

*Energy for Development*

ENERGY RESEARCH CENTRE  
UNIVERSITY OF CAPE TOWN  
PRIVATE BAG RONDEBOSCH  
CAPE TOWN 7701

EDUCATIONAL TELEVISION IN BOPHUTHATSWANA:

DOCUMENTATION AND SOCIAL ASSESSMENT OF THE "EDUTEL"  
PROJECT

WILLIAM D COWAN

Energy for Development Research Centre  
Energy Research Institute  
University of Cape Town

March 1991

## ABSTRACT

The early years (1985 to 1988) of the Edutel schools television project in Bophuthatswana are reported, drawing on information from some fifty local observers and participants. More than 350 secondary schools in Bophuthatswana were equipped with television and video sets, using solar power in non-electrified schools. Educational programmes were distributed, mainly by videocassette. As such, the Edutel project represents the most notable attempt to date to use this educational technology in underdeveloped regions of Southern Africa. Although permission to conduct a survey of schools was not granted, the provisional evidence gathered suggested very low rates of utilisation of the service. Motivations for the project, according to informants, were not only educational but also political. Problems and constraints leading to disappointing outcomes are discussed. They included unsuitability of imported educational software, insufficient consultation with teachers, shortages of staff, expertise, organisational resources, finance and infrastructure, and the over-ambitious scale of the project (targeted at all schools, in all subjects, through school standards 5 to 10) in relation to available resources. The Edutel experience is compared with observations on similar ventures in other developing countries and also set within a broader South African context.

## CONTENTS

	Page	
1	INTRODUCTION	1
2	RATIONALE AND OBJECTIVES OF THE STUDY	2
3	METHODS OF ENQUIRY	4
3.1	Research plan	4
3.2	Blocks to research, and adaptations	5
3.3	Comment: independent research versus in-house evaluation	7
3.4	Theoretical approach	8
4	SCHOOLS TELEVISION IN BOPHUTHATSWANA: BACKGROUND	11
5	MOTIVATION FOR THE EDUTEL PROJECT	13
5.1	Educational motives	14
5.2	Technological intervention	15
5.3	Political and commercial motives	15
6	EDUTEL DELIVERY TO SCHOOLS	19
6.1	Distribution	19
6.2	Staffing and expertise	20
6.3	Production facilities	21
6.4	Scale of resources required	21
7	UTILISATION	23
7.1	Status of information on utilisation levels	23
7.2	Assessment	24
8	PROBLEMS AND CONSTRAINTS	26
8.1	Educational software	26
8.2	Scale of implementation	29
8.3	Teacher and pupil attitudes	33
9	CENTRALISATION VERSUS DECENTRALISATION	38
10	SELF-SUFFICIENCY VERSUS DEPENDENCY	43
11	SUMMARY	49
	Bibliography	51

## 1 INTRODUCTION

In 1988 the Institute for Research Development (IRD) of the Human Sciences Research Council (HSRC) provided an ad-hoc grant to support a research study entitled *Educational Television in Bophuthatswana: Documentation and Social Assessment of the "Edutel" Project*. This generous financial support from the IRD is gratefully acknowledged. It should be stressed that the opinions and findings in this report and allied publications are those of the author and do not necessarily represent the views of the HSRC. The project was initiated independently, and responsibility for the project rests with the author.

Limitations on the research were imposed by the Bophuthatswanan government.

This report describes the approach and the main findings of the study which was undertaken. Separate documents, which were based on the research, entirely or in part, are submitted together with this report:

- 1 COWAN W D (1990). *Educational Television for South African schools: Key Questions for Policy Makers*. Energy Research Institute, University of Cape Town.

[A monograph oriented to South African educational policy-makers which attempts to identify key questions and discusses these questions from the basis of Bophuthatswana's experience and international comparative material on schools television in developing countries.]

- 2 COWAN W D (1990). *Conflicts of Interest, Social and Technical Rationality: Photovoltaic Applications in a Divided Society*. Pp. 331-336 in A A M Sayigh (ed): *Energy and the Environment*. Oxford: Pergamon.

[A description and analysis of non-optimal investments in renewable energy technologies amongst South African "homelands", with focus on photovoltaic-powered schools television in Bophuthatswana. The paper was presented at the 1st World Renewable Energy Congress, Reading UK, 23-28 Sept 1990.]

- 3 COWAN W D (1989). *Small Photovoltaic Systems for Educational Purposes*. Proc. Alternative Energy Supply Options for Developing Southern Africa Conference, Development Bank of Southern Africa, Johannesburg, 2-3 February 1989.

[A condensed assessment of technical, economic and institutional factors affecting the course of the Bophuthatswana "Edutel" schools television project.]

The present report is presented, however, as a self-contained document of the project research.

## 2 RATIONALE AND OBJECTIVES OF THE STUDY

The author initiated this project as a consequence of technical investigations into applications for solar energy technology in developing areas of Southern Africa. In 1985, work was begun on exploring the use of solar photovoltaic systems for supplying electrical power for rural education centres. At this time, Bophuthatswana was introducing educational television in its middle and high schools. Some 80% of these schools were not connected to any grid electricity supply, and in these schools photovoltaic systems were to be used to power the television and video equipment in classrooms. The Bophuthatswana schools television project was therefore selected as a case study, to provide context for the technical study into photovoltaic system performance.

The author's initial engagement with schools educational television (ETV) in Bophuthatswana thus arose from technical interests. But it soon became apparent that technical issues were not paramount in determining the chances for success or relative failure in this ambitious venture in educational technology. Socio-economic and organizational factors appeared to be of primary importance.

Accordingly, the Human Sciences Research Council was approached for an ad-hoc grant to support a more sociological study of the origins and subsequent development of schools television in Bophuthatswana.

Bophuthatswana's ETV project, known as Edutel, is interesting and important in its own right. It was a brave and forward-looking reform and remains the most notable attempt in Southern Africa to date to employ modern electronic technology in the service of school education. Edutel has further significance, however, in that similar educational technology has been proposed (for several years now) for use in South African schools. Large-scale technological innovations in education will perhaps always carry elements of risk, faith and conjecture; but given the vigour with which ETV is proposed for South African schools, and given the immediate example provided by the Bophuthatswana project, it seemed wise to try to collect whatever lessons could be gathered from the Bophuthatswana experience in order to contribute to debates about technological solutions for South African schools.

In the course of assessing Bophuthatswana's experience, it was necessary to make comparisons with other developing countries which had embarked at one time or another on major ETV programmes. This helped to provide perspectives on the difficulties which emerged in Edutel, and also provided a broader base from which to formulate judgements which may be applicable to the broader South African region.

The objectives of this study were modest. Even so, they were not fully realised, for reasons which are explained below.

- 1 The principal objective was a descriptive one: to document the origins and first years of development of the Edutel project.
- 2 The secondary objective was evaluative: to assess the achievements, limitations and potential of the Edutel project, entailing some analysis of contextual factors, the management of the project, and other factors affecting the quality of service and the utilisation of the service provided.

There was no intention to examine the impact of ETV on pupils' learning, in any systematic way. This latter point constituted a boundary in conceptualisation of the research.

More severe and cramped boundaries, however, were imposed in the course of undertaking the research. The research plan was sharply truncated when the Bophuthatswana government refused the researcher access to schools in 1988. Consequences for the scope and depth of the study were most unfortunate and are discussed in the following section.

It was still possible to pursue the initial main objectives, on the basis of information gathered before research access was blocked. But it is essential to state that the findings must be regarded as incomplete and provisional, based on limited access to necessary information.

### 3 METHODS OF ENQUIRY

#### 3.1 Research Plan

It was proposed to gather factual information about the course of the Edutel project from interviews with key informants in Bophuthatswana. An initial exploratory study had suggested that useful information could be obtained from past and present Edutel staff, Education Department officials, selected teachers, representatives of the company responsible for installing (and at that time, maintaining) ETV equipment in schools, and with tertiary educationists well acquainted with the Edutel project. The latter group included academics and researchers at the University of Bophuthatswana (UNIBO) closely involved in aspects of Bophuthatswanan school education, as well as media specialists with locally-informed interest in educational technology.

At the same time, subjective evaluations of the course of the project would be recorded and assessed, with attempts to balance different points of view by comparing opinions from different commentators in the light of their particular interests and experience.

Amongst these key informants, three broad categories of possible bias were anticipated:

- i) Bias arising from a *position of separation from the recipients* of the ETV service, either because informants were engaged "from above" in supplying or organising the service, or because they were looking in "from the side".
- ii) Bias arising from *particular professional interests or commitments*.
- iii) Bias arising from the high degree of *centralisation* of key informants in the urban centre of Mmabatho-Mafikeng, possibly under-representing information and opinions from remoter rural areas of the region.

For these reasons, and also because it was desirable to obtain "distributed" information, such as opinions of a wide range of teachers and data on ETV utilisation rates across a range of schools, a representative survey of schools was planned, using a multi-stage sample and the services of a fieldworker with experience in educational and media research. At a sub-sample of the surveyed schools, the fieldworker would conduct more in-depth investigations of the experiences of teachers and pupils with ETV.

In the latter instance, the researcher would explore possibilities and suggestions for enhancing the benefits of educational television in classroom learning.

Access to schools, under the authority of the Bophuthatswana Department of Education, was to be arranged through the Institute of Education (Research Division) at UNIBO.

Institute members at the time of planning had a close working relationship with the Department and were confident that the planned research would be officially sanctioned.

### 3.2 Blocks to research, and adaptations

In retrospect, it is not a good idea to conduct research in Bophuthatswana from a base in Cape Town; wherever possible, *local* researchers should be supported, saving time and travelling costs and allowing benefits of day-to-day local knowledge and rapid appraisal of changing circumstances. The disadvantages of distance would have been less severe had the research proceeded as planned, with the opportunity for the field-researcher to spend several continuous months in Bophuthatswana, but other circumstances intervened.

A successful visit in July 1988, some eighteen months after the initial pilot study, provided information through a number of key-informant interviews, and allowed preparations for research access through the Institute of Education. In this period the designated field researcher (also from Cape Town) was introduced to key contact-people in Bophuthatswana. Plans were refined for sampling and surveying Bophuthatswanan schools and fruitful directions for more in-depth investigations were discussed.

The first obstacle after this was the withdrawal of the field-researcher from the project, due to the attractions of a competing long-term research programme which she wished to participate in. It was not possible to find an equally qualified substitute at short notice, so the research plan was revised to allow less experienced fieldworkers to gather information from schools, under more direct supervision. Setswana-speaking social science students from the University of Cape Town were consulted, two of whom were offered positions as fieldworkers. A further fieldworker with educational experience, resident in Mmabatho, was approached to conduct fieldwork in that vicinity.

The second obstacle materialised as the survey was scheduled to commence (early 1989). The newly appointed Secretary for Education in Bophuthatswana informed the Institute of Education (Research Division) at UNIBO that permission to conduct such research now required cabinet approval and was outside the discretion of the Department of Education. Assurances were given that this was a formality, and that the submitted project proposal was "at the top of the agenda". However, local advisors with government contacts interpreted this as a sign that permission would not be forthcoming, or would be delayed so long as to make the project impossible. After waiting some time in Mmabatho, this advice was followed and further stages of the project were abandoned. The advice turned out to be correct on both counts - a brief refusal was received (by fax to Cape Town) some six months later.

In the meantime, a limited number of interviews with teachers and pupils in a few rural and peri-urban schools had been conducted by one of the fieldworkers on an informal basis, supplementing information which had already been gathered from key informants.

Three major consequences of the refused permission were

- i) a representative sample survey of schools could not be conducted as planned;
- ii) access to official channels of information was ruled out after this; and
- iii) most of the information used for this study was thus restricted to the early years of the Edutel project, and was gained from interviews completed before permission was refused for further research.

Local speculation about reasons for the Bophuthatswana government not wanting outside research conducted on the Edutel project included the following possibilities:

- suspicion, caution and changes in government structure following an attempted coup d'etat in 1988
- disenchantment with research by outside agents, instances of which had led earlier to discrediting press coverage with an "investigative" flavour
- unwillingness to expose the origins or running problems of the Edutel project to public scrutiny
- obstruction by staff who might feel threatened by enquiry

In the context, the reluctance to allow independent research and the use of the cabinet to convey this reluctance are understandable. The effects are regretted. Free access to information increases the chances of coming to valid and constructive conclusions, while partial access increases possibilities for bias. But two remarks should be appended to these general points. Firstly, the author should have been more wary of promises of permission and prepared for a reversal. Secondly, the assumption that an independent approach with no particular partisan interests is a safeguard to the people who are the "subject" of research is presumptuous.

