THE IMPACT OF SATELLITE TELECOMMUNICATIONS ON THE UNIVERSITY SYSTEM IN BRITISH COLUMBIA: ITS EFFECTS ON INSTITUTIONAL ORGANISATION AND CURRICULA AT THE UNIVERSITY OF VICTORIA

by

VALERIE A. C. COLLINS

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We accept this thesis as conforming
to the required standard.

Dr. Peter Evans

Dr. Geoff Potter

Dr. Michael Masson

University of Victoria
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Supervisor: Dr. Peter Evans

ABSTRACT

Supervisor: Dr. Peter Evans

The study discusses the use of satellite telecommunications in British Columbia for Distance Education. It examines specifically the role of the Knowledge Network with its mandate to co-ordinate programmes and manage the telecommunication links for their transmittal.

The purpose of the study is twofold: (1) at the micro-level, to examine the effects of the technology, particularly live, interactive television, on the process and product of the curriculum, and (2) at the macro-level, to investigate the changes effected in the internal and external functions of the three universities, specifically to determine whether these institutions have become more 'open' and 'collaborative'.

Criteria for the assessment of Distance Education programmes and practices were drawn from the research in three areas: Learning Theory, Communication Theory and Adult Learning Through Educational Television. Knowledge Network administrators, practitioners and students were interviewed, and video-taped programmes and print materials reviewed. The process of Distance Education was found inconsistent with the literature in certain fundamental respects, notably in the constraints placed upon human

interaction by the mediated environment, and the lack of an active or deep-level approach to learning. The product of Distance Education was found strong in coverage of content, but weak in presentation, particularly in the visual impact of television programmes.

The internal organisational structure of the universities was examined to see whether changes had been made as a result of their involvement in Distance Education. In spite of increasing recognition given to Distance Education within the individual universities, the institutions were found to be generally conservative and resistant to modification and there was little evidence of change in internal organisation. However, the universities have become increasingly collaborative in the development of jointly produced Distance Education programmes.

[redacted]

Dr. Peter Evans

[redacted]

Dr. Geoff Potter

[redacted]

Dr. Michael Masson

CONTENTS

LIST OF FIGURES

Acknowledgement

With gratitude to Dr. Peter Evans without whose encouragement and support this study would not have been written.

CHAPTER 1

Introduction

The Need for Distance Education in British Columbia

The geographic and climatic conditions of British Columbia, with areas of rugged terrain and seasonal extremes of temperature play an important part in the distribution of the Province's population. Almost 60 per cent of the total population is concentrated in the southern coastal areas of the Mainland and Vancouver Island. Hence, it has been a challenge to the educational system to ensure that dispersed and isolated communities are as well served as those living in the south-west, with access to the Province's three universities.

Development of Distance Education Systems

British Columbia has, throughout its short history, sought ways to provide equal access to educational opportunity for all. This commitment has been supported by both Social Credit and National Democratic Party (N.D.P.) governments. The arrival of the new technology, satellite telecommunications, enabled educators to overcome geographic barriers of distance and terrain. Thus, it can be considered that the technological innovations served to

'open the door' to learning for a dispersed and previously educationally disadvantaged population.

British Columbia's Distance Education Bodies

There are different forms of Distance Education provision in British Columbia, the two most important bodies being the Open Learning Institute (O.L.I.). and the Knowledge Network. OLI courses are primarily print-based, with supplementary material on audio-cassettes. They offer three levels of programming: Adult Basic Education (A.B.E.), Career/technical/vocational programmes and degree programmes. Most of these are credit courses. The Knowledge Network is the organisation which manages and operates British Columbia's satellite-based telecommunications system, which transmits the programmes offered by the three universities, fifteen community colleges and various technical/vocational colleges, and, to some extent, government ministries.

The satellite 'footprint' covers 100 per cent of the Province, and parts of Eastern Alberta. A special convertor attached to the television set is needed to receive its signal in Victoria and Vancouver. Knowledge Network programmes are generally regarded as 'Distance' programmes

viewed off campus, either in local centres, or increasingly, at home. Programmes may be live broadcasts sometimes with recorded video inserts, or wholly recorded, and they are either interactive through a telephone bridging system, connecting incoming calls from students directly with the instructor in the studio, or non-interactive.

The Focus of the Study

The assumption behind this study is that the introduction of Distance Education is making a difference to the working of the post-secondary educational system in British Columbia, especially at university and college level. The purpose of the study is to examine the impact of Distance Education and the coming of the new information technology on the university system (not the colleges or institutes) and to show what changes are taking place.

The focus of this study is the satellite-based, live interactive television broadcasts of the Knowledge Network. The programmes discussed are those originating at the University of Victoria, rather than at Simon Fraser University or The Univeristy of British Columbia. Most of these are degree-level credit courses, in a variety of disciplines.

The study will address two distinct areas, that is, the changes that are being effected in (1) the educational experience: curriculum process and product; and (2) the organisational structure of institutions: internal and external functions.

The rationale for conducting the study at this time is that major shifts have taken place within recent years in the demands placed on the post-secondary education system and its capacity to respond. Specifically, the system has had to provide for the needs of significant numbers of adult learners returning to education, seeking professional development and updating of skills (Carney, 1978, p. 59). At the same time, innovations in information transmission and technological "hardware" have led to radical changes in methods of educational delivery. Information banks are increasingly accessible and the technology is available to make instruction more individualised and student-centered than ever before (Forsythe, 1983, p. 10). Therefore, it is pertinent to ask how the existing education system is responding to these social and technological developments, and whether understanding and adaptation within the system is keeping pace with the new demands of a post-industrial, information-based society.

Of special interest is the concept of "open" versus "closed" learning environments, and a model of these will be given. Distance Education, non-traditional methods of education, and individualised instruction are all considered as subsets of open systems.

Definitions

Distance Education.

The term Distance Education is defined by Keegan:

1. The separation of teacher and learner which distinguishes it from face to face lecturing.
2. The influence of an educational organisation which distinguishes it from private study.
3. The use of technical media, usually print, to unite teacher and learner and carry the educational content.
4. The provision of two-way communication so that the student may benefit from or even initiate dialogue.
5. The possibility of occasional meetings for both didactic and socialisation purposes.
6. The participation in an industrialised form of education which, if accepted, contains the genus of radical separation of Distance Education from other forms.

D. Keegan, 1980

(The Six Elements of Distance Education)

At British Columbia's Knowledge Network the technical medium (point 3) used to carry the educational content are geostationary telecommunications satellites, used for the delivery of television signals over a large geographic area. These signals are received by television receive-only (TVRO) "dishes" and retransmitted by cable television to peoples' homes throughout British Columbia. Open Learning

Open Learning covers a wide range of innovations and reforms in education. Included are changes that aim to improve such things as the participation of learners, instructional design, methods of transmitting information, and support of learners.

