecturer, and bringing in recorded teaching from outside, there are circumstances in which the import of recordings will be cheaper.

Third, it is often possible to re-use a recording at virtually no extra cost. Copyright limitations make it difficult to make absolute statements here, but it will generally be possible for recordings to be re-used at one university, or

used at a number of different universities. In this chapter we have assumed that each recording would be used only once: if it can be used more often then the costs are reduced to a fraction of those quoted here. In the long run this possibility of using recordings on a number of different occasions, and at a number of different universities, is clearly of the utmost importance. The key question here does not lie in economics but in education: we need to find out how far universities throughout the Commonwealth can use the same material. For it is in that sort of multiple use that major savings in cost are possible.

VI.

Future Technical Developments

Communications technology is changing rapidly. While much of this report is concerned with the principles, and the educational thinking, which govern university links and exchanges, the state of the technology determines the ease with which communication links can be set up. Technical changes in two areas may soon affect work of this kind. First, the development of television cassette recorders will ease the exchange of recordings. Second, communication satellites will make it possible for universities to have live, two-way, television exchanges, and eventually perhaps to do so at a reasonable cost.

Cassette Recorders

It is at present possible to exchange recordings on videotape, on sound tape or on film. The drawbacks and advantages of each are discussed in chapter four. While there are clear advantages in using videotape for many exchanges, problems of compatibility are serious. And, while compatible videotape recorders have now dropped in price to about £300, the exchange of videotapes remains awkward and inconvenient—even when both parties have videotape recorders which are nominally compatible.

In an effort to overcome these problems, and break into the potentially vast education and home-entertainment markets, many electronics manufacturers are developing new devices to play cassettes or discs through a normal domestic television receiver. At least eight different systems of this kind will soon be on the market: four will use magnetic tape and will work on the same principles as videotape recorders. The other four work on quite different principles. While some of the systems using magnetic tape may be compatible with each other, the alternative systems cannot, by the nature of the case be compatible.

It seems unlikely that all these systems can survive: anyone who invests large amounts of capital in any one system during the next three years might find that, by the end of the decade, software for this equipment was as rare as 9.5 mm teaching films. The only sound advice for the educational buyer seems therefore to be to wait and see.

It is worth stressing that there are two different jobs to be done by cassette recorders: first, there is the need for a more convenient way of sharing and distributing programmes made in small numbers than the exchange of videotapes. Second, there is clearly a long-term market for mass produced programmes, analogous to gramophone records. The former need is probably more significant in higher education. If agreement on a standard videocassette

system can be reached in the near future, then there will be a strong case for educational bodies to invest in such equipment as it will apparently offer advantages of flexibility and of price. Although decisions must await progress on the question of standardisation, it seems most probable that one or other of the systems will make the exchange of television recordings far easier and more straightforward within the next five years.

Satellites

Over the last six years there has been a steadily increasing amount of discussion about the use of satellites for education. One or two trial exchanges have been carried out internationally: perhaps the most dramatic was the televised class shared by the West Bend High School in Wisconsin and the Lycée Henri IV in Paris via Early Bird on the 31st May 1965. They used satellite time free of charge the day before the engineers handed it over for regular service. But, for the most part, the cost of using satellites has been so high that they have not looked a realistic way for international educational links by television in the immediate future.

This situation will change, and eventually we can expect satellite time to become cheap enough for higher education to use. Indeed, one of the justifications for setting up our research programme in the early seventies is that it should yield valuable experience for the day when satellites are available for university use. But at present there are closely related financial and technical barriers to the use of the present generation of satellites in commercial use for educational purposes. The cost of a one-hour, two-way, television exchange between Britain and North America would be some £5,600. Furthermore, complex ground installations, costing up to £2 million, are necessary to receive television signals from the present generation of satellites—Intelsat 4. And these satellites are expected to remain the basis of regular international satellite communication until the late 1970s. A ground station of this kind is now under construction in Jamaica; there is none in Guyana, Trinidad or Barbados so that, on technical grounds alone, it would not be possible for the university campuses in those countries to take part in a satellite exchange of this kind.

Most of the discussion about the use of satellites for educational purposes has hinged on school and adult education. It is possible that satellites will be used for these other educational purposes and that it will then be possible for universities to use time on them, at less than the true economic cost. In the meantime there are important possibilities for experimental satellite links using American research satellites (ATS F and ATS G) in the mid-1970s. There seems good reason to believe that trial educational links on these satellites might be set up at a much lower cost to the participants than those involved in using the Intelsat series. There are already detailed proposals for using

these satellites, on an experimental basis, in both India and Brazil. If appropriate technical and financial arrangements can be made, it will be worth keeping in mind the possibility of the Unit's developing experiments in this field, alongside the other proposed exchanges.