It would of course have been possible to pursue information gathering surreptitiously, but this was not in keeping with the aims of open communication and ethical openness implicit in the research proposal.

### 3.3 Comment: independent research versus in-house evaluation

University academics frequently assume that independence and objectivity are not only prerequisites for "good" social research, but are desirable and presentable attributes. This study was initiated with no strong pre-conceived agenda, beyond a desire to gather factual information (including the facts of subjective opinions) and to present and interpret the research data in ways which could be helpful both to participants in the Edutel programme and to other audiences interested in the potentials of schools television.

However, even though a researcher may be good-willed, and even where s/he aspires to a high level of objectivity and fairness, there is little protection for the subjects of research against undesired consequences. Conflict is endemic in social life, and a researcher's self-defined brief to understand both overt and hidden dynamics carries potential dangers for some of the actors in the system studied.

When project evaluation research is carried out in-house, there can be more control over what is researched and what happens with the results. It is understandable that project managers may prefer this option. Further, the reasons for in-house evaluation typically originate within the organization, whereas the reasons for approaches from an independent researcher are not fully known and are open to suspicion. Independence and objectivity may be commendable attributes in the eyes of the academic researcher, but can be viewed as puzzling and dangerous by project participants.

Such differences of perception are especially likely if a project is performing below expectations, if there is hierarchically contained conflict and, broadly, if there is information which is being withheld from public scrutiny. Such features are probably more typical of third world ETV projects than atypical, judging by the observations of international researchers in this field. Corresponding preferences for in-house evaluations unfortunately bring attendant risks of incomplete disclosure and bias towards presenting project achievements in a favourable light (cf. Carnoy, 1975; McAnany, 1978).

In this regard, the following orientations were encountered in the present study.

- i) Officials bearing a degree of responsibility for the Edutel project were extremely guarded.
- ii) External organisations with interests in the Edutel project, such as commercial suppliers of technology, stressed positive aspects of the project.
- iii) Critics of the Edutel project strongly welcomed an independent study.

From the above, it is expectable that (a) information gathered would contain biases of interest, and (b) since information from critical observers was more readily accessible to the researcher, this could lead to imbalance.

The action of the Bophuthatswana government in closing official channels and preventing a representative survey of schools limited the opportunities for more complete assessment of these factors. Both in this respect and also in the specific respect of the failure to obtain reliable quantitative data from a representative sample of schools, the findings of this study must be regarded as provisional and preliminary. Conclusions are presented, in many cases, as judgements of probability based on the information available to the researcher.

### **3.4 Theoretical approach**

The study was initiated as an open-ended enquiry. It was hoped not to pre-judge or to pre-theorise the terrain, but rather to gather the opinions of observers and participants. In the language of ethnographic-style research, the understandings of participants in themselves constitute theorisations (at various levels), and part of the task is to assess these in the light of empirical observations, where possible; to compare different opinions and their conflicts; and to explore reasons for such conflicts. It is probably mistaken to think that sociological theory and methodology bring much light to bear upon this process, although it is possible to conceal that mistake through using the effective terminology of methodological traditions.

Equally, though, the same traditions point out the mistake of assuming an observer can be "theoretically" naive.

In the present study an interesting observation was that many of the key informants seemed highly influenced, in their expressed judgements, by bodies of published theory (if they were academics or researchers) or by pockets of specialised theory / evaluative precepts (if practitioners). In other words one could assert that their opinions were partly pre-formed by "foreign knowledge", made their own, however, through selection and application to their local experience. This occurs widely, perhaps, but carries a particularly sharp flavour in an ambiguously post-colonial situation, where elite expertise, knowledge and informed opinions are often still partly imported from elsewhere.

In order to seek the locally applicable content of judgements and information, unmediated by these influences, it would be necessary to identify the influences and somehow subtract them. This is probably impossible in any full way, but attempts were made to trace the imported bases of judgement, whether in the case of media specialists making judgements informed by media literature; company representatives supplying photovoltaic systems, informed by overseas technical practices; teachers commenting on their

experience through the filter of their teacher training; or documentary policy statements, such as the "Education for Popagano" tract which landmarked Bophuthatswanan educational reform, combining imported and locally coloured ideas about future directions for education in the region (Republic of Bophuthatswana, 1978).

In this respect, the aim of gathering information as objectively as possible would be served by a *de-theorisation* process, subtracting imported theoretical perspectives. This kind of venture is familiar to phenomenologists but generally unsuccessful or inconclusive.

From the researcher's side, there is a corollary - the need to identify pre-study assumptions brought to the topic and their influence on both the gathering and interpretation of information in the field. This can be a slow and even painful process, impossible fully to achieve, but aided by surprises on the one hand, and intersecting with the progressive formation of an interpretive picture on the other. Slowly, details of the picture fill in and some of these details, and their structured interrelationships, bring initial taken-for-granted assumptions into question. But there are risks that the researcher will fail to clean his/her window completely. The risk is greater when the field of view is limited to "incomplete data", and additionally greater when the researcher *shares* common implicit assumptions with informants. Two strategies for partial remedy here are to seek out maximum disagreement (a disagreeable process!) in gathering information, and to insist as far as possible on quantifiable evidence in support of positions. Both these strategies were weakened in the present study by access constraints mentioned earlier.

As the study progressed, the information gathered was compared with information and commentaries on educational television in other developing countries. This did not bring any coherent theoretical framework to bear on the topic but rather indicated changes of hopes and viewpoints in the international literature over the seventies and eighties, and brought to attention priority concerns arising from experience in other countries. In general, later literature tends to be more critical and less hopeful than earlier accounts; and in application to Bophuthatswana's experience it was difficult to avoid a sense of time lag, in that the hopes and mistakes of the Edutel initiative seemed congruent with thinking of a previous decade. But such judgements are too easy to make and do not fairly recognise the way that patterns of problems which arose elsewhere are *freshly* encountered by new people in a new place. Retrospective judgements on the Edutel initiative, bolstered by accounts of other countries' experiences, are therefore presented with a degree of discomfort - but in the hope that such observations are on balance constructive.

More broadly, in assessing the potential and limitations of a development-oriented project such as schools television in Bophuthatswana it is difficult not to be influenced by underdevelopment theory. Underdevelopment perspectives are stronger in identifying macro constraints than in pointing out directions of high potential, and again, for that

reason, there is little pleasure in noting the severe constraints on Bophuthatswanan development associated with its economic and political environment and with aspects of internal structure which reflect that macro environment.

Such perspectives did not inform the study as originally conceived, but were explored later to describe and explain a situation where various aspects of "dependency" are strongly in evidence, and much in people's minds.

#### 4 SCHOOLS TELEVISION IN BOPHUTHATSWANA: BACKGROUND

The Edutel schools television project was initiated in 1984, soon after the inauguration of Bophuthatswana's new television service. The initial plans (as reported by Roodt, 1984:30) were to equip 342 schools with television and video equipment by mid-1985. In the approximately 80% of these schools which lacked grid electrical supply, solar photovoltaic systems would supply electrical power.

Portions of Bophuthatswana are fragmented and dispersed. The map below indicates geographical locations, and the seventeen "educational circuits" under which the school system is administered.



**Figure 1** Map of Educational Circuits in Bophuthatswana  
[reproduced from Holderness, 1986:10]

Following Bophuthatswana's acceptance of "independence" from South Africa, a status not recognised internationally, the improvement of educational provision in the region had been identified as a clear developmental priority. In the years following independence (in 1977) school enrolments increased dramatically and attempts to increase both the quantity and quality of educational provision encountered growing resource constraints. Educational television was proposed as a means of alleviating some of these constraints.

It was proposed that educational TV/video programmes would be delivered to classes in "middle" and "high" schools [ie. excluding only school standards 1 to 4] across the region, both by broadcast and by physical distribution of videotapes in areas temporarily not reached by broadcast transmission. The intention was that schools television would play a supplemental role in pupils' learning, not entirely replacing the teachers' functions but instead increasing the access of both pupils and teachers to high quality standardised educational resources.

Motivations for the project appear however to have been more complex than this, and are discussed in the next section.

The proposals were accepted and the project was under way by late 1985, with rapid installation of solar powered TV/video equipment in more than 350 schools across the region, conducted by a South African-based company which had prior experience in engineering Bophuthatswanan television facilities. Educational software was obtained from British and American sources, and the Edutel centre was partially staffed. Approximately 150 000 school pupils were to be the target audience.

## 5 MOTIVATION FOR THE EDUTEL PROJECT

A broad context of attempts to reform Bophuthatswanan education, in the period following acceptance of "independence" from South Africa, formed the decision-making environment for the Edutel initiative. A documented landmark in this process was the publication of the "Popagano Report" (Republic of Bophuthatswana, 1978), which proposed a unifying indigenous educational philosophy, as well as a number of practical steps towards restructuring Bophuthatswana's inherited educational system.

Amongst other elements in the Popagano philosophy, there was a stress on education for *emerging nationhood* - a common theme in newly independent African state philosophies, but perhaps complicated in this instance by Bophuthatswana's ambiguous nation-status, having accepted independence from South Africa, but lacking international recognition as a sovereign state. A pre-occupation with the quest by the government to gain measures of international recognition appears to have influenced the Edutel project, as noted below.

Despite Bophuthatswana's considerable continuing dependence on the South African economy and state, there is little doubt that the acceptance of formal independence opened opportunities for limited autonomy in development decisions. Besides embarking on a number of national-symbolic prestige projects, funds were also allocated to crucial development areas, amongst which education was prioritised. As De Clercq (1984:23) has argued, (with qualifications): by accepting independence as a "National State" in 1977, Bophuthatswana gained a relative freedom to introduce educational innovations, breaking with the philosophy and largely by-passing the bureaucracy of South African "Bantu Education". The Edutel initiative emerged in this context of educational innovation and repair.

Key problems faced in the educational system were a shortage of suitably qualified teachers, a shortage of adequate school facilities, and rapidly increasing school enrolments.

School enrolments at secondary level had increased from 16 000 in 1972, to 66 000 in 1977, and to 146 000 by 1984, when Edutel was initiated (De Clercq, 1984:36-37; Rep. Bophuthatswana National Assembly Debates, 1984:336). The 1984 figures include a change in the composition of "secondary schools", since by that time, following recommendations of the Popagano Report, secondary schooling had been broken down into "middle schools" (standards 5 to 7) and "high schools" (standards 8 to 10). These school standards were to be the target for educational television.

## 5.1 Educational motives

Increasing school enrolments, resulting from demographic and socio-economic factors, had increased the strain on educational resources. The rate of increase reflected population growth within Bophuthatswana, population displacements, increasing ability to access the school system and a degree of spill-out to Bophuthatswanan schools of pupils who would otherwise have attended schools in South Africa, where reaction to the state education system was more acute and schooling disruptive.

Between 1977 and 1983, the average teacher-pupil ratio in Bophuthatswana secondary schools had worsened from 1:34 to 1:38, while the percentage of secondary teachers without a Senior Teaching Certificate had risen from 50% in 1977 to 60% by 1982 (De Clercq, 1984:36-37). In middle schools alone, the teacher-pupil ratio had increased to 1:45 by 1984. Some schools had to operate double shifts. Underqualified primary school teachers were moved into middle schools, while expatriates were being employed to fill the acute qualifications gap at senior levels, especially in science, mathematics and English (Rep. Bophuthatswana, National Assembly Debates, 1983:799; 1984:336).

Educational television was proposed as a technological contribution which might alleviate some of the problems of an overstretched education system. The goal was to bring standardised, high quality educational programmes into the classrooms to provide pupils with additional learning facilities, including expert presentations of subject matter in areas where teachers' qualifications or expertise were lacking. Simultaneously it was hoped that educational television could contribute to in-service upgrading of existing teaching staff, by setting good examples of teaching methods, as well as by extending teachers' substantive knowledge.

Qualified teachers were not the only shortage facing Bophuthatswanan educational development. Improved physical facilities, notably more schools and more classrooms at existing schools, were urgently required. Many schools needed improved basic amenities, such as water supply; most lacked electricity.