The term 'Open Learning System' is frequently linked to the concept of learning at a distance.

> Such systems are designed to offer opportunities for part-time study, for learning at a distance and for innovations in the curriculum. They are intended to allow access to wider sections of the adult population, to enable students to compensate for lost opportunities for the future. Open learning systems aim to redress social or educational inequality and to offer opportunities not provided by conventional colleges and universities. (MacKenzie, N., Postgate, R., & Schupan, J., 1975, p. 11)

Restrictions on learning are fewer than those commonly associated with learning in formal educational environments. Furthermore, opportunities for learning are deliberately planned so that access to knowledge is available to individuals in spite of barriers such as geographic distance.

A detailed account of the historical, institutional and environmental development of British Columbia's Higher Education System are provided in Appendices A and B. Special reference is made to the growth of Distance Education provision, and to the development of the concept of 'open learning' in British Columbia.

The Nature of the Study

The approach to be taken is a broad one, that attempts to provide an overview of the current situation in British Columbia with respect to the impact that Distance Education, especially Knowledge Network programming, is having upon the university system.

Thus, this study is of a general systems nature, rather than an in-depth focus on any particular institution or organisation. Discussion will be limited to the role of the three universities which are the primary users

of the Knowledge Network, and particularly the University of Victoria.

The research paradigm used is that of 'illuminative evaluation' described by Parlett and Hamilton (1972). This approach is explained in Chapter 4 Research Design. The primary concern of this approach is with description and interpretation, rather than measurement and prediction. Thus, the conceptual framework for this study is not the 'classical', or 'experimental' paradigm.

Principal and Subsidiary Research Areas

The introduction of new modes of educational delivery such as satellite telecommunication will bring about change on both a micro and a macro level. Hence, two principal questions will be addressed, that is, changes effected by Distance Education and new information technology on:

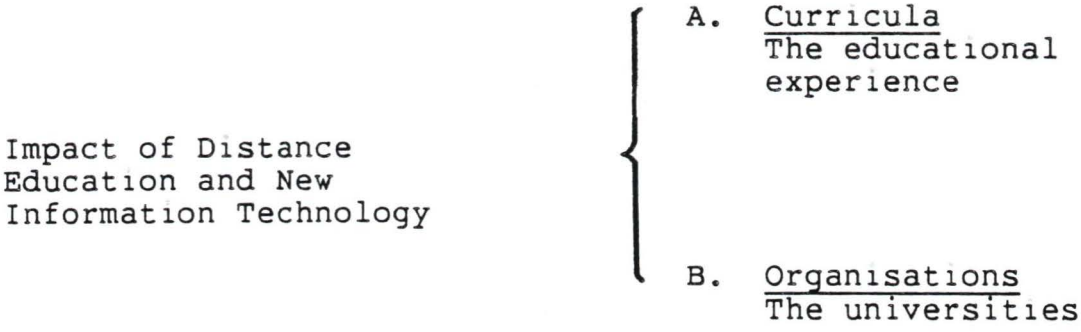
A. The educational experience - process and product of the curriculum.

B. Organisational structure of institutions within the Higher Education system of B. C. - internal and external administrative functions.

This is expressed diagrammatically in Figure 1.

Figure 1

Principal Research Areas



It is recognised that these are two major research areas. The rationale for attempting to address both questions in the same study is that, because Distance Education and the new information technologies in British Columbia is a relatively new field and little research has been conducted into its integration with the existing system, the author considers that a more valuable contribution to the field may be made by providing an overview of the current situation in its totality. As developments in the use of satellite telecommunications for educational purposes are a fairly recent innovation, not only in British Columbia but worldwide, and as comparatively little written information has been produced on the impact made upon traditional methods and establishments of education,

there is reason to believe that a comprehensive 'state of the art' document may serve a more useful purpose at this time, than a study which focuses on a single aspect.

There are two principles underlying these two research questions.

Assumptions

A. Curricula

An assumption of this study, in Area A, Curricula is that the nature of the processes of learning and communication, particularly the role of interaction need to be considered in the design and planning of instructional programmes.

B. Organisation

The introduction of Distance Education and new information technology is making a difference to the system of higher education in B. C. especially at university and college level. Specifically, it is assumed that the universities are becoming

a. more open and flexible (internally and externally)

b. more co-operative and collaborative (externally).

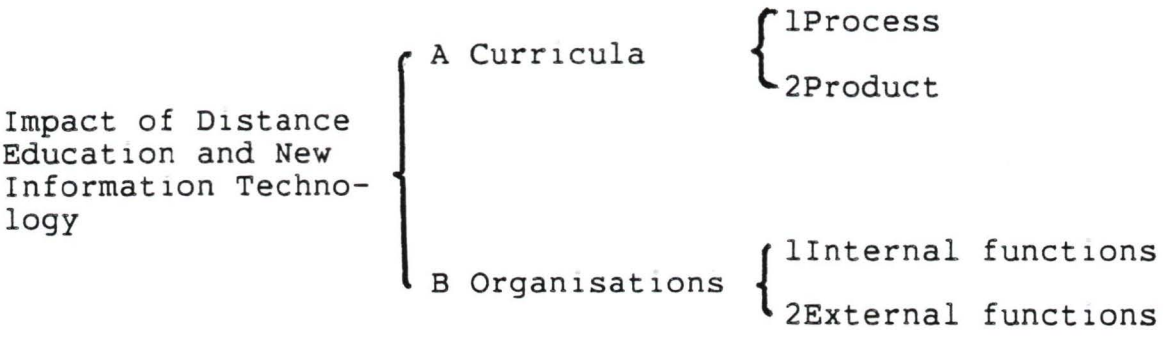
Relation of the two principal research areas to each other

A clear link exists between the two areas of study. Consideration is given to the impact of innovative methods of educational provision, specifically satellite-based telecommunication systems, upon the development of the university system. It is to be expected that the impact of any major innovation will be felt throughout the system, both at the level of classroom operation, that is, the nature of the curriculum (process and product) and therefore the experience of teaching and of learning, as well as at the organisational level, that is, the way in which the administration of educational establishments must change to accommodate the new styles and contexts of instruction. The introduction of an entity such as the Knowledge Network which makes use of this major new technology and which services the three universities in their delivery of Distance Education programmes has meant that the Universities may now have to be more co-operative than ever before. Hence the two research areas represent consideration of essentially the same phenomena, but at two different levels as shown in Figure 1.