There are a number of other developments which hold out promise for the educational use of satellites. First, within some countries, notably Canada and the U.S.A., the volume of communications traffic is so great that satellite distribution may be a cheaper way of transmitting signals (ranging from telephone calls to television programmes) than the present system using cable and microwave links. Within the next few years it may, therefore, be technically possible for the 46 Canadian universities to share their teaching by satellite and so to demonstrate for the rest of the world something of the possibilities.

Second, there have been a number of regional proposals for satellites to be operated jointly by a number of countries, notably in South America and in Europe. And this too may in the long run make capacity available for university traffic.

Finally, two American universities (Wisconsin and Stanford) now have licences from the Federal Communications Commission (FCC) for satellite communication and have been experimenting with its potentialities using existing American satellites (principally the American research satellite, ATS 1). They have already, for example, used satellite links to connect electrocardiograph equipment in Alaska with a Washington D.C. hospital in order to demonstrate the possibility of easing highly specialist communication with remote areas. The Space Science and Engineering Center (EDSAT) at Wisconsin is interested in both the technical and the academic questions involved in educational links by satellite and concerned to solve some of the software problems even before the hardware is cheap enough for universities to use.

We have at present no information about satellite communications for education in the Soviet Union. But it is inevitable that the U.S.A. and the U.S.S.R. will be the front runners in these fields; and it seems that it will be some years before satellite communication can become a major part of the programme of university links and exchanges. But preliminary experiments may help us to identify the appropriate role for satellites alongside other forms of telecommunications for linking universities. For the most part the most sensible policy for organisations in this country, and in much of the Commonwealth, would seem to be to keep in close touch with international organisations with an interest in space communications like UNESCO, and with specialist organisations like EDSAT and possibly to tie part of its research programme in with them. In that way, Commonwealth universities should be in a position to take advantage of new technical developments in satellite communication when they arrive.

VII.

Long Term Implications

Throughout this report, we have tried to set the development of inter-university communication within the context of the development of higher education generally. It is argued that the feasibility study is sufficiently encouraging to justify a period of experimental exchanges over the next five years. It is therefore appropriate to consider developments beyond that five-year period—to speculate on the place of links and exchanges between universities in the late 1970s and the 1980s. Questions of two kinds are involved: first, in the long run, what sort of organisation should set up and co-ordinate links between universities; second, how will higher education change, and what will be the effect of those changes on this type of work?

Organising Inter-University Communication

Although it is too early to decide on the most suitable way of setting up and organising exchanges through educational technology once the experimental stages are over, it is possible to see some of the alternatives. And it is clear that there will be a variety of different patterns, in different parts of the world and in different subject disciplines. There may be a case for existing inter-university organisations, like the Association of Commonwealth Universities, or regional bodies like Association of Caribbean Universities to move into this work, playing a more active role in the development of teaching than they have previously done. Within particular academic disciplines, it is possible that professional and learned associations, traditionally more concerned with research than with teaching, may see a new role for themselves in this work. There may, too, be a continuing need for an experimental body, co-operating with some or all of these organisations, to experiment with new forms of communication as academic needs, and communications technology, change.

Whatever the organisations involved, one of the key problems in fostering international exchange will be the cataloguing problem which already faces national organisations. (cf. chapter 4.) Already there are moves, within some countries, to set up national multi-media catalogues. And, within Europe at least, there are moves towards international standards in cataloguing non-book materials. Once the exchange of software is technically easy, and accepted as normal by a fair number of universities, an international information service will be a necessity—especially if the economic benefits of this kind of work are to be realised. In the next phase of the Unit's work it will be important to consider and discuss the most suitable type of organisation to do this permanently in the light of the Unit's own experience. It will, of course, be important to relate any proposals in this area to the future plans of international organisations like UNESCO.

It would be absurd to make hard and fast predictions about the patterns of higher education five to fifteen years hence. Indeed the safest prediction is probably that many students will continue to spend much of their time in conventional lectures addressed to fairly large groups. Educational technology will not transform the universities at revolutionary speed, if at all.

It is, however, possible to extrapolate from trends already apparent in higher education. Three seem particularly important and widespread. First, universities are competing with other parts of the educational system—as with the rest of the economy—for resources. There is a heavy demand for tertiary level education to be available at a lower cost than universities have usually been able to offer. In some fields traditional universities are being outflanked by different kinds of institutions—the community colleges in America, the polytechnics and the Open University in Britain. If universities anywhere are to thrive at a time when the demands for higher education are rising more rapidly than the gross national product then they must prove their value to the community, and often do so in terms of cost-effectiveness.