Other deficits at schools included books, libraries, teaching aids and laboratory equipment. To some extent, according to the 1986 Acting Director of Edutel, it was envisaged that school television could help meet some of these further needs, by opening a window to a world of richer educational resources, and by "bringing laboratories into the classroom".

There were therefore coherent educational motives for embarking on a school television project - or to express this more cautiously, the circumstances prevailing in Bophuthatswanan schooling provided a rationale for introducing educational television.

## 5.2 Technological intervention

The precise ways in which the project was initiated were difficult to establish. The initial impetus is commonly ascribed to one person, working at the time in educational technology at the University of Bophuthatswana (UNIBO), who subsequently became the first director of Edutel, before moving to commercial television in South Africa.

There are suggestions that the initiative was, to a degree, *technology-led*, rather than based on a rounded assessment of educational needs. Bophuthatswana had recently acquired its television broadcasting station: there was excitement about the potential of this communications technology on the one hand, and concern about how to use the technology for development gains on the other. Attractive equipment was on the market for solar-powered television and video for remote areas. Good lines of communication existed between individuals with professional interests in such technology and certain government officials.

Over two decades, educational television projects had already been tried in a number of developing countries (with mixed consequences - critical commentators suggest that the lessons learnt in other countries had not been adequately heeded by the planners of Edutel). But at least from a technical point of view, leaving aside the production of software and the social organisation of the Edutel project, the proposed scheme was feasible. In addition it carried a number of political and commercial attractions.

## 5.3 Political and commercial motives

Obvious commercial attractions derived from the scope of the proposed project. From the outset, the intention was to equip virtually all middle and high schools in Bophuthatswana with television/video facilities. The systems, in the event, were installed at a unit price of R7 500 (1984/85 prices) in more than 350 schools, amounting to a contract worth in the region of R2.6 million for school installations.

Political attractions of the project have been suggested at two levels, regional and international. At both levels, the theme of "nation-building" is prominent. It is difficult to assess whether political motives actually predominated in the implementation of the Edutel project. Two centrally placed informants, with access to government policy, claimed this to be the case.

## Intra-regional politics

Bophuthatswana is a geographically fragmented territory. At the level of regional politics, the geographical fragmentation of Bophuthatswana aggravated problems of political unification, and of the dissemination of government policy and services to scattered populations. Judging by Assembly Debates, broadcasting in general was viewed by politicians as a powerful and prestigious way of representing the Bophuthatswanan nation to its people. This political attraction, which played a considerable part in the President's 1983 decision for urgent acquisition of a television service, seems to have extended to educational television as well. The geographical scope of the proposed schools television project would have added to its appeal, promising reception of central messages across the entire territory. Amongst others, Minister C K Sehume, responsible at that time for broadcasting, gave expression to this point of view in 1984:

"The development of television will enable the Government to establish a closer relationship with the Batswana wherever they reside, television being the great communicator... [T]he service will also proceed apace ... until the bulk of the people will be able to watch television even in the remote areas, where electricity will be a problem for some years, through the use of solar-powered receivers, perhaps viewing under community circumstances, in village centres or schools."

*(Rep. Bophuthatswana, National Assembly Debates, 1984:531)*

At the same time as Mmabatho politicians wished to exploit broadcasting as the "mouthpiece of the Bophuthatswana nation" (Rep Bophuthatswana, National Assembly Debates, 1985:170), another dimension of political demand came from regionally based politicians and chiefs, calling for a more equal distribution of resources to their constituent areas. Specifically with regard to the school television proposals, regional representatives were happy to be assured by central government that the Edutel project would extend to all areas of Bophuthatswana. The promise of equally distributed, centrally supplied, high quality educational television made some amends for existing regional inequalities in educational provision (such as provision of classrooms).

Such politically-based aspects of the motivation behind the Edutel project are of some relevance to the path it took. For example, they contribute part of the explanation for the decision - widely criticised by educationists - to start the project from the outset on such a large scale, without pilot investigations. Experience from a number of other developing countries has indicated that it is wiser to proceed in careful stages (cf. Schramm, 1977:153), and that to mount a successful educational television project which would reach all middle and high schools and be directed at all school standards within those schools, would require far greater resources than Bophuthatswana has had at its disposal.

Interestingly, American Samoa, which was the early flagship for educational schools' television beginning in 1964, also proceeded at headlong pace, targeting all elementary

schools in its first year of operation and all secondary schools the following year. While judging this in retrospect as a procedural mistake, Schramm noted (1977:152) two sources of motivation for being "in such a hurry": firstly political reasons of *incorporation*, secondly a Samoan *egalitarian ethic* whereby it would have been distasteful to favour some children with the new service and not others. It is probably fair to say that these observations could equally be applied to the Bophuthatswana venture.

## International politics

International politics also entered into the combination of motives leading to schools television. It has been claimed that the project was

"...all tied up with politicians, trying to set up relationships with the French. Bophuthatswana isn't internationally recognised. By signing business deals with French businessmen, maybe influential in government, this led to a later establishment of a trade mission in France..."

This observation was made in confidence (in 1986) by a centrally placed official<sup>1</sup>, and the suggestion was independently supported (in 1988) by another informant with access to government policy and decision-making. It is notable that preceding the inception of Edutel, both the President and the Minister of Education travelled to France. Their visit gained applause from the Bophuthatswana Assembly, where it was felt that progress was under way towards achieving a measure of international recognition.

As one Assembly member put it:

"[W]e have not achieved recognition, but we have connections with leading countries in this world. When we have connections with countries like France and our leaders go to France and are welcomed by France and these are shown to us, this is showing that we are going to be recognised. The future of our recognition is very bright by touching these individual countries that make up the United Nations. Steadily and softly we have connections with the Five great powers that run the security of the United Nations."

*(Rep. Bophuthatswana, National Assembly Debates, 1984:548)*

The vulnerability of regions like Bophuthatswana to international commercial overtures, owing to their national aspirations, form of government and ambiguous sovereignty, has been demonstrated to unfortunate effect in other South African "National States" and "homelands". For example, sales of technology for third world development, including

---

<sup>1</sup> **Methodological Note:** In general, informants have not been identified by name, except if their statements have been published elsewhere. Where information was provided on an implicit or explicit understanding of anonymity, or where it could be judged to have potential for harming the informant, informants have been identified in a sufficiently general way to avoid personal attribution. This caution is regretted, as it limits opportunities to assess the context and origins of information, but in view of unpredictable consequences it is considered necessary on ethical grounds.

solar technology, have figured in obscure deals made at highest levels and without adequate assessment of local needs<sup>2</sup>.

With what degree of justification one cannot be sure, but opinions have been expressed both by Edutel staff and by informed observers that the Edutel project is something of a political inheritance, brought into being for other than purely educational motives, and that the remaining task of trying to make Edutel serve an educational function is a remedial one.

This is not to imply that political motivations have no place in commissioning development projects. Especially in developing countries, they are likely to be central. Schramm (1977:171), in an evaluation of factors promoting success in educational television ventures in third world countries, has identified the commitment of top leadership to such projects as centrally important. What is of concern, in evaluating the course of the Edutel project, is the articulation between political motivations and educational motives, and the implications of the mixture for the way the project was set in motion.

McAnany (1978:18-19), in a similar evaluative survey of third world communication technology projects, observed that typically "the promoter of the project sells his ideas on a political or long-range criterion and the implementors and evaluators often concentrate on a short term educational goal." This observation corresponds well with sentiments expressed by Edutel implementors as well as critical observers: from Edutel, a feeling that the scheme had been set up by decisions outside their control, "...and then we had to make it educational"; from critics, the opinion that centralised top-down decision-making had prevailed, with insufficient consultation, research and forward planning, leading not only to difficulties in realising the potential of the educational technology, but even creating blocks to short term educational goals.

---

<sup>2</sup> A current illustration was offered in the Republic of Ciskei, where an Israeli proposal for solar-powered lighting, television and refrigeration for rural centres led to an untendered contract with an Israeli-based company for over-priced equipment, inappropriate to local needs, which in any case was poorly designed and did not work satisfactorily. In such situations there is the potential for high-impact decisions to be made by relatively isolated political leaders, often without adequate depth of local technical support - and often without adequate assessment of needs, potentials and infrastructural / organisational requirements associated with successful implementation of "technical solutions" to development problems.

## 6 EDUTEL DELIVERY TO SCHOOLS

Robin Welsh, the principal promoter of schools television in Bophuthatswana, as interviewed by Roodt (1984:30), had envisaged in advance of the project that Edutel would develop over 4 to 5 years to a point where educational programmes would be broadcast for 53 hours each week.

Initially, for schools not within the range of television reception, pre-recorded videotapes would be distributed by post, by circuit inspectors and by maintenance teams. Local production of educational software would be in the hands of three production teams, each producing about 4 to 5 hours' material per month. In the early stages, there would be three script-writers (recruited from the teaching profession) advised by programme committees, and five "utilisation officers" responsible for producing manuals and guides, arranging utilisation workshops, and providing feedback from schoolteachers to the production teams.

In addition, two fulltime researchers would monitor and explore the course of the project.

According to the new acting director of Edutel at the end of 1986, and information from other observers in subsequent years, these ambitious broadcasting and organisational aims had not been (and seem unlikely to be) attained.

### 6.1 Distribution

First, Edutel had to rely heavily on the physical distribution of videotape cassettes. Educational programmes were obtained from overseas, mainly from America and Britain, and equipment was purchased for simultaneous duplication of videotapes (fifty at a time), typically containing a variety of educational/instructional material suitable for different school levels in various subjects. One of the recurring areas for criticism of Edutel delivery has been the quality and suitability of the imported software, while local production of programmes for schools has been severely constrained by economic and organisational factors discussed below.

Broadcasting could be a cheaper means of distribution than reproducing and distributing videotape cassettes, but constraints here included the infrastructural expense of extending microwave links, or gaining a satellite link, in order to extend broadcast reception to all areas in Bophuthatswana. In 1987, the Minister of Broadcasting announced the inception of telecasting to schools for an hour each morning and in an afternoon slot at 16h00, while videotape distribution was continuing to "the 485 Middle and High Schools in the country" (Rep Bophuthatswana, Assembly Debates, 1987:551).<sup>3</sup>

---

<sup>3</sup> Judging by published programme guides, broadcast delivery has fluctuated. Beginning June 1989, a regular Edutel broadcasting slot has been advertised from 15h00 to 17h00 on weekday afternoons.

In the same budget speech, the Minister noted that of the R45 million requested that year for broadcasting services, only R25,7 million had been allocated, necessitating cutbacks in many areas. Top priority was being given to moving all broadcasting facilities to a new prestige building. R5 million for this move had to be obtained at the sacrifice of other developments in the broadcasting service, including educational television and staff training. "The transferring of these funds from the entertainment and educational television programmes will by necessity mean a reduction in the amount of local programmes which can be produced during the current financial year" (Rep. Bophuthatswana, Assembly Debates, 1987:550).

## 6.2 Staffing and expertise

With regard to Edutel staffing, the nominal staffing structure in 1986/87 was characterised by gaps and vacancies. In the important *Utilisation* section, responsible for liaison between Edutel and schools, five appointments had been made. A need was expressed for a further five, to cover all areas, but of the original appointees (according to one source, in 1987) several resigned, partly through finding the lines of communication too unidirectional: they found the feedback they communicated from schools was not sufficiently taken into account. In the *Production* section, no staff were employed in 1986. The *Research* section similarly had no staff; a previous appointee had left, apparently amidst disagreements. The *Technical* function, responsible for repairing television sets, etc., appeared at this stage to devolve on maintenance support from the supplier company.

The original Director of Edutel first moved to take responsibility for entertainment programming in Bophuthatswana Television, adding to his commitments and leaving less time for Edutel, and then left altogether to join commercial television in South Africa.

In summary, the Acting Director at that stage lacked adequate organisational support.

Limitations of finance no doubt played a part in holding back the staffing of Edutel, but further problems arose through the lack of sufficiently qualified and skilled recruits. To aggravate the situation, an informal policy of separation from the University had prevented Edutel from making full use of the relative concentration of media, production and educational expertise at UNIBO. (According to one source, for example, Utilisation Officers had been instructed to have no dealings with university personnel.)