Figure 1 can be extended to include further subdivisions:

Figure 2

Principal and Subsidiary Research Areas



Area A, Curricula will be assessed in the light of criteria drawn from the educational literature in three areas: Learning Theory, Communication Theory and Adult Learning Through Educational Television. Four to six 'questions' will be abstracted from each of these three areas, which will be applied in the evaluation of the Distance Education programmes and practices to discover whether what is being done is in keeping with current research literature and thinking in the field.

The framework used in the assessment of area B, Organisations (2. External functions) is that of Pask's Conversation Theory described in Chapter 2, Theoretical Framework.

The major questions to be addressed in this study can be stated as follows. The issues will be introduced with

a general question followed by an explanatory paragraph elaborating upon the main question.

A. Curricula

1. Process

To what extent are there differences between the Distance Education learning process and the process of face-to-face learning? In what ways are the two processes similar, and in what ways different?

Distance Education learners, instructors and administrators alike have expressed general satisfaction with the end 'product' of Distance teaching methods, in terms of print packages, instructional aids, graphics, etc., but dissatisfaction with the 'process' involved, particularly with reference to telecourses (live interactive television broadcasts). The lack of non-verbal and spontaneous verbal feedback from learners is perceived as a problem, particularly amongst instructors.

The perceptions of learners and instructors concerning the quality of the Distance Education process, compared with the process of face-to-face instruction will be given.

In the 'mediated' environment, that is where some technological system connects instructor and learner and

provides access to data bases, the human interface in the process of learning is changed. Research evidence in learning and communication suggests that learning is a social phenomenon requiring human contact and dialogue and that a two-way flow of communication is needed. "Connecting" technologies perpetuate the social and human isolation of learners. We need to know whether meaningful learning can take place in this context, and what new roles and responsibilities are created for learners and educators in the use of the new technology. In what ways do the new technologies change the relationship between the instructor, the body of knowledge and the learner?

It has been suggested (Salomon, 1979) that the use of the new technologies in education requires the acquisition of new 'coding' skills; encoding skills in instructors who create or produce messages and decoding skills in learners who receive them. As yet, little is known about the precise nature of these new thinking skills, nevertheless the question will be raised of what new encoding and decoding skills are necessary for Distance Education relative to face-to-face education. A detailed account of Salomon's research into media's symbol systems is given in Appendix C, and an outline of the principal issues in Chapter 3, Review of Literature, Section II.

2. Product

Is there any difference in the 'product' of Distance Education, that is, the curriculum content, compared with the on-campus 'product'?

Also, how does the 'medium' of delivery in Distance Education affect the 'message' or content of the curriculum, compared with face-to-face programmes, as manifested in
(a) Print materials
(b) Television broadcasts?

Distance Education learners, instructors and administrators alike are generally satisfied that the Distance Education product, that is the content of the curriculum and its style of presentation (what is seen, heard, read) is of equal or even of superior quality educationally compared with the curriculum methods and materials in classroom use.

An important area of investigation is that of whether, and in what specific ways, the 'medium' of delivery affects the 'message'. The two major 'media' under consideration here are the live interactive television programmes and supporting print packages.

The content and style of television programmes may be influenced by such considerations as the public nature of the television medium; the lack of direct interpersonal communication; time and scripting constraints; the poten-

tials and limitations of the technology, for example, use of video inserts, computer graphics, 'static' camera positions; viewers' expectations of television as a medium of entertainment with professional production standards.

The content and presentation of the print packages will be affected by such factors as the private, individualised nature of the print medium; the lack of interpersonal communication, so that much explanatory detail is included, and very complex topics may be excluded; the lack of rigid time constraints; the fact that these materials support the 'primary' medium of delivery, that is, the television broadcasts, and that they may be reviewed as required by the individual learner.

B. Organisational Change

There are two assumptions underlying this part of the study.

One is that the higher education system in British Columbia appears to be becoming more open and flexible as the universities provide for the needs of adult learners at a distance. This relates to Area A, changes within individual institutions (Internal Organisation) and to Area B, relationships amongst the institutions (External Organisation).

A second principle is that the system is becoming more co-operative and collaborative as the universities work together to provide for the needs of distance learners and to avoid duplication of effort. This relates to Area B, that is, relations amongst the universities. The existence of the Knowledge Network which acts as a service agency making available its system of satellite telecommunication for delivery of television programming provides a unifying principle for the functioning of the three universities. The institutions are forced to 'enter into conversations' with each other, through their common involvement in the Knowledge Network.

These two underlying principles will be examined in the light of the data collected in the course of the research.

1. Internal functions

> To what extent and in what ways are the internal administrative functions of the universities changing in response to Distance Education and the use of the new information technology?

It is anticipated that each institution will have made some internal changes, to provide for the needs of their

distance learners. Specifically, how is the work of faculty, administrative staff and other personnel affected? Has there been a reduction in 'contact hours' for faculty engaged in Distance Education programming? How is the 'plant' of the institution used differently? To what extent have the individual institutions become more 'open' and 'flexible' in such areas as entrance requirements and student assessment to take account of the requirements of adult learners without formal qualifications or recent study experience returning to education? Is accreditation to be given in recognition of the work and life experience of these mature learners?

2. External functions

> To what extent and in what ways are the relationships amongst the universities changing in response to Distance Education and the use of the new information technology?

It is further anticipated that there will be increased co-operation and collaboration amongst the universities who use Knowlege Network, in such areas as the joint production of Distance Education programmes, and in statements of policy.

Transferance of credit between courses and amongst institutions needs to be generally accepted. Establish-

ment of a 'credit banking' system has been suggested to facilitate credit transfer.

A Further area of concern to the study

The following issue which needs to be considered in any study of Distance Education in British Columbia will be raised in Chapter 5, Findings and discussed in Chapter 6, although it is not the primary focus of attention of this particular report.

Institutional Involvement in Distance Education

A fundamental area of concern is the 'raison d'etre' of Distance Education provision in British Columbia. We need to know on what bases the institutions of higher education have become involved in the use of Distance Education technologies. To what extent, if at all, has the opportunity for Distance Education encouraged the educational institutions to create a need for particular programmes? That is, how far has bureaucratic self-interest influenced the involvement of educational institutions in Distance Education activities? Did the technological innovations enable educators to solve a pre-existing problem, as described in the introduction to this chapter or

has the fact of the availability of the technology led to the creation of a market for its use? Also, how has the need for Distance Education amongst learners in B. C. been identified; and how far do the programmes and support services currently offered meet the needs of Distance learners?