Second, universities are under pressure from a number of different directions to widen the curriculum, and offer courses in an ever-increasing number of subjects. The accelerating growth of science and technology accounts for some of this pressure. But some of it comes more directly from society which wants universities to produce graduates of the kinds, and in the quantities, which it needs. Some comes from students themselves who demand teaching in subjects that they consider relevant to the world in which they live, even where these lie beyond traditional academic boundaries. And so, with the competition for resources, universities have, at the same time, to teach more and more subjects. There seems every reason to believe that this trend will continue, and become of even greater importance.

Third, universities and their students, are beginning to move from their traditional concern with teaching to a concern with learning. The first steps are being taken towards providing self-learning facilities. If the trend continues, there must be an increasing demand for educational materials suitable for use in a self-learning situation. There must also be a shift in the function of the university teacher who should decreasingly be used simply as a convenient mechanism for transferring information to his students: the development of self-learning materials offers us the opportunity to consider which educational jobs are best done in the face-to-face situation and which are not.

All these trends, then, will have a crucial effect upon universities' staffing policy. It is difficult to believe that universities will be able to continue to enjoy staffing ratios as generous as those in Britain over the last quarter-century.

And, increasingly, university staff will be called upon to teach subject matter further beyond their own specialism than has been usual in the same period. These problems could be crippling for any single institution, or at least could result in a staggering deterioration in the quality and standards of its work. The techniques described in this report have been developed to make it easier for universities to call on each other's resources. For this seems one of the more promising ways for universities to come to terms with the situation by making better use of the resources of the whole university system. If the programme of action and research described is successful, then the techniques may prove of central—not peripheral—importance to higher education in the late 1970s and 1980s.

VIII.

Summary

This report has discussed the use of educational technology to link Commonwealth universities and other institutions of higher education so that they can share their resources for teaching and research. Links of this kind run counter to the traditional autonomy of the universities but are relevant to the critical situation faced by higher education today, and to the world shortage of educational resources. Experience within Britain and North America has confirmed the value of educational technology for university education and has shown that universities can co-operate this way within a single country.

Discussions at the University of Guyana and the University of the West Indies and correspondence and discussions with representatives of other Commonwealth universities, have shown that exchanges of this kind could meet needs felt by the universities. They would be of particular value in three situations: where a university would like to be able to use more illustrative material in order to improve their existing teaching; where they lack a specialist in a particular, narrowly defined, field; and where educational technology could facilitate contact with universities in other developing countries. It is also important to investigate the possibility of co-producing basic teaching materials, designed to meet common teaching needs in a number of Commonwealth universities. The report recommends a five-year programme of research and action, starting in the Caribbean and going from there to other parts of the Commonwealth. The programme would begin in four subject areas: technology; education; comparative studies in the social sciences and Afro-Asian studies.

The practical obstacles to the exchange of teaching are discussed: there is reason to believe that at least the technical difficulties will rapidly become easier to solve. Similarly, the costs of doing exchanges through educational technology are likely to decline over the next five to ten years. As much of the costs at first will be for organising and administering exchanges there is a case for advancing as rapidly as possible to the situation where a considerable amount of teaching is being exchanged internationally. Finally the report suggests the relevance of this work to future developments—both technical, where satellites will eventually make live inter-university television exchanges practicable, and educational where the increasing pressures on universities make the sharing of their resources even more important.

We hope that the report as a whole makes the case for going on from the present feasibility study to a five-year period of action research. The case is briefly this. While the present study has shown the potential value of links between universities for the exchange of teaching, we still need to know very much more about them. And, if their potential value to education throughout

the world is to be realised, we need to experiment with them and demonstrate what they can and cannot do. At present this job falls to no national or international organisation, and there are proper, open, questions about the appropriate long-term constitutional arrangements for stimulating and controlling it. This study has shown one way of beginning a series of exchanges which would meet felt needs, and at the same time answer some of the research—and other—questions. The Research Unit would now like to go ahead and do that work, on the basis of the detailed proposals around which this report is framed.

Advisory Group to the Unit

The Inter-University Research Unit's policy is being guided by the following Advisory Group.

Professor E. G. Wedell (Chairman) Professor of Adult Education, University of Manchester.

Mr. J. R. Bunting Director-General, Centre for Educational Development Overseas.

Dr. Leslie Farrer-Brown formerly Director of the Nuffield Foundation.

Professor L. J. Haynes Professor of Chemistry, The Open University (representing the Inter-University Council for Higher Education Overseas).

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Professor Robert C. G. Williams Visiting Professor of Electronics, University of Surrey (representing the Council of Engineering Institutions).

together with a representative of the University of Guyana, when able to attend meetings, and an observer from the Association of Commonwealth Universities.

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