Three reasons have been suggested for the restricted communication between Edutel and UNIBO. One was that university educationists and media people tended to be critical of the process and planning of Edutel, and were therefore not viewed as supportive. Another was that university staff would prefer to keep some autonomy and "not get constricted in the political imperatives". Finally, it was suggested that concerns about status and qualifications had led to a degree of defensiveness amongst less well-qualified staff in

parastatal posts. From this point of view, university academics could be perceived as a threat to status.

### 6.3 Production facilities

Inadequate production studio facilities available to Edutel were also claimed, by observers with production experience, to add to the problem of producing local programmes. Such locally commissioned programmes as have been made, have generally been contracted out to independent commercial production companies, drawing on South African professionals<sup>4</sup>.

### 6.4 Scale of resources required

Experience in other countries has indicated that the financial and organisational resources required for mounting a schools television project are considerable. For instance, two of the countries which undertook such projects, which were cited as examples by Edutel motivator Robin Welsh (in Roodt, 1984:30), were Niger and the Ivory Coast.

Niger began with a production team of about fifty people - skilled specialists from France (Schramm, 1977:144) - a capital budget of about some \$1.5 million, and a recurrent budget of more than \$500 000 per year, in 1964 currency. Ivory Coast, starting in 1971, drew on international aid to a value of approximately \$18 million over five years, made use of an elaborate organisational structure within Ivory Coast, and made use of further French assistance for programme design and production, and evaluation (Valerien, 1981:11-14). Making approximate conversions to 1990 SA Rand, Niger served ETV to some 800 students with a capital investment of about 11 million rand and annual recurrent costs of about 6 million rand, while Ivory Coast expenditure during the seventies was in the region of 30 - 45 million rand per year (based on estimates by Carnoy, 1975:207-248). By comparison, the financial and organisational resources available to Edutel, as a minor subdivision of the broadcasting service, have been of small magnitude, and appear insufficient for undertaking such an ambitious project. Both Niger and the Ivory Coast progressed more slowly than Bophuthatswana attempted to do, addressing only one school grade per year.

Installing reception equipment in schools is typically only a small portion of the overall costs of organisation and infrastructure required and the costs of production and transmission. In a particularly well-documented project (Carnoy, 1975) in El Salvador, total costs over five years for schools instructional television amounted to some 54 million rand (1990 equivalent) broken down roughly as follows:

---

<sup>4</sup> A few informants alleged instances of attempted bribery in this process; no attempts were made to substantiate such allegations.

Pre-production planning	4%
Technical assistance	18%
Transmission equipment	26%
Reception equipment	5%
Construction	19%
ITV department operating costs	28%

[Costs of administering the project within the school system not included.]

There is no evidence that financial planning for the Edutel project allowed for the organisation and staff needed to provide an adequate service to some 150 000 students.

It could be argued that, to the extent that Bophuthatswana is able to make use of imported rather than locally-tailored software, financial and organisational needs could be reduced. However, as already noted, the imported software was reported as a major reason for dissatisfaction with Edutel's delivery to schools.

## 7 UTILISATION

Any evaluation of the benefits of the Edutel project would require reliable knowledge about the extent to which the services are actually being used in schools. More qualitative information would then be needed, to evaluate the quality of the service and its educational contribution. However, quantitative levels of utilisation are a necessary baseline for enquiry, and (assuming teachers are free to make use of the service, or not) a primary indicator of levels of acceptance of the educational technology.

Unfortunately, reliable information about utilisation levels in Bophuthatswanan schools was difficult to obtain. It is suggested that only a representative survey of schools, conducted in such a way as to elicit frank information and opinions from teachers, would establish the pattern of utilisation levels across the region. As explained previously, the Bophuthatswana government did not allow this. In the absence of such a survey, judgements had to be made from the observations of key informants, backed up by informal interviews with teachers and pupils in a small, haphazard sample of schools.

### 7.1 Status of information on utilisation levels

Of the approximately fifty key informants interviewed, about ten had regular direct contact with a range of schools in the region. Several more were in touch with a network of teachers. Teachers interviewed were sometimes able to comment on utilisation at schools other than their own. These sources provided useful information, but the information must be regarded as non-systematic and although the observations were generally consistent there is no way of knowing that the collected information from these sources was representative.

Edutel staff may have had central records, but would only give impressionistic statements about utilisation levels. It is suggested below that central records could in any case be of doubtful validity as teachers admitted misreporting utilisation levels.

The company which supplied the schools TV/video systems conducted systematic maintenance "sweeps" at periods after installation, and comments by teachers (generally headmasters) were recorded on many of the maintenance records, although it was difficult to correlate comments with the question of utilisation levels.

Informal interviews by the author, a fieldworker and a visiting teacher were conducted at only six schools outside the Mmabatho area, in three different Education Circuits. Candid information was obtained, but the haphazard sample was too small to be able to generalise from that information.

The following assessment of utilisation levels is therefore limited in scope, accuracy and generalisability, and must be regarded as a provisional assessment of utilisation levels

between project inception and 1988-1989 based on limited information. It is notable however that *none of the informants with direct involvement in rural schools reported significant levels of utilisation of the ETV facilities.*

## 7.2 Assessment

Available information about utilisation levels was not encouraging.

Supplier company representatives estimated that some 80% of schools were making use of the equipment within six months of installation. However, no quantitative estimates were obtained either from the company or from Edutel officials about the extent of usage within schools which made use of the facilities.

Company maintenance records, covering all schools where sets had been installed, were scanned. Written comments by headmasters or teachers-in-charge included a proportion of appreciative and courteous remarks (perhaps a quarter) and a smaller minority of frankly negative comments, the majority of maintenance reports carrying non-committal comments or signatures. This could support the observation by both company representatives and Edutel staff that utilisation varied considerably from school to school, depending to a great extent on the approach of the school principal.

No independent observer identified a rural school where substantial use was made of the facilities, but several agreed that different problems had been experienced in different regions. In some remoter areas there had been problems with distribution of videocassettes; damage to equipment (eg. stoning of solar panels) was believed to be more prevalent in urban and peri-urban areas near Pretoria rather than in rural areas; theft of equipment (especially the cassette player) was claimed to be a problem particularly in Thaba Nchu<sup>5</sup>.

Educationists, media specialists and researchers from UNIBO expressed uniformly sceptical views about actual levels of ETV utilisation. One noted that after regularly visiting a cross-section of schools in the region, he had never seen the sets in use for classroom purposes, after the project had been operational for over a year. Teachers had sometimes been observed watching the television in off-duty moments.

---

<sup>5</sup> Information from a single informant, not confirmed. Company personnel noted that the VCR's were most susceptible to theft, despite a security cabinet, due to their portable size.

Another observed that

" ... the teachers weren't drawn in at the beginning, and now anyway they are very frustrated with the material which is made available to them ... the timetables are already very tightly filled, so what happens is that these videotapes are only used when a teacher is sick, or something like that - the class is sent off to watch a video."

Interviews with teachers and pupils at schools supported such opinions. Pupils interviewed reported watching videos as infrequently as once a year; others confirmed only watching videos when a teacher was sick. Teachers in one area complained of long delays if they requested particular video programmes, making it not worthwhile to fit ETV material into their curriculum teaching. They noted that while they did not use the facilities, they filled in forms saying that they had, in order to avoid criticism. In another rural school closer to Mmabatho, the vice-principal confirmed receiving a "good supply of tapes from the Circuit Office" but added

"They don't fit in with the syllabus. A lot of it is too advanced. Pupils can't get anything out of it, there is no point in showing it. The tapes stay in the cupboard."

Company personnel attributed low usage levels mainly to teachers, and said that pupils were placing pressure on teachers to see more videos, especially where communities had paid for the equipment in schools. A local media specialist expressed the dissatisfaction more strongly: "In community schools, they have had to contribute to the cost of the solar panels and televisions, and now when they find they are getting nothing back from it they get very angry." Some teachers expressed the same concern but attributed the problem mainly to the unsuitability of educational software available:

"We must find a way of showing them [the parents of pupils] that we can do something with the money we get, to try and regain their confidence. The teachers are quite unhappy, although we thought the idea was a good one. The Council of Principals is right now sending a memorandum to the Department of Education to put pressure on Edutel to deliver useful material. Sure, the ultimate question will be whether they have enough money to do anything, but at any rate the pressure should help."

The solar-powered school TV/video systems were designed to provide for up to ten hours of video and television use per day. At the time of this study, judging by the incomplete but generally consistent evidence gathered, it appears that average utilisation rates across the region are likely to be at least an order of magnitude less than that design level, and perhaps two orders of magnitude less. If this is the case, one techno-economic consequence is that the unit costs of the solar-generated electricity will be astronomically high (Cowan, 1989). The major consequence, of course, would be that very low utilisation rates preclude any widespread delivery of the intended benefits of the educational television project.

## 8 PROBLEMS AND CONSTRAINTS

A number of problems have been identified to account for limited ETV utilisation in schools, and these are now discussed. The status of the information in this section is that of subjective opinions, expressed by a number of key informants and gathered mainly between 1986 and the end of 1988. In most cases, the problems which are discussed below were raised independently by several informants, giving an indication of perceived generality. However, it is likely that the experiences of educational television in schools would vary across the schools of Bophuthatswana. The problems and perceptions of teachers would therefore need to be representatively surveyed to provide a firmer basis for generalisation.

### 8.1 Educational software

The value of having TV/video facilities in schools depends very much on the quality and appropriateness of available educational software. This was a central area for concern in the set of opinions gathered from educationists and teachers in Bophuthatswana.

As previously discussed, Edutel had relied principally on reproducing and distributing videotape material obtained from overseas suppliers. Several difficulties had been identified in making effective use of such material in local classroom teaching.

#### General quality

Some of the recorded complaints were directed at the general quality of the available video programmes.

For instance, charges were laid against the "faded 1950's-style American presentation" of some of the programmes. However, software was procured from several sources in America and Europe, including Granada and the BBC, so such general criticism must be restricted in application. It was reported that a considerable consignment of educational films had been obtained by Edutel as a donation, and perhaps this material included dated films.

An Edutel representative, commenting on the variable quality of software obtained, classed the American material as generally stronger in professional presentation, while software bought from British sources tended to be superior in content. A number of informants, however, shared a belief that at least the initial procurements of video material had been guided more by opportunity and expedience than by a coherent educational strategy.

## Distinguishing instructional and supplementary educational programmes

It was suggested that the purchase of educational software had failed to take into account distinctions between **instructional television** and **educational television** programmes. As a consequence, the material purchased was difficult to apply systematically in a classroom environment. Some programmes had been designed for directive instruction, while others were rather of "general" interest. It was felt that this unevenness could confuse and frustrate teachers, especially if they had little means of knowing in advance whether a given programme would function as a substitute for a lesson, as a supplementary component within a lesson, or perhaps as supplementary material of educational interest but not directly related to syllabus teaching.

In an interview, the acting director of Edutel in 1986 shared these misgivings and said that a forthcoming goal was to pay more attention to the "methodology" of using material more effectively, drawing more careful distinctions between different categories of software - for example, programmes which would facilitate drill learning, those which carried forward or amplified the set syllabus, and programmes of more general educational interest. To what extent this goal was subsequently achieved is uncertain. The comments reported earlier about pupils only watching videos when one of the teachers was sick suggest that there are least cases of schools where the available video programmes are lumped together as "educational extras".

## Language

A number of observers commented about the unsuitability of the **language**, in imported programmes, for use in local schools. One problem here was the accents of presenters, "too British or too American for our pupils to follow." American pronunciation was counted especially difficult for Tswana pupils to understand. For the majority of pupils, English is a second language, and the English they encounter in their lives is not based on American pronunciation.

Apart from the accents, it was felt that the vocabulary employed by presenters was too advanced for most Tswana pupils. Hence pupils could sit through a whole programme comprehending almost nothing. It was felt that locally produced programmes, with native Setswana speakers, even if of lower technical standard, would be much more comprehensible to local pupils, and would also serve as a more useful role model for local teachers.

## Environmental congruence

The issue of environmental congruence (cf. Michel and Thomas, 1985:251) was raised by a number of commentators. They pointed out that the imported programmes frequently used illustrations which would be totally foreign to pupils in rural schools, even at such simple levels as talking about a fish as if every member of the audience should be familiar with what a fish looks like. Or as one observer pithily put it:

"An American voice says, *Now go outside and turn over a leaf and look at it..* In this climate! Our pupils will be lucky if they can find a leaf anywhere - the best they could do would be to study some ants!"