Organisation

Chapter 1 has provided the introduction to the study and given the research questions to be addressed. Chapter 2 contains the theoretical foundations for the study, indicating sources in the literature for derivation of assumptions, hypotheses, theories and models used. Chapter 3 is the review of the literature, pertaining to area A, Curriculum, that is, theories of Learning, Communication and Adult Learning through Educational Television and the criteria used in assessment. Chapter 4 explains the design of the study, what research methods were used to collect and analyse data and why these methods were chosen. Also, the limitations of the study are outlined in

Chapter 4. The data are presented in Chapter 5. The concluding section to the study, Chapter 6, describes the extent to which the learning system is responding or failing to respond to the innovations in Distance Education and use of technology, in terms of both curriculum and organisation. Based on the conclusions and discussions of the results, recommendations are made concerning possible future developments in Distance Education projects and the concomitant response in the university system. Suggestions are made regarding potential areas of further research.

CHAPTER 2

Theoretical Framework

Naturalistic Methodology: Illuminative Evaluation

The nature of the study is primarily descriptive and discursive, rather than analytical in a clinical or scientific sense. The approach taken follows that laid out by Parlett and Hamilton (1972) in 'Evaluation as illumination: a new approach to the study of innovatory programmes.' The aim of such a model is to address and illuminate a complex array of questions concerned with the introduction of an innovation; to discern and discuss the innovation's most significant features.

According to this approach, the problem dictates the methods used, not vice versa, and different techniques may be combined to throw light on ('illuminate') a common problem. A process of 'triangulation' is used whereby pieces of evidence, for example, observations and quotations, corroboration from research, are shown to support one another in agreement about a particular conclusion. 'Triangulation' facilitates the cross- checking of other-

wise tentative findings, and is also known as 'convergent validity' or 'structural corroboration.' This is the method used in the collection and discussion of data in this study.

In illuminative evaluation, there are three characteristic stages: investigators observe; enquire further; and then seek to explain. Within this three-stage framework, an 'information profile' is assembled using data collected from four areas: observation, interviews, questionnaires and tests, documentary and background sources. In this study, to a greater or a lesser extent, all of these four sources of data were drawn upon. At any point, the researcher may find it necessary to return to the research literature for further information on a point which is emerging as significant.

Central to the approach of illuminative evalutaion are two concepts: the 'instructional system' and the 'learning milieu'. The formalised plans and statements relating to particular teaching arrangements constitute an instructional system, and may include a set of pedagogic assumptions, a new syllabus, and details of techniques and equipments. This pertains to area A of this study, Curricula (the micro-environment).

The learning milieu is the social-psychological and material environment in which students and teachers work together. The learning milieu represents a network or nexus of cultural, social, institutional and psychological variables. This relates to area B of this study, Institutional Organisation (the macro-environment).

Illuminative evalutaion concentrates on the information gathering, rather than the decision-making component of evaluation. At the conclusion to this study, it is stated that more questions were raised than answered, at least in the mind of the writer, in the course of the study. This conclusion is in keeping with the terms of reference of illuminative evaluation.

The task is to provide a comprehensive understanding of the complex reality (or realities) surrounding the programme; to take account of similarities as well as differences in elements to be compared; to deal with apparent inconsistencies and attend to personal and subjective reaction, both in others and in the person of the researcher. The data collected is 'soft' rather than 'hard' data, qualitative rather than quantitative in nature. The kinds of analysis undertaken is concerned with perceptions, impressions, judgements and opinions,

rather than testing, measurement, and deduction. Cross-checking and corroboration (triangulation) is carried out, to avoid excessive subjectivism.

In short, the aim of the illuminative evaluator is 'to sharpen discussion, disentangle complexities, isolate the significant from the trivial and to raise the level of sophistication of debate.' (Parlett & Hamilton, 1972).

A Systems Approach

A general systems approach will be taken to the central question of the study, as originally outlined by Ludwig vonBertalanffly (1972). The systems view looks at the world in terms of the interrelatedness of all phenomena. A system is defined as an integrated whole whose properties cannot be reduced to those of its parts. According to systems thinking, or cybernetics, educational curricula and organisations are designed to exercise control over the learning process. The introduction of new technologies and distance methods of education changes the patterns of communication and control in the learning environment. It is precisely the nature of these changes that is of concern here.

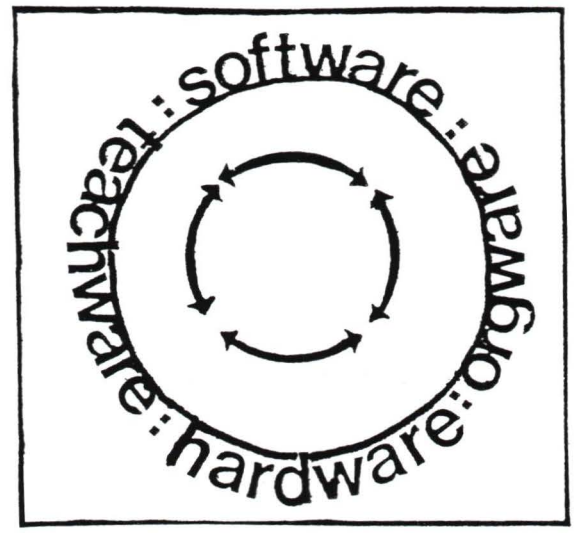
The study will be concerned with the characteristics of a macro system (organisation) and a micro-system (curricula) thus linking systems thinking to teaching, learning and innovation. Both the macro and micro environments are described and evaluated according to the illuminative research paradigm described above, that is without the intervention of the researcher in any role other than that of observer and enquirer. The systems under study are in no way altered or manipulated, but merely investigated as they exist.

Evaluation Model

A model proposed by the Russian systems engineer, Dubrov (1979) provides a general framework for consideration of the central research area. This model illustrates the elements within an educational system that must change in order for innovation to become integrated. Each of the four elements are examined in the course of the study in the light of illuminative evaluation, through a combination of direct observation and interviews in the elements of hardware, software and teachware, and research and interviews in the area of orgware. This model has been used deliberately in British Columbia in the implementation of the Knowlege Network (Forsythe, 1983).

Figure 3

Dubrov's Systems Model (1979)



Hardware - Devices and techniques that make the innovation possible (e.g. a t.v. set, communications satellite).

Software - Algorithm of knowlege processes used with hardware (e.g. a computer programme, t.v. series).

Teachware - Teaching use of new innovation (e.g. a training course).

Orgware - Organisational changes needed to integrate innovation (e.g. funding, personnel, structural changes).

The elements of hardware, software and teachware pertain to the first research question, Area A. Change in Curricula. The type of 'hardware' under discussion is

satellite telecommunications systems. The Distance Education courses represent the 'software'. The many practitioners have recently formed a co-ordinating committee for Distance Education to provide the 'teachware'. The element of 'orgware' pertains to the second research question, Area B. Change in Organisational Structure.

All these aspects were considered in integrating the experimental use of satellite telecommunications into the higher education system so that its use would be seen as an extension of the educational environment and not as a separate, incremental activity.