At a less obvious level, the modes of presentation, self-expression and interaction of overseas presenters could be jarring to Tswana pupils, accustomed to different norms of polite behaviour (cf. Gana, 1980:15 for parallel observations about how children respond to "Sesame Street" in Nigeria).

All such comments point to a degree of inevitable mismatch between the intentions of overseas programme design and what would be received from the programmes by pupils living in quite different physical and cultural environments. At the same time, there is a partial counter-argument, in that one intention of the educational television service was precisely to expose school pupils to information which would otherwise remain outside their experience.

## Subject variations

Company representatives gave the opinion that programmes in subjects which were less context-sensitive, such as mathematics, science and perhaps biology, were generally more successful than subjects which needed greater local content (geography and history were suggested as instances of the latter).

In recent years, Edutel has gradually increased its locally produced software resources, beginning with production of a useful local history series, and further investigation would be required for a more current evaluation of the degree to which software problems continue to be a source of dissatisfaction. With limited resources, however, it seems that Edutel could at best play a supplementary role in providing educational aids, and perhaps (within the present framework) intervene most effectively by focusing its production and distribution resources around selected school subjects and at selected school levels.

## 8.2 Scale of implementation

Criticisms of the scale of the Edutel project have already been mentioned above. The issues are explored further in this section. Some of the relationships between the scale of technological innovation, the choice of technology, and the peripheral status of rural education in an underdeveloped region will be discussed in Section 10.

Three arguments were commonly put forward to support the contention that Edutel began on too ambitious a scale. The first was simply that Edutel lacked the financial and human resources to take on a full-scale schools television scheme successfully. By spreading available resources over such a large target area, overall quality had to suffer, thereby hindering acceptance of what was offered.

A second line of argument was that overcommitment from the beginning severely restricted the ability of Edutel to learn from and adapt in response to emerging experience. Introducing schools television on a more exploratory scale could have allowed Edutel to refine its aims and methods in the course of growth.

Allied to this argument, some observers (reflecting a popular current theme in the international educational media literature) pointed to the different philosophy and practice expressed in "formative" and "summative" evaluation respectively. Summative evaluation would represent an assessment of achievements and failures once the project was substantially in place, by which time options for change might be greatly reduced, the costs of change increased, vested interests entrenched, and teachers' attitudes perhaps adversely set in place. Formative evaluation, on the other hand, would entail finding out, at each stage in the process, how teachers and pupils responded to what could be offered, and building these discoveries into subsequent directions for development.

"It should have been started as a small pilot project, finding out what teachers' problems were and then trying out various solutions, with formative evaluation at every stage. And this could better have been done not in Mmabatho but in some remoter area, some forgotten area, where things are more realistic... If after a year the pilot study showed that it wasn't working as intended, that's fine - it's better than forging ahead with costly mistakes. Then you can go into the problems that have come up and devise new ways of approaching them, try those out in turn. It needs time and it needs people involved in this work, in close cooperation with the teachers themselves. This can be done on a small scale but it can't be done on a large scale with our short resources."

Any comprehensive form of formative evaluation could be extremely time-consuming and expensive, perhaps restricted to such huge and well-funded ventures as the production of the American "Sesame Street" series. To this extent, the appeals for formative evaluation in Edutel's development could be idealistic; but they do clearly point to the concern, amongst these educationists, over the relatively unguided transplant of technology and imported commodity software into local schools.

"Edutel was designed from the top down. The project just went ahead, the contract for the equipment was signed, with almost *no* preparatory work. You can't just dump technology into education. People have found out everywhere that it doesn't really work."

The third common argument was concerned with the dynamics of spreading an educational innovation. By offering schools television across the board, in middle and high schools, and throughout the region, little scope was entertained for spontaneous organic growth by demand.

The Bophuthatswana "Primary Education Upgrading Programme" (eg. see Holderness, 1986) has frequently been held up as an example to show how new methods in education should, and can, disseminate organically in response to growing demand. This Programme, which has been widely acclaimed both locally and internationally for its achievements, expanded from a kernel of education activists, almost contagiously, as teachers in other primary schools became aware of and excited by the achievements and morale of school teams which were already taking part in the Programme. The implementation of Edutel was seen as a sharp contrast to this model: the over-extension and under-delivery of the Edutel project, from a centralised office, was viewed as inhibiting teachers' enthusiasm and participation. Related points of criticism included repeated charges of "technology-dumping", and of following a "solution-based" strategy instead of finding out and responding to teachers' felt needs<sup>6</sup>. To quote one observer,

"To get projects like this going successfully, they must start off slowly and on a small scale, and then if they are seen to be valuable, they will spread by themselves. I like to make a distinction between a problems-based approach and a solution-based approach. With a problems-based approach you find out first what teachers say their needs are, and then you try to respond to these needs - and in a flexible way. You don't present them with a package and say 'this is your solution'. You might have to try out various different options, and the best options themselves might change over time... I understand that a solution-based approach is more convenient to people at the top, and to companies selling equipment. The companies of course want to sell their products and as many as possible - they like things to be simple and they like them to move fast. This of course is typical of capitalism. I don't blame the companies for what they do - that's their business and we should know what their business is. The trouble comes when decision makers do not take the trouble to set out all the options offered. When we see advertisements saying 'Drink Coca-Cola for a good life' we don't necessarily run off to the store to buy Coke."

---

<sup>6</sup> These criticisms were surprisingly uniform amongst UNIBO educationists and researchers and it is suggested that they reflect, in part, a collective school of thought which prioritises classroom practice and the role of the teacher, and is suspicious of technological interventions "from above". Similar opposition to imposed technological solutions can be observed in some education departments in other South African universities. It is likely that the critique is not only based on judgements that "technology dumping" doesn't work, but also expresses a reaction to the unusually strong technicist component in state and private enterprise discourse on black education in South Africa.

Important ingredients in the dissemination and adoption of an innovation such as schools television could include

- the role of individuals who act as prime movers
- the development of demand for a facility that has not previously been part of users' experience, and is therefore imperfectly understood
- the ability to adapt the innovation to particular needs
- the receptiveness of different sections of the target population
- the development of a feeling, amongst users, that they "own" the facilities and are responsible for their creative use

It can be argued that blanket dissemination from a central source would tend to act against these potentially important dynamics.

Individual prime movers cannot effectively motivate new users on such a wide scale, especially when they are geographically dispersed and channels of communication are limited. (It is notable here that the initially appointed "utilisation officers", whose task was partly to motivate and train teachers in schools, were reported to find their work unsatisfying due to shortage of time at each school, but were then instructed to cut their time and travelling costs even further because of Edutel budget pressures.)

The growth of demand for what schools television could offer, due to systematic installation of sets throughout the region, could really only take form after the sets had already been installed in schools. It is debatable whether demand grows more strongly when people lack something they know they want, or when they are provided with something when they are not sure that they want it. There is a possibility that facilities which have not been used before could generate their own demand, once teachers find out what can be done with the equipment. The alternative, though, or at least a powerful complementary factor, would be the communication of interest and enthusiasm through example. If one school in an area had demonstrated the use of television to good effect, others might more strongly want to follow. Further, it is reasonable to expect that some schools, their principals and staff and pupils, would offer more fertile ground than others for making use of educational television. Blanket dissemination could obscure the more fertile routes for adoption of the technology.

A complicating factor in the generation of well-founded demand, in this particular case, is that television itself (along with somewhat similar technologies, such as radio and hi-fi) is a *popular consumer demand*. On the one hand, this engenders a superficial level of demand for something like schools television, since television itself is seen as a desirable technology. But there are misleading differences, since in the case of schools television the unit of consumption (and control) is not the household or other established consumer unit, and of course the service is different in appeal from entertainment television. Subject to income levels, it is relatively easy to market domestic commodities, such as

solar-powered music centres. To market a communal facility such as schools television in a demand-led commercial way would be more difficult. There are further economic reasons against the viability of piecemeal dissemination which are discussed presently.

The issue of who controls, or who "owns", a technological innovation appears to be central to acceptance and utilisation, over a wide range of application areas, and no less so in the field of educational technology. It is possible that blanket dissemination of a centrally-controlled project could reduce teachers' feelings of power and responsibility, and take on the aspect of an imposed choice. From the authorities above (according to Edutel and the supplier company) it was made clear that schools could decide whether or not to purchase the TV/video facilities, but judging by the perceptions of some teachers interviewed, there were effective pressures to join the scheme, if not in the first round of installations, at least subsequently. The reported practice mentioned earlier, of teachers signing forms saying they had used the facilities when they had not, also points to a perception of pressures and expectations from Edutel or the Department of Education authorities. Lines of control within schools, from school principals downwards, could further affect teachers' and pupils' subjective and objective "ownership" of the facilities.

Some of these considerations would have been affected by the style and scale of implementation of the project. However, it needs to be added that issues of control within schools, and within classrooms, and of control from education authorities, are also structured into the education system, extending well beyond the terrain of the Edutel initiative.

More narrowly, it appears that teachers generally did not have control over introduction of the technology, and they do not have control over the software available, but they do have effective control over how much they use the equipment. In commenting on utilisation of educational television in developing countries, Potts (1979:26) claimed: "Teachers want the same things the world over, regardless of whether they make up their own curriculum or whether it is laid down by central government. They want to be in charge of the situation in the classroom." For a variety of reasons, some of which are discussed further in the following section, it may be that teachers do not see the television facilities as contributing to this want, and this may in turn contribute to low average levels of utilisation.

### 8.3 Teacher and pupil attitudes

Evaluative reports of educational/instructional television in other countries have frequently stressed the issue of teacher resistance to the innovation. In comparing television projects from different countries, and their progress over time, there appear to be a number of variables which can influence acceptance or resistance. For example:

- (a) The status of teachers prior to the innovation. Where teachers have diminished status, or are clearly too few or too underqualified for the educational tasks in hand, resistance is likely to be less.
- (b) The degree to which schools television is "instructional" (largely replacing traditional teaching, or a pivotal component in new styles of teaching) or rather "educational" (serving as a supplement to traditional instruction). Where television plays a greater role in dictating classroom procedures, resistance from experienced teachers is likely to be greater.
- (c) Consultation and training. Where teachers are brought into close consultation about the planning and implementation of a project, resistance is likely to be less. Additionally, where teachers are offered special training in utilising the medium within their practice, resistance may be less.
- (d) Educational level. It appears that teachers at primary school levels are generally more open to the innovation. (A number of studies have also suggested that pupils are more accepting of school television at primary levels.)
- (e) Changes over time. A number of possible interrelated effects have been noted whereby initial levels of acceptance may tend to diminish over time.

In Niger, for example, the problem of resistance from experienced teachers was by-passed by employing inexperienced "monitors", after six weeks' training, to oversee television instruction in primary grades. This appeared to work well (cf. Schramm, 1977) except that progressively the lack of integration of trained teachers and integration into the ministry of education undermined national support for the project (1977:158).

In the Ivory Coast, great emphasis was placed not only on serving the expansion of primary schooling, but also on teacher training aided by television. In the initial expansion period, from 1971 to 1977, nearly 40% of broadcasting time was allocated specifically to teacher retraining (Valerien, 1981:13) as part of a coordinated drive to increase the quantity and quality of available teachers. During this time, broadcasting rose to over 400 programmes per year, thereafter levelling off to about 300 programmes per year, up to 1980. Primary enrolments rose from 20 000 to 650 000 in this period. However, after 1980, educational television broadcasting in the Ivory Coast dropped to less

than 20 hours per year, and part of this sudden decline was associated with increasing teacher resistance. "[T]eachers who are increasingly better-qualified react against a pedagogy which imposes many constraints" (Valerien, 1981:15). Also, "secondary school teachers openly criticise teaching by television, accusing it of giving lessons to pupils who are not sufficiently-prepared, who are too active and who lack discipline" (1981:15). These themes, of increasing resistance from teachers as they gain in their qualifications, and increased resistance at more advanced school levels, are echoed by a number of other writers.

Schramm (1977) notes that in response to such changes in attitude over time, it is likely that television projects would contract, that the medium would be used more sparingly and discriminatingly, adapting more to a supplementary than instructional function. Hawkrige (1982) makes the same comment, less positively:

"[M]any projects which began using television for direct instruction in the classroom have been modified to provide supplemental or enrichment content. Such transitions may reflect changing needs in the system. It is more likely, however, that utilisation problems eroded the effectiveness of the direct instruction projects. Recognition of this erosion may have produced a drift to supplemental or enrichment content simply to salvage something from a system which continues."

A further compounding factor, however, in the progress over time of third world educational television projects is the availability or otherwise of supporting resources. In many cases, projects have fallen by the wayside, or undergone sharp transitions, following the withdrawal of overseas aid or expertise. Thus, even if as Schramm suggests there might be a natural course of expansion and contraction, this may be pre-empted by other factors.

In the Bophuthatswana Edutel project, no firm evidence has been obtained about the nature and extent of teachers' resistance to schools television. Diverse opinions which have been collected largely coincide with the points raised above.

The acting director of Edutel dismissed teacher resistance as a significant obstacle (1986 interview). His opinion was that teachers did not view schools television as a threat. "If they were equally strong they might see it as a threat, but since they are not, only a very few see it as a threat - rather as an aid." This could be linked with the way in which television was put forward as a supplementary aid to teachers rather than as an instructional replacement for them. However, other observers were less sure, and attributed greater importance to teacher resistance. An educational media specialist suggested: "A certain amount of resistance is inevitable with any innovation - but this can be minimised and overcome if teachers are well consulted and drawn into the project, and if they can see that the innovation really helps them". She believed that this had not happened in the Edutel project.

Apart from the claim of inadequate prior consultation with teachers, it was suggested that Edutel was falling between two stools in failing to make a systematic distinction between instructional and supplementary educational software. Almost certainly, an imposed programme of fully-fledged instructional television would have incurred strong resistance from existing teachers in secondary schools; and this probability is avoided by offering a supplementary rather than instructional service. However, teachers who feel strongly constrained to teach within the prescribed syllabus find it difficult to incorporate educational video material which is not coherently related to their syllabus teaching.

This frustration is said to be compounded by timetable-scheduling problems, and sometimes by space constraints.

School timetables are already tightly filled with the existing curriculum, and only in exceptional circumstances (like staff illness) are teachers amenable to diverting time for activities outside the syllabus curriculum. Secondly, it has been suggested that the television/video facility can compete for space in schools which are already desperately short of accommodation. A few educationists observed that in some schools the set was housed, for security reasons, in a special room, which could not then be used for general classroom teaching.

It is probable that such problems would be felt more strongly in secondary than in primary schools. Judging evidence from a number of other countries, Hawkrige [1982] noted that "the sequence of changing classes in secondary schools complicates scheduling problems in using broadcast materials. The primary teachers, who usually have responsibility for a single class during the entire day, have much greater flexibility in fitting broadcast materials into their teaching schedule."

Further problems contributing to unfavourable attitudes amongst secondary teachers concerned disciplinary contact between teacher and class. At a milder level, it was suggested that the contact between pupils and the television set is too passive and uninvolved to keep pupils alert and interested. Factors such as high temperatures in the classroom, too many pupils viewing one screen, and inability to follow the language, were said to lead to pupils losing concentration and falling asleep. More strongly, it was suggested that some teachers regarded the intrusion as a threat to their authoritarian disciplinary control, in as far as programme material could show or imply deficits in the teacher's expertise, or illustrate teacher-pupil relationships which were less authoritarian and more participative. Such teachers, already feeling over-extended, would then have to expend greater efforts to recover and maintain their authority in the classroom.

In this context, the views of an external commentator are of interest. An educational media specialist with the South African Department of Education and Training (DET) in Pretoria was interviewed for his opinions about Edutel in Bophuthatswana and possibilities of a similar venture in South African "black" schools administered by the

DET. Speaking in his personal capacity, he noted the problems which Edutel had experienced with educational software, and observed that software production was an area currently being contested within the South African Broadcasting Corporation and the DET. He believed that innovations such as educational television would have a greater chance of success at primary school level, partly because more primary school teachers were women and because primary teachers in general were less concerned about maintaining an authoritative, disciplinarian stance in the classroom. A further advantage of introducing the medium at primary school level was that pupils' attitudes and expectations at that stage would be less moulded by the existing authority patterns. By being exposed to pedagogical approaches which encouraged greater participation and questioning, pupils might then enter secondary education with greater expectations of their teachers and a greater inclination to question what teachers taught and the style of teaching. The new generation of pupils might then help to transform the character of secondary school teaching by demanding more from teachers.

It can be assumed that this viewpoint would not be fully shared throughout the DET in view of historically demonstrated preferences for tight discipline and controlled syllabus teaching. It could also be expected that strong differences of opinion would be expressed in conflicts about who should produce South African educational software and how its content and pedagogy should be controlled.

Returning to the Bophuthatswanan case, pupils' attitudes towards schools television could not be adequately assessed without careful research in a cross-section of school populations. The information collected in this preliminary study only provides some incidental indications.

Amongst the small, non-representative sample of pupils interviewed in a few rural and peri-urban schools, no definite attitudes were recorded and it appeared that these pupils were either indifferent to the medium or had had insufficient exposure to it to form opinions. Other incidental indicators have been mentioned previously: suggestions by the supplier company that pupils exerted pressure on teachers to show more videos, and other observations that community resentment (parents or pupils?) focused on the expense of the equipment in relation to low utilisation levels. It was also suggested that damage to solar modules caused by stones could at times be an expression of resentment, but it is not easy to distinguish accidental and deliberate damage, and the fact that such damage was said to be more prevalent in "politicised areas" close to Pretoria could reflect expressions of general resentment towards the education system rather than attitudes to the ETV project as such. It is clear that much more thorough and fine-grained research would be required to separate the complex factors which could affect pupils' attitudes towards the innovation.

Finally, a common theme in negative assessments of schools television was that compared with other pressing needs in schools, it could not be regarded as a high priority need.

Other material needs which were mentioned included more classrooms and better accommodation; improved water supply and sanitation; books and libraries; simple teaching aids, such as maps and charts; laboratory equipment; and electricity supply for a range of applications, including lighting, rather than a dedicated supply just for television/video. Competing needs are not only a problem for planners choosing priorities. Teachers, pupils and parents also have views about priority needs, and if solutions offered do not correspond with their evaluation of what is most needed, this can contribute to negative attitudes.

Educationists further suggested that the primary need was for a sufficient supply of teachers, suitably qualified, to sustain Bophuthatswana's educational expansion and reforms. They expressed scepticism that this problem could be leapfrogged by replacing teachers or teachers' skills with a limited television offering. They felt that the resources should rather have been devoted to teacher training. A commitment to teacher training and the provision of schools television are of course not mutually exclusive, although they may involve a degree of competition for resources.

## 9 CENTRALISATION VERSUS DECENTRALISATION

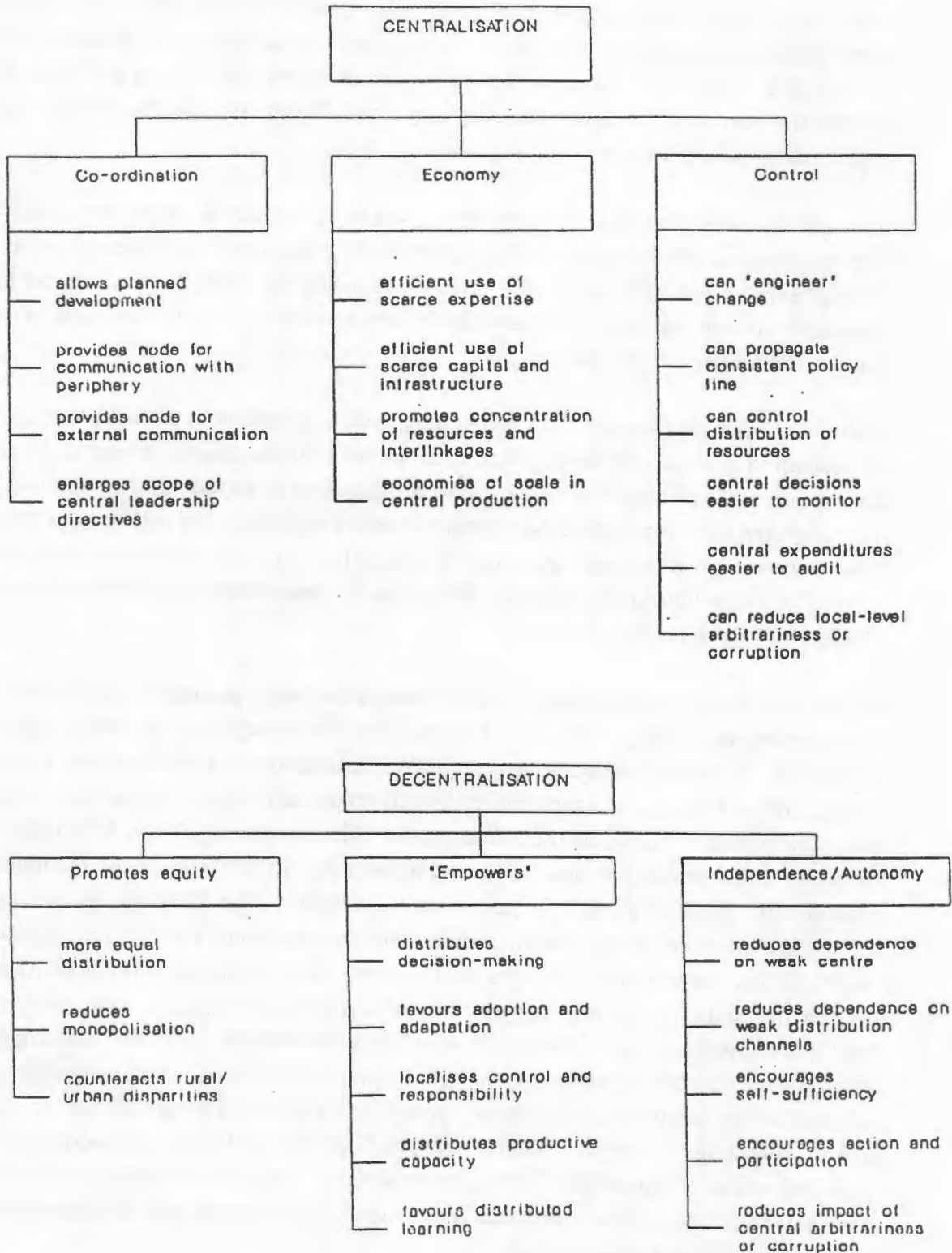
One of the interesting tensions in the Edutel project has been the interplay between centralised planning and decentralised end-use. Even the technology employed reflects this. Solar photovoltaic power systems in schools are a classic example of small-scale stand-alone technology which can be used in remote applications, autonomous from central grid supply. Broadcasting technology is, of course, usually centralised; as mass media, the purpose of broadcast television or mass-distributed videotapes is to distribute information widely from central facilities.

It could be added that state systems for mass schooling tend to show the same tension, between central planning and widely distributed "end-users" (teachers making use of central services, and finally pupils). While this is true generally, across school systems the degree of centralised control is variable and dynamic; within a particular system, it can be the subject of intense conflict.

A relevant example from such contested terrain was expressed by a South African scholar of education systems. In response to possibilities that the South African Department of Education and Training might follow Bophuthatswana in introducing schools television, he suggested that any technology which increased centralisation within the DET system should be viewed with apprehension. Similarly, from counterparts in Bophuthatswana, several of the critical opinions noted earlier can be linked with conflict about appropriate degrees of centralisation.

In various ways, centralisation issues have also been prominent in debates about "appropriate technology". Notions of appropriate technology have moved through several shifts, from early focuses on suiting capital- or labour-intensive techniques to prevailing factor prices, through to later concerns with ecological compatibility (originating mainly as a first-world concern) or the management of international dependency relationships between underdeveloped and advanced economies in the course of technology and commodity transfer (mainly a third-world concern). The changes in conception of appropriate technology can be viewed as historically relative, for they can be associated with political and economic changes in the industrialised nations, technological advances, and with politico-economic experiences of development options and constraints in underdeveloped regions. However, in most conceptions of appropriate technology, other than the most narrowly technical, the debate about centralisation versus decentralisation of productive capacity and lines of control has tended to go in favour of promoting decentralisation - both in application to the course of first-world industrial growth and to third-world development. The varied debates recognise strong interrelationships between the distribution of productive resources, the character of technology employed and socio-political configurations.