Learning and Communication

The first assumption upon which the study rests is that learning and communication are inter-related processes, the nature and function of which need to be considered in the design and planning of instructional programmes. A review of educational literature in three areas was conducted: Learning Theory, Communication Theory, and Adult Learning Through Educational Television (see Chapter 3 Review of Literature). The purpose was to conceptualise the nature of those processes and to establish what must be known and put into practice by educa-

tionalists to ensure that they communicate effectively and that their students are given the best opportunity to learn. Particular emphasis was placed upon the role of interaction in the processes of communication and learning, especially as this relates to adult learners at a distance, studying in a 'mediated' environment where a technological system links them to the instructor.

Open and Closed Systems

The second principle upon which the study is based is that the learning system in B.C. has become increasingly 'open' as the concept of 'open learning' has gained acceptance. At this point the concept of an 'open system' needs to be clarified. General systems thinking distinguishes between 'open' and 'closed' systems (von Bertalanffly, 1972). A system is open if some exchange takes place between the organism and the environment, if it is closed, no such exchange takes place.

In the educational context, an open system is one which facilitates human learning by providing access to learning resources that were previously inaccessible. It is also concerned with the human process of learning and the environment of those who want to learn. The concept

of open learning implies an approach to education which is driven by the desire to accommodate the individual needs of the learner in their particular social context. Academic programmes and establishments are thus 'open' in terms of such criteria as entrance requirements, date of entry, time and place of study, rate of progress and accreditation. Open learning is less rigorously structured than traditional approaches and is often more in keeping with the needs of adult learners (MacKenzie, 1975).

In this study, one of the questions asked during the interviews with Distance Education instructors and high-level administrators specifically requested comment on to what extent and in what ways British Columbia's universities have become more open in these respects, in response to the introduction of Distance Education programmes and technologies.

The Learning Environment in British Columbia

The learning environment as it is emerging in British Columbia reflects both these views. However, unlike the open learning systems approach of the Open University in Britain, this system is a 'hybrid'. It contains a number

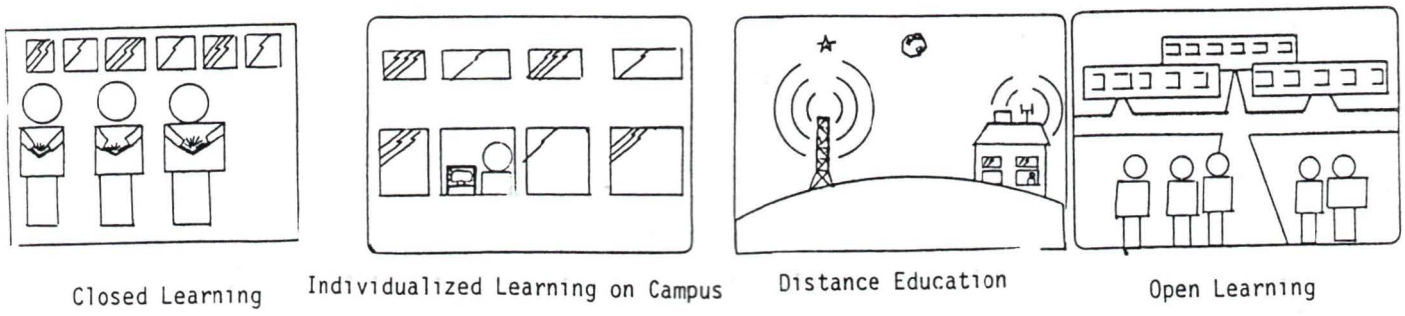
of traditional and non-traditional institutions making use of new technology.

Types of education can be seen on a continuum ranging from the traditional "closed" environment where students attend classes on a full-time basis, in schools, colleges, or universities, through individualised learning on campus, to distance learning, and, at the other end of the continuum, open learning. There, students have ready access to knowledge in which they engage on a part-time basis either at learning centres, at home or in impromptu groups.

Figure 4

A Continuum of Educational Service:

Open and Closed Systems (Forsythe, 1982)



As one moves along the continuum from a traditional 'closed' model to a non-traditional 'open' model of education, the relationship of the learner to the institution and of the learner to the instructor changes. The focus of the student in that environment also changes. Most students who use the non-traditional systems are part-time. In the conventional campus environment, students are usually full-time. The move to provide opportunities to part-time students has spurred the use of telecommunications. The adaptation of a similar approach in the campus setting is now beginning.

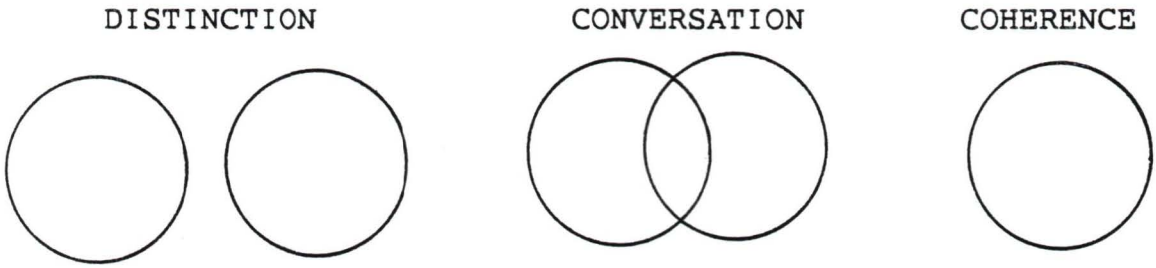
Conversation Theory

One of the principles upon which the study is based is that, following the creation of the Knowledge Network, the university system has become more co-operative and collaborative than ever before. The universities retain their autonomy and self-governance, yet work together to offer a comprehensive educational service to Distance Education students and to avoid duplication of effort. The term 'co-operative individuality' (Forsythe, 1982) describes this balance between the shared and autonomous nature of operation amongst the universities.

This relationship will be discussed within the conceptual framework of 'Conversation Theory' (Pask, 1980). In The Limits of Togetherness, conversation is defined thus: 'Conversation maintains the autonomy or identity of systems and also generates independencies between systems (human, societal, or others), which is a prerequisite of dialogue.' Pask refers to the logic of 'distinction' and the logic of 'coherence' to delimit the extremes of independence/lack of agreement and total unity/agreement or 'supersaturation'. In order for a conversation to take place, there must be a balance between these extremes, thus:

Figure 5

Pask's (1980) Conversation Theory



As Lee (1982) explains in The Practice of Conversation Theory: Understanding and Encouraging Innovation.

> In a system, each subsubsystem must have an integrative tendency to function as part of the whole and a self-assertive tendency to preserve its individual autonomy. These two tendencies are opposite but complementary and, in a healthy system, there is a balance between integration and self-assertion. This balance is not static but consists of a dynamic interplay between the two complementary tendencies and makes the whole system flexible and open to change. If these integrative and self-assertive tendencies are isolated from each other, an imbalance occurs in the system.