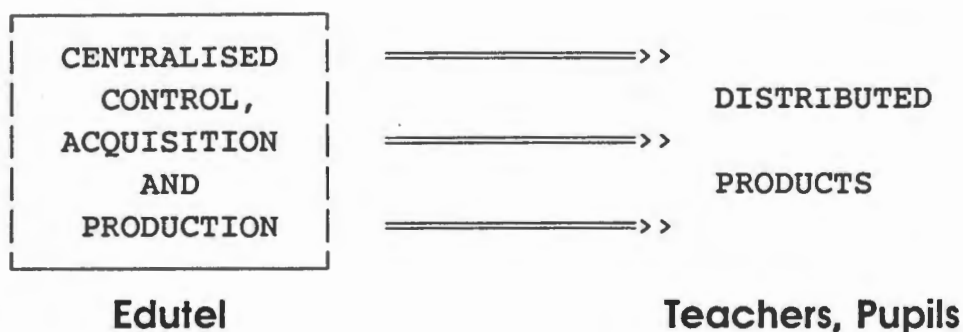
**TABLE 1** Some Developmental Features of Centralisation and Decentralisation



As applied to an underdeveloped region such as Bophuthatswana, some of the salient arguments for decentralisation or centralisation are summarised in Table 1. They address issues of motivation, efficiency, power, political control and scarcity of resources. The fulcrum of the debate is scarcity of resources (human and material resources) for development, and the policy-level decision should be how to optimise the utilisation and further development of available resources.

In relation to the educational technology represented in the Edutel project, several of the arguments summarised in Table 1 can be associated with motivations for or objections against the schools television venture.

The broad characteristics of the project can be depicted as:



Objections to the project, referring issues discussed earlier to items in Table 1, include: insufficient involvement of teachers in decision-making, hindering acceptance and decentralised responsibility; over-reliance on a weak central organisation and weak distribution channels; lack of adaptability to local needs.

Motivations for the project included: a desire for more equal distribution of educational resources, partly to help counteract rural/urban disparities; "engineered" planned change; efficient use of central resources to compensate for weakness of regionally-distributed resources (human and material).

However, it could be maintained that the "centre" (the central Edutel organisation) has had weak production and delivery capacity, and hence weak penetration into the decentralised arena of classroom teaching. The unfortunate position, by this view, is that the attempt to harness and efficiently employ scarce resources through centralised control has been less than successful due to insufficient human, financial and organisational resources at the centre. At the same time, potential advantages of decentralised development have not been achieved, partly because the method of project implementation did not promote this.

Television broadcasting or mass videotape distribution are primarily media for unidirectional communication. Feedback is of course possible by other channels, but the technology differentially empowers information flow from sender to receivers. The same is true of other mass media, for example - within the educational context - text books or radio broadcasts (except that there have been sporadic uses elsewhere of two-way radio in rural education).

The essential characteristic of such media is their ability to *repeat* messages, in many locations or across time, and that is also their economic attraction. Educationally, the repetitive function has both strengths and weaknesses, depending on the content of messages and how they are used.

Assimilation and learning require interaction with information sources. Encouraging greater interaction is an aim of many pedagogical approaches, and is often considered an important factor in the choice of educational technology. In the Edutel schools technology, at a technical level, teacher interaction with video material is restricted to being able to switch on and off and to repeat sections of the video. The facility for recording broadcasts on videocassette brings this same flexibility of use to broadcast programmes. The scope for interaction with source material of course depends more importantly on the pedagogical design of the software - whether a programme is presented as a resource or trigger material, inviting participation, elucidation, critique, or whether it functions rather as autonomous stand-alone instruction. (This applies equally to text-books.) It may well be that, properly used, video programmes could offer greater scope for interactive participation in the classroom, for instance by providing stimuli to which both teacher and pupils can respond more freely than if the teacher were presenting a lesson unaided. Judging by collected opinions in earlier sections, however, it appears unlikely this has been the trend in Bophuthatswana classrooms, and more likely that the users have been essentially "receivers" of centrally disseminated messages.

One question here is the extent to which teachers could participate in the *production* of educational programmes. Edutel's intention was to train teachers to be script-writers in the production teams (implying career change, rather than opportunities for participation by practising teachers). The level of technical and professional skills required for both preparing and presenting good television programmes would tend to limit participation, although Michel and Thomas (1985:254) have reported effective participation by trainee teachers and university personnel in Haitian educational television. One educationist from Mmabatho suggested that educational radio has been more accessible for teachers. The demands on production and presentation skills are less, and because production is technically simpler and cheaper, there has been greater opportunity for teachers to contribute. It appears that radio broadcasts are being used most constructively in Bophuthatswana at primary school level.

The expense of producing television programmes must be counted the most important limiting factor, constraining scope for participation, scope for pedagogical experimentation, and, overall, the quantity of local production that is possible. In relation to this, the costs of production must also be justified in terms of potential "market size". Unless Edutel could export its products beyond the region - and this is certainly feasible, to a limited extent - does Bophuthatswana have a sufficiently large school audience to justify the expense of extensive local television productions? The limited allocations available from Broadcasting and Education budgets point to the difficulty, and enforce an unwanted degree of dependence on imported software (produced, of course, for considerably larger markets).

It could be argued that there would be a case for regional cooperation in producing educational software. At present, political differences and disparate educational systems are limiting factors, although there must also be areas of common interest, and good educational software in some subject areas could be widely acceptable. Such conjectures, however, return one to the question of whether educational television is an optimal medium for aiding education in the Southern African region, and bring back the dilemma that to run efficiently and cost-effectively, a schools television system presupposes centralised resources of considerable magnitude, needs to achieve wide coverage, but for that requires decentralised acceptance by teachers and pupils, which can be imperilled by attempting a comprehensive service before the benefits have been established. Because of the nature of the medium, educational television with local content would be very expensive to "pilot" in underdeveloped regions, yet without proceeding through pilot stages has a reduced probability of success. Because of these factors, it is difficult to envisage other regions comparable to Bophuthatswana adopting similar educational television projects, or at least not wisely.

## 10 SELF-SUFFICIENCY VERSUS DEPENDENCY

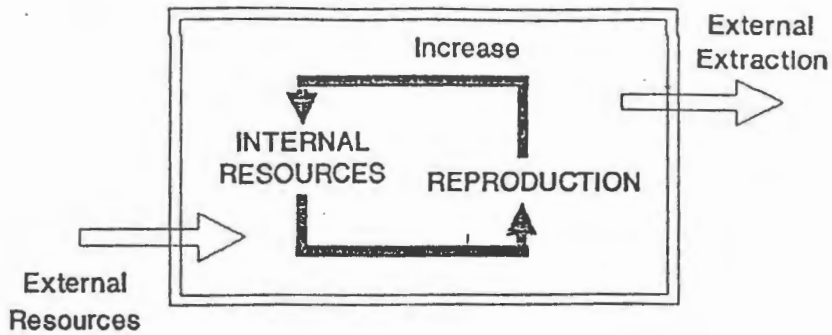
Like the issue of centralisation/decentralisation, the issue of self-sufficiency versus dependency is also a prominent theme in debates about appropriate technology, and in development strategies more broadly considered.

It is understandable that "self-sufficiency" should also often feature in national political pronouncements, especially in regions where there are perceived strategic reasons for avoiding interdependence, or where there has been a history of past (and perhaps continuing) political/economic domination.

In Bophuthatswana, "self-sufficiency" is a key theme in national political discourse, and extends into the "Popagano" philosophy of education. In this respect, Bophuthatswana does not differ from neighbouring independent states, such as Botswana. However, in common with other "national states" or "homelands" brought into being by the South African government, Bophuthatswana has a higher degree of continuing dependence on South Africa. Economically, this is illustrated by the high proportion of Bophuthatswanan wage earners who work, as migrants or commuters, in the South African economy. Politically, it is illustrated by the intervention of South African armed forces in 1988 to quell an attempted coup d'état and restore the Bophuthatswana government to power. Consequently, "self-sufficiency" can be only pursued in a rather limited terrain, and the expressed fervour for it is complicated by powerful contradictory forces.

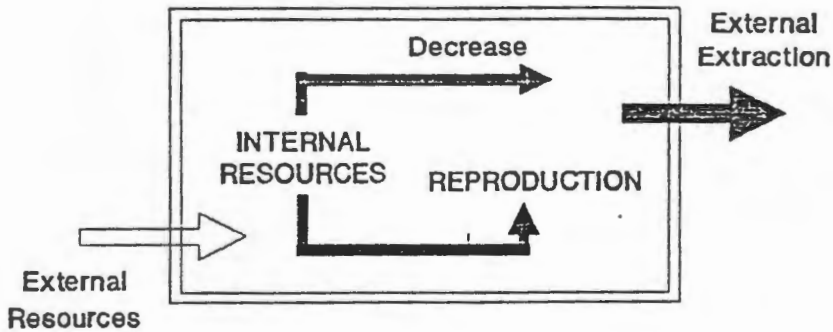
In any case, "self-sufficiency" is an awkward concept to attempt to apply, in any complex society. There are two main problems. First, the concept implies some unit around which one can draw boundaries, and the practical implications will vary according to the unit or level of organisation being considered. For example, self-sufficiency at a national economic level is different from self-sufficiency in the economy of a rural community school. Similarly, for a national unit to be self-sufficient in (for example) energy resources there is no presumption that self-sufficiency obtains at every level, or that where it does (as in an isolated village) that this is advantageous. The second problem is that the term can obscure the diverse character of exchange relationships which are virtually inevitable both between societies, and within societies at every level, some of which can be synergistic, others antagonistic. It seems more useful to consider the "terms of exchange" in particular social, economic and political relationships. However, the concept of self-sufficiency still has a useful and more specific central thrust, if it is understood along the following lines: at a specified unit-level, sufficient access to internal resources (cognitive and material resources, and powers of social control) to allow the unit both to reproduce itself and to further increase its internal resources.

This need not exclude access to external resources, as schematically illustrated overleaf, providing the above conditions are met.



In distinction to this, the notion of "dependency" focuses on social, economic and political interrelationships, specifically where the terms of exchange are adverse, thus hindering potential for autonomous development. In this sense, dependency is a concept associated with theories that view underdevelopment as an active process, caused in part by such adverse terms of exchange [schematised as [A] below]. Dependency can also be used in a less theorised way, simply to indicate dependence on external assistance for internal survival and reproduction, as in [B].

[A]



[B]

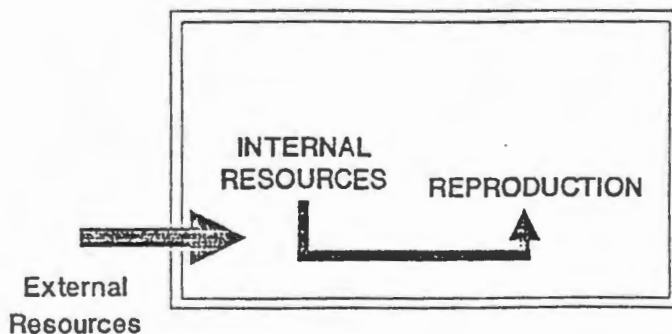


Table 2 attempts to set out some of the cognitive, material and social power resources which might be required to attain increased self-sufficiency at various levels in the school education process in Bophuthatswana. Clearly it does not provide a comprehensive picture, but helps to draw attention to areas of weakness, and to necessary interdependencies between different levels of organisation.

	INTELLECTUAL/COGNITIVE RESOURCES	MATERIAL RESOURCES	POWER / CONTROL
PUPIL LEVEL	Acquiring learning skills Knowledge competence Self-esteem	Basic material needs Finance for fees, etc.	Ability to challenge their education Career mobility
TEACHER LEVEL	Teacher competence Satisfactory social environment Self-esteem	Necessary material resources for teaching Satisfactory pay	Control over teaching process Control over educational content Classroom discipline
SCHOOL LEVEL	Calibre and supply of teachers Attainment of pupils Congruence of school and community aspirations	Physical structures Finance for operation and maintenance Finance for development	Independence from adverse interference (eg. from tribal authorities) Constructive relationship with Department of Education
EDUCATION SYSTEM LEVEL	"Emancipation from <i>Bantu Education</i> " Indigenous curriculum Planning expertise Research and development	Ability to provide schools and equipment Ability to recruit and pay teachers Finance for development initiatives Finance for compulsory education	Constructive relationship with government Power to respond to demands from teachers/pupils Ability to monitor schools effectively
	Teacher training capacity Ability to produce and distribute educational materials		
GOVERNMENT OR NATIONAL LEVEL	Sufficient organisational expertise Sufficient technical expertise and capacity  Internal legitimacy Nationhood International recognition	Economic Independence Infrastructure Viable national economy	Political Independence Political power

**TABLE 2** Some Requirements for Increased Self-Sufficiency at Various Levels in the Educational System in Bophuthatswana

Typically, school pupils are dependent on their teachers to a large degree, and (as discussed earlier) a primary educational aim of introducing schools television was to diminish the negative aspects of dependence on an inadequate supply of suitably qualified teachers. To what degree this aim has been achieved is debatable, and not fully known. No evidence has been gathered that the autonomous learning of school pupils has been enhanced. Critical educationists, who have expressed doubts that school television has been effective, tend by contrast to see *teachers* as the agents in the system who need to achieve a greater measure of self-determination, and they do not regard the school television facilities as materially contributing towards this. Low levels of utilisation are attributed partly to the dependence of teachers upon central provision of software and supporting materials.