The principle of co-operative individuality is examined in Area B, Organisational Structure, part 2, where the external or inter-institutional relationships are discussed. Evidence is given from documentary and other sources to indicate the nature and extent of institutional collaboration in provision of Distance Education programmes.

CHAPTER 3

Review of Literature: Educational Theory

Section I : Learning Theory

Introduction

This section of the review of educational literature deals with theories of learning and how the process of learning has been defined and conceptualised within the major schools of thought. Particular attention is paid to recent findings in the area of brain functions and cognitive processes, visual representation and mental imagery, attention, individual differences in learning style and the particular characteristics of adult learners. The comparative effectiveness for learning of the various teaching methods is briefly discussed.

From this review of the research literature, criteria are established for the evaluation of the data. These criteria are summarised at the end of each section. Detailed commentary on the implications of this are reserved until Chapter 6 'Conclusions and Discussion'.

What is Learning?

Two major psychological schools of thought regarding learning may be identified: the behaviourist (stimulus-response) theory and the cognitive field theory.

Most of the definitions of learning in print originate from the behaviourist tradition where learning is considered as 'a relatively permanent change in behaviour which occurs as a result of reinforced practice.' (Kimble, 1961) or 'a process whereby an organism changes its behavior as a result of experience' (Gage and Berliner, 1974).

The conception of learning within cognitive field theory places less emphasis on 'reinforced practice' leading to 'change in behaviour' and is more concerned with modifications to inner thought processes or knowledge structures (Gagné, 1970 (a)).

Behavioural approaches regard the learner as one who is acted upon by events, one who 'responds' to some 'stimulus' and who will continue to respond in the same way if positively reinforced to do so. However, it is the learner's perceptions of the world and her interaction with ideas and phenomena presented by the environment which are the focus of the cognitive approach. Here, the role of the teacher is to act, not as one who provides appropriate

stimuli and reinforcement to promote learning, but to 're-structure the environment' so that these cognitive insights have a chance to occur.

Each school contains a variety of sub-theories, and individual theorists are often in disagreement with others in their camp. Cognitive theory includes elements of dynamism, general organisational patterns, and gestalt theory. Stimulus-response theory is usually associated with classical and operant conditioning, rote learning, and associationism. Cognitive theory recognises elements of general consciousness, insight and intuitiveness which cannot be explained by known connections among learned events, whereas stimulus-response theory views the mind as changing in reaction to connections built up through series of trials and associations.

A third major school is now developing. Theorists in this group are attempting to reconcile the ideas of the other two schools so that a single, unified learning theory may be developed (Roueche, 1977). This approach to the understanding of learning recognises that elements from the behaviourist tradition such as the notions of practice, repetition and positive reinforcement are educa-

tionally valid and that these are not incompatible with the elements from the cogitive school where emphasis is upon mental processes of perception, comprehension and memory. Therefore, neither an extreme behaviourist nor an extreme cognitive position is supported here as the 'correct' approach, but rather, learning is regarded as a complex and multi-faceted process, a function of the interaction between external events and inner thought processes. This was the conceptualisation of learning that provided the basis for the evaluation of the Distance Education practices and programmes considered in the study.

Types of Learning

Distinctions have been made between different kinds of learning tasks including classical and instrumental conditioning, discrimination learning, serial learning, paired association, free recall and problem-solving, although there is some debate as to whether these tasks represent many discrete types of learning, or merely variations of some common underlying process. The view taken here is that learning may take place by a variety of methods, according to the nature and complexity of the task, and the sophistication and preferred learning style of the

learner. Individual learners may well be able to adapt from one 'method of attack' to another, as the need arises.

The Functions of the Brain

Contemporary learning theorists generally represent the cognitive approach to learning and place renewed interest in the brain and its functions; in right and left brain lateralisation, in how information is perceived, processed, and stored in short-term and long-term memory, and in how it may be retrieved.

According to Wittrock (1978, 1980) research on the brain and its cognitive processes emphasises the generative nature of learning and the reciprocal interplay between environmental events and the learner's generative cognitive processes. This view of learning is opposed to the behaviourist model which suggests that learners are passive recipients acted upon by external events, or 'empty vessels' waiting to be filled with knowledge. Thus, learners are not passive recipients of information presented to them. They actively construct their own meanings from the information they are taught.

Wittrock's conclusions, drawn from research in neuroscience, cognitive psychology and education can be summarised thus:

> Learning is a generative process that is influenced by previous learning and the cognitive and affective attentional and encoding processes and strategies of the brain. The brain actively selects, attends to, organises, perceives, encodes, stores and retrieves information. It uses information processing strategies such as analytic and holistic strategies, to construct organisations and meanings from stimuli. (Wittrock, M. C., 1978, p. 64, p. 99)

Cognitive psychologists are concerned with the organisation of knowledge in the brain, and how new information can be integrated with existing knowledge. Clearly, the more familiar is the learner with the concept under discussion, the more readily will information be absorbed. Teachers can employ certain strategies to provide their students with background knowledge before introducing a new topic. Ausubel (1963) has referred to 'advance organisers' which 'set the scene' or provide 'readiness' for the introduction of unfamiliar material. Links with known or familiar concepts will help learners to integrate the new with existing knowledge.

Encoding of information in the brain

Several researchers have questioned the accuracy of the verbal versus spatial dichotomisation of the encoding[1] processes of the brain, that is, that the left brain is predominantly verbal, the right brain predominantly non-verbal, spatial or visual in function (Bogen, 1975). Recent research has demonstrated that the hemispheric functions of the brain are distinguished more by the way in which they organise or represent information than by the type of information they organise. Bogen uses the terms 'propositional' and 'appositional' to characterise the functions of the left and right brain hemispheres, respectively. However, it is not possible to draw any definite conclusions about the nature and function of hemispheric internalisation, and the implications for educators, given the present state of Knowledge in the field.

Wittrock (1977) reports the findings of human information-processing which investigate how people use their brains to generate models of reality and to organise, code and store abstract and concrete representations of experience in memory.

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(1) In neuroscientific research, the term encoding refers to the way in which external events are processed and stored as information in the brain.

Several of these studies suggested that self-generated verbal or imaginal representations of the information to be learned facilitated learning. Also, teaching strategies that elaborate verbal information in a synthetic spatial or imagery strategy can facilitate memory. In simple terms, use of pictures, metaphor, or highlighting of key words can increase comprehension and memorisation of verbiage.

Research evidence on the role of visuals, actual or imagined, in promoting learning, especially of abstract or complex information, is of direct relevance to all educators, but especially to those working in a visual medium such as television. Television as both an audio and a visual medium can be considered as addressing the 'whole brain', left and right hemispheres, combining both visual and verbal language in its multi-channelled capacity. The power of television to attract and sustain attention and to influence the behaviour of viewers has been well documented by those concerned with the effects of mass media. The potential of television as an instrument of education is only now being fully realised. The importance of television and visual literacy will be discussed further, in Sections II and III of this chapter.

Attention

Attention has long been a centrally important topic in the study of learning, especially to the cognitive theorists. Clearly, learning will be greatly affected by the ability of the learner to maintain attention span for periods of time without becoming distracted. Neuroscientists and cognitive psychologists are constantly developing models and measures of attention and arousal, so that it should be possible in the future to influence attention among different students, subject matters and learning tasks. These data and models indicate the constructive or generative nature of attentional processes. Attention is influenced by the past experience and present plans of the learners. The stimulation of attention might involve modifying a learner's goals and intentions, or using novel instructional stimuli, subject matter and textbooks.

Recent research on attentional mechanisms of the brain suggest that these often respond to novelty, to the unexpected or unusual, in keeping with cognitive dissonance theory. Whereas the behaviourist school of learning advocates repetition and reinforcement, cognitive

approaches suggest something different, to avoid production of habituation and boredom.

The advantage that the instructor teaching via educational television has over the instructor in the classroom is the availability of the technology to produce novel and stimulating visual and auditory stimuli, such as cannot be so readily produced in the class, for example video inserts, computer graphics, music and special sound effects. However, the television teacher should be aware that, if the viewer's attention fails to be attracted and sustained, their presence can be 'tuned out' at the flick of a switch.

Individual Differences in Learning Style

Research indicates that learners respond differently to the same stimuli, and the differences in response relate to their cognitive styles (Wittrock, 1980). Cognitive styles have been described in a series of paired, contrasting characteristics (Kogan, 1971), for example learners may be convergent or divergent thinkers. For the former, thinking is directed towards finding the one 'right' answer. For the latter, thinking branches outward

in several directions and no single right answer will be sought or found.

Pask (1976) distinguishes 'serialists' from 'holists'. The serialist learner is one who is a low-order worker who operates in careful, ordered steps to reach a conclusion; the holist is a high-order thinker who works downward from an overall conception of the field, rather than upward in a series of incremental stages. Similar to this distinction is that between the 'inductive' and the 'deductive' learner. The inductive thinker works from examples towards a general thesis statement or conclusion; the deductive thinker works from the general statement to the particular.

Witkin (1977) describes as 'field dependent' the student who relies on external cues from others in order to learn, and as 'field independent' the student who relies upon internal cues and prefers to work alone. This student is more likely to be more analytical, with highly developed spacial skills and a tendency toward achievement in mathematics and science subjects.

Kagan (1966) notes a difference in the style of response preferred by students. Those who are 'impulsive'

will speak out before careful consideration, whereas those who are 'reflective' take time to formulate a response. This may be a function of the students' personality type, whether this is extroverted or introverted. Extroverts are those who enjoy talking and leading discussion; introverts are reluctant to participate in public debate.

The implication of these research findings for educators is that teaching can be differentiated and learning sometimes improved by matching cognitive styles to organisations of instruction (Pask & Scott, 1972) and to the type of mental elaboration that the learner employs (Krevoy, 1978). It may be the case that learners have not one but many styles and strategies for learning and that they move amongst them as the task demands. An advantage of distance education and use of the new technology is that learning becomes increasingly individualised. The distance learner is more autonomous than her on-campus counterpart and is potentially at greater liberty to employ the learning strategy considered appropriate for the task to be accomplished. However, adult learners with 'rusty' learning skills and who lack the support of a peer group and informal contact with their instructor, may experience

difficulty in establishing their preferred learning style, or in deciding which method is best suited to the particular problem.

Adult Learners

The age of the student is an important factor in learning. The design of a programme of instruction for adult learners will be very different from a programme designed for adolescents, for example, not simply in terms of the level and complexity of the work involved, but also, the characteristics of adult learners are different.

Research conducted into adult learning suggests that adults have the same capacity to learn as younger students, but their 'learning mechanisms' are more likely to default (Rogers, 1982). Potential problems may include the danger of overloading short-term memory; a greater propensity to distraction; the possibility that the information being taught may conflict with the adult's past experiences or with their personal values. When working with adults, it is especially important for the instructor to attempt to link the content of the lesson with the learner's prior experience.

Of importance here is the question of the learner's perceptions of the 'relevance' of learning material to their course of study. One of the most common reasons given for adults failng to complete their Distance education television courses is their perceived 'lack of relevance' (Bates, 1981). Furthermore, adult learners may enter the instructional programme with a poor sense of their self-worth as a learner having had past experiences in the classroom which have left them with a sense of failure. Study skills are likely to be unpractised, and adults have outside responsibilities and commitments that limit the time available for studying. These special characteristics of adult learners need to be borne in mind by the planners and instructors of Distance Education courses, and their support staff. If problems such as those described are likely to be experienced by adult learners, then the job of the Distance Education instructor is made all the more difficult. Just as additional help is needed, the geographic and social isolation of the learner militate against the availability of personal assistance and reassurance. Provision of special support services is already made at the universities and there may

well be a place for training guidance for learners who choose to study in the Distance mode.

Learning Theory - Implications for Educators

The findings of recent research into brain functions and learning mechanisms reported here can be summarised thus:

1. Learning is not a single, but a multi-faceted activity. An individual learner has a potential for different kinds of learning.
2. Learning is a 'generative' or creative activity, the outcome of the interplay between environmental events and the learner's cognitive processes.
3. The left and right hemispheres of the brain, whilst overlapping in many of their functions, may be different in the type of information they process and also in their information processing strategies.
4. Use of pictures, actual or imagined can facilitate learning and memory.
5. Attentional processes are generative or constructive, and are important for learning.

6. Attentional mechanisms often respond to novelty, e.g., surprise or unexpected stimuli.
7. Learners respond differently to the same stimuli, indicating that there are important individual differences in learning style.
8. Adult learners have the same capacity for learning as younger students, but their learning mechanisms are more like to default.

These conclusions would seem to imply that instructors need to take account of the nature of the learning task, the variety of learning that this demands, and the individual's preferred learning style. Learners should be viewed as being active participants in the educational process rather than as passive recipients of knowledge.

The manner of presentation of information is important. Information should be structured and communicated to take account of previous knowledge. Highlighting of key points, use of visual displays or guided imagery may improve understanding and memory. Special consideration needs to be paid to the needs of adult learners, particularly in ensuring that learning units are 'relevant' both to personal and professional interests and to the educational context.