Dependency shows itself most clearly in the hardware/software split. The frequent unsuitability of imported software, and the difficulties in the way of producing local software have already been discussed. It appears that local production is often contracted out to basically South African producing companies. There have also been reports of private contracts being sought through under-the-counter offers of extra payment to government officials. Such irregularities, while not unexpected from some sections of the business world, would be less likely to occur if Edutel had the resources to operate autonomously.

Software dependency may be typical of transfers of modern electronic technology to underdeveloped regions. It could be thought of as a kind of "transparent" dependency, because on the surface, through hardware acquisition, it appears that the receiver nation has gained tools for its own use, promoting autonomous development. However, if the receiver nation is not in a position to produce the software, then both financially and perhaps culturally there is a continuing indebtedness to the more highly industrialised producer nations. In the case of educational television in Bophuthatswana, the dependence here has been evident. The software dependency includes a limitation on inculcating a "national culture" or, at least, transmitting locally selected values through the medium (as had been hoped). One consequence appears to be that local software production, including programmes classed as adult education, may have concentrated more than is optimal on national-symbolic matters, leaving the more strictly educational content in the hands of foreign production.

Concerns about software dependency have been strongly expressed by local educationists in relation to other electronic educational technology as well, notably computer assisted instruction. Large computer companies have solicited Bophuthatswanan educational authorities (as in some other South African "national states" or "homelands") and even offered considerable quantities of free hardware. In particular, American offered computer-based literacy technology has been criticised for pushing against the view that literacy should first be taught in the mother tongue of young children; for lack of local congruence; and for downline expenses even if initial pilot facilities are offered free.

A feature of dealings between government officials and representatives of powerful companies offering technology for development, in a context like Bophuthatswana, is an imbalance in expertise. The officials may lack the technical backup necessary to evaluate what is offered, and this problem is exacerbated if decisions are made by politicians without adequate consultation. This becomes a serious concern of educationists who worry that, even if motives are benign, decisions taken between state officials and powerful companies will effectively lead to "dumping" of expensive technology in schools; that the technological solution sold to high-level decision makers will not be a useful solution to needs at grassroots level.

There are broader dimensions of dependency which plague the educational system and in particular rural schooling in a region like Bophuthatswana. Urbanisation, industrialisation and the growth of central bureaucracy take place to a certain extent within the region, reducing the attraction of rural subsistence and pulling resources and people away from rural areas. Amongst other things, this dynamic reduces the supply of willing rural teachers, and relatively well-trained teachers are attracted into other jobs, especially during the honeymoon period of an expanding government bureaucracy. Urban employment opportunities however are not sufficient to absorb extensive migration from rural areas, which are therefore likely to remain sites of subsistence and family reproduction. There is a sense in which, to use the terminology of dependency theorists, rural areas become increasingly peripheralised relative to the urban centre/s, and the terms of exchange can become increasingly adverse as relatively fewer resources flow to rural areas, and as the countryside is depopulated of its most productive people. Rural areas then become a reproductive support system for the centre, and get little in return.

But in Bophuthatswana's case, the major demographic dynamic which sucks off the attainments of the schooling system arises from proximity to highly industrialised areas of South Africa, where employment prospects are relatively much greater. Thus Bophuthatswana as a whole can be viewed as a reproductive system for providing South African labour, and the irony appears that the resources which Bophuthatswana allocates to its education system would largely bear fruit in the South African economy. This process is not total, but sufficient to establish a definite dependency cycle: within the context of Bophuthatswanan schools television, it is illustrated by the profits made by South African companies in supplying equipment or by undertaking contract software production, followed by the probability that if educational television were successful in raising the educational attainments of Bophuthatswanan school pupils, the gains would be transferred out of Bophuthatswana through migration of qualified school leavers to South Africa.

## 11 SUMMARY

An overall assessment from this study must be that the television and video facilities installed in Bophuthatswana schools were severely under-utilised, diminishing any potential benefits. Major reasons for difficulties in realising the potential value of the project, as suggested by interviewed observers and participants, included the following:

- 1 The scale of the project was too ambitious, in view of Bophuthatswana's limited financial, organisational and production resources. Other developing countries which have tried schools television with some success, such as Niger and Ivory Coast, proceeded much more slowly and started with considerably greater resources. By contrast, Edutel from the outset targeted all school standards, all middle and high schools, and all school subjects, for the educational television service.
- 2 It appears there was inadequate consultation with teachers before embarking on the project and inadequate response to feedback from teachers once the project was under way. The project has been characterised as a "top-down" and "technology-led" initiative, offering a package solution rather than a negotiated response to felt problems and needs.
- 3 It was claimed that political motivations and commercial interests played a dominant role in the decision to proceed with the project, and that this undermined the educational rationale.
- 4 The nature of a mass-medium technology such as schools television/video places the distributed users of the service (teachers and pupils) in a position of dependence upon centralised organisation, production and distribution. Central resources for Edutel's expansion were insufficient, in terms of person-power, organisation, production facilities, support facilities, and finance.
- 5 Considerable dependence on imported educational software led to dissatisfaction with much of the software available to schools. Programmes were not readily comprehensible to local school pupils, lacked environmental congruence and posed language difficulties. No clear distinction was made between instructional, educational and supplementary/ enrichment programmes in acquiring software. Teachers found it difficult to incorporate the available software in their syllabus teaching.
- 6 It has been difficult to meet requests for increased local production of software, because of scarcity of resources and production costs.

- 7 In view of the costs of delivering an appropriate schools television service, it has been questioned whether television was an appropriate choice of educational technology.
- 8 The implementation of the schools television project must be seen against other needs in the educational system (some of which educational television was intended to alleviate). There have been reports of community resentment over having been pressed to pay for the school television facilities, when other needs were seen as more immediate; low utilisation levels may add to the discouragement.

An experienced media specialist, summing up his assessment of the Edutel project, regretfully observed: "For all the right reasons, all the wrong things happened." Sincere hopes and aspirations appear to have reached only limited fruition, and this serves as a reminder that the value of any technological innovation depends on how people manage to connect the technology to existing resources, needs and wants.

## BIBLIOGRAPHY

- Adkins, Gale R  
1982 Instructional TV in developing countries. Pp 120-123 in *Media in Education and Development*, Vol 15.
- Allen D W and P R Christensen  
1973 Strategies for the use of mass communications media technologically developing nations: a strategic overview. Washington, DC: Academy for Educational Development.
- Arnove R and A Coladarci (ed)  
1973 Educational television: a policy critique and guide for developing countries. Report to Ford Foundation. School of Education, Stanford University.
- AUDECAM  
1975 La television scolaire du Niger, 1964-1971. General Report. Paris: AUDECAM.
- Baldauf R B  
1981 Educational television, enculturation and acculturation: a study of change in American Samoa. Pp 227-245 in *International Review of Education*, Vol. 27.
- Bhatt B, G W Krishnamoorthy, R Marathey and M Bourgeois  
1965 Radio broadcasting serves rural development. Reports and Papers on Mass Communication, 40. Paris: UNESCO.
- Butman R C, G W Rathens and C J Warren  
1973 Technical-economic considerations in public service broadcast communications for developing countries. Washington DC: Academy for Educational Development.
- Carnoy M  
1975 The economic costs and returns to educational television. Pp 207-248 in *Economic Development and Cultural Change*, Vol 23 (2).
- Cassirer H  
1973 Mass media in an African context: an evaluation of Senegal's pilot project. Reports and Papers on Mass Communications, 69. Paris: UNESCO.
- Cowan W D  
1989 Small photovoltaic systems for educational purposes. Proc Alternative Energy Supply Options for Developing Southern Africa Conf., Development Bank of Southern Africa, Johannesburg, 2-3 February 1989.
- 1990 Conflicts of interest, social and technical rationality: photovoltaic applications in a divided society. Pp 331-336 in A A M Sayigh (ed): *Energy and the Environment*. Oxford: Pergamon.

- Cowan W D  
1990 Educational television for South African schools: key questions for policy makers. Mimeo, Energy Research Institute, University of Cape Town.
- De Clercq F  
1984 Education and development in Bophuthatswana. Institute of Education, University of Bophuthatswana, Research Monograph 3.  
  
1986 Conflicts over rural schooling: an historical case study of educational development in Taung. Institute of Education, University of Bophuthatswana, Research Monograph 7.
- Gana F G  
1980 Foreign films in Nigerian society. Pp 14-15 in *Educational Media International*, Vol 4.
- Graaff, J F deV and M Lawrence  
1986 Rural parents and school enrolment patterns in two regions of Bophuthatswana. Institute of Education, University of Bophuthatswana, Research Monograph 6.
- Head S  
1974 Broadcasting in Africa: a continental survey of television and radio. Hirshey, Pa.: Temple University Press.
- Humphrey G L and S H Taole  
1986 A survey of the nature and provisions for the teaching of science at high schools in Bophuthatswana. Institute of Education, University of Bophuthatswana, Research Monograph 8.
- Harbison F  
1973 The Open University in the Third World. *Educational Broadcasting International*, Vol 6 (4).
- Hawkridge D  
1982 Organising educational broadcasting. London: Groom Helm.
- Holderness W L  
1986 Upgrading primary education in the seventeen circuits, 1980-1985: a celebration of achievement. Occasional Publication 2. Institute of Education, University of Bophuthatswana.
- Ingle H T  
1973 Behavioural objectives and the evaluation of educational reform in El Salvador. *Educational Broadcasting International*, Vol 6 (2).  
  
1974a Communication media and technology: a look at their role in non-formal education programs. The Information Center on Instructional Technology. Washington DC: Academy for Educational Development.  
  
1974b Technology and educational reform: the case study of El Salvador. Pp 1-6 in Instructional Technology Report, Jan 1974.
- Marchl H and E Brunswick  
1977 Educational television in developing countries. Pp 9-13 in *Educational Media International*, Vol 2.

- McAnany E G  
 1978 Success or failure of communication technology in the third world: by what criteria shall we judge? Pp 16-23 in *Educational Media International*, Vol 4.
- Michel C and R M Thomas  
 1985 High quality, low cost television for children of developing nations: a Haitian experience. Pp 249-257 in *International Journal for Education Development*, Vol 5 (4).
- Potts J  
 1979 Educational media in developing countries. Pp 25-27 in *Educational Media International*, Vol 2.
- Perraton H  
 1981 Radio broadcasting and public education in Africa. Pp 4-10 in *Educational Media International*, Vol 4.
- Republic of Bophuthatswana  
 1973- Annual Reports, Department of Education. Mmabatho.  
 1978 Education for Popagano. A report of the National Education Commission. Mmabatho, August 1978.  
 1978- National Assembly Debates. Mmabatho.
- Rodwell S  
 1980 Innovations - choices and challenges. Pp 99-105 in *Education Broadcasting International*, Sept 1980.
- Roodt M  
 1984 Bop goes the easel! - educational television becomes a reality. P30 in *Mathasedi Education Bulletin*, Vol 3 (1), Institute of Education, University of Bophuthatswana.
- Schramm W  
 1972 Quality in instructional television. Honolulu: University Press of Hawaii.  
 1977 Big media, little media. Beverly Hills: Sage.
- Schramm W and M T Betham  
 1981 Bold experiment: the story of educational television in American Samoa. Stanford University Press.
- Valerien J  
 1980 Education by television in the Ivory Coast. Pp 11-15 in *Educational Media International*, Vol 4.