It was noted in Chapter 1 that the technology is available to make instruction more individualised and student-centred than ever before. Typically, the Distance Education student works alone and at home, using the print package, televised lectures or home computer to provide the stimulus for learning. On-campus also, students interact with technology, for example in sophisticated language laboratories, with only occasional teacher guidance. This is a very different educational environment from that of the traditional classroom. Here the person of the teacher is physically present to provide the knowledge base and guidance needed for learning. The findings of Wittrock and others in the field of cognitive psychology suggesting that learning is a generative process, the outcome of 'the reciprocal interplay between environmental events and the learner's generative cognitive processes' seem to fit well with modern developments in the style of educational delivery, particularly in the use of new information technology which facilitates individualised learning, both on and off-campus, and in Distance Education, where the student is largely responsible for her own learning.

Teaching Method and the Development of Cognitive Skills

A recurrent question in educational planning concerns the method of delivery of information, whether learning will be most facilitated by the lecture method, seminars, tutorials, class discussions or by individualised learning methods. The scores of experiments that have been conducted to measure the comparative effectiveness of instructional methods, in terms of students final examination results show that there is no appreciable difference in the effectiveness of these methods to convey information or knowledge (Gage & Berliner, 1979). However, there are important differences in the kinds of skills, cognitive, affective or psychomotor, promoted by the various teaching methods.

Individualised learning methods and interactive methods such as discussion are regarded as superior to the lecture for teaching more complex cognitive and affective objectives, because they permit a greater degree of student activity and/or opportunity for 'feedback'. The lecture presentation is thought to be particularly unsuitable for teaching psychomotor skills, and individualised methods rate far more highly here.

When considering choice of instructional method, the question is less of whether one style is better than another in 'getting final results' but of what kinds of thinking skills each method is best suited to promote. For example, the lecture method is effective in communicating information, but it may also promote a receptive or passive approach to thinking and learning, while the discussion method is useful in fostering the ability to undertake critical thinking in the appraisal of ideas (Gage & Berliner, 1979). Discussion teaches the ability to reason and argue, and participate in the exchange of ideas with others.

> The lecture is especially successful in securing the attention of students to what is being said, but that it evokes primarily those thoughts which are appropriate to the following and comprehension of information, while the discussion is more successful in evoking complex problem-solving types of thought. (Brown, 1953, p. 56)

In the mediated environment, such as in the use of television for Distance Education, there is little opportunity for discussion to occur between instructor and learner, or amongst groups of learners. Some Knowledge Network programmes are 'live interactive' broadcasts, so that some dialogue can take place by telephone, but in a

limited sense only. Hence, there is a tendency towards lecture style presentations. The implication of this is that Distance learners may be advantaged in receiving appreciable quantities of information, hopefully presented in a stimulating manner, but disadvantaged in that they may soon become passive viewers, there to absorb rather than to interact with information.

Conclusions

Implications of Research for Teaching

There have been numerous attempts made to discover how learning occurs and for many learning theorists, the attempt to answer this question has taken a lifetime's work. Early in the development of modern psychology in the 1920's, differences in interpretations were the basis of vigorous arguments among the various theoretical schools of psychology. In recent years, the differences have become less clear-cut and the controversies about them quieter. Now, rather than looking on theories as true or false statements about how learning operates, system builders consider the theories as more or less ade-

quate ways of summarising present knowledge and of facilitating the gathering of new knowledge. Theorists now differ, not so much in their biases about the nature of learning as in the areas they prefer to study and the methods they prefer to use.

It would be gratifyingly straightforward, were we able to state with certainty how learners learn, for then we would be able to draw firm conclusions about how teachers ought to teach. However, no one theoretical position seems to suffice in the wide array of contexts in which learning takes place. There are too many variables to be taken into consideration, such as the individual differences in students and teachers, the nature of the material and the task, the facilities available and the context of instruction. A single theory of teaching or of learning will not be able to answer for the multitude of factors which influence the process of learning. Joyce and Weil in 'Models of Teaching' (1972) challenge the idea that there is any such thing as a perfect model and suggest that there are many kinds of 'good' teaching and that the concept 'good' when applied to teaching is better stated 'good for what' and 'good for whom'. Thus, it would be

naive to believe that there is any one right way, any single best model. A more profitable approach is for teachers to plan instruction to capitalise on how certain teaching methods facilitate learning and thinking, taking into consideration the variables of the particular teaching/learning situation in which they are involved, and to be fairly flexible in their approach.

Educators have long been pursuing the discovery of the one best way to teach. However, as it has been stated the current belief is that different students will profit differentially from identical presentations and there is no single best instructional process or format which will provide optimal learning for all students (Cronbach, 1967; Gage, 1967; Jensen, 1968; & Dwyer, 1972a).

The rationale for 'aptitude by treatment interaction' (ATI) research is the contention that students learn from instructional presentations to the extent that their aptitudes enable them to interact with the materials. The ATI movement suggests that it may be possible to identify which individual difference variables interact with specific types of instructional presentations as joint determiners of academic achievement, so that eventually it will

be possible to match students to specifically designed instructional formats which will ensure maximum levels of achievement. Further attention will be given to the question of learning from instructional technology and matching the medium to the task and the learner in Section II of this chapter.

From this review of the literature in the area of Learning Theory, the following five principal criteria were determined, to be used in the assessment of Distance Education programmes and practices.

Learning Theory: Evaluation Criteria

1. To what extent, and in what ways, are general learning principles followed?
2. How far is the apparent approach to learning consistent with programme goals?
3. How much, and in what way, is attention given to individual differences in learning style?
4. How far, and in what way, are attempts made to attract and sustain audience attention?
5. To what extent, and how, is generative learning encouraged?

Section II : Communication Theory

Introduction

In order to assess area A, Change in Curricula as a result of the new information technology, a review of the literature in Communication Theory was undertaken. The purpose was to ascertain some fundamental principles relating to communication, particularly in the area of communication in the 'mediated' environment. These criteria were used in the assessment of the Knowledge Network programmes and interviews with participants.

This section describes the two principal approaches to understanding communication, the 'process' and the 'semiotic' schools. Ten models of communication are presented, according to the extent to which they reflect these two 'extreme' alternatives. The importance of 'feedback' or interaction for communication is emphasised, and it is noted that in the 'mediated' situation, human interaction is made difficult or even impossible.

The choice of medium of communication is shown to make no significant difference to the effectiveness with

which information can be conveyed. Understanding of a message may be influenced, however, by the symbolic code through which it is delivered and may activate different mental skills in the receiver.

Approaches to Communication

Communication may be considered as a complex, interactive process by which meaning is conveyed amongst individuals by verbal and non-verbal means, in face-to-face or mediated situations, in specific social and cultural contexts.

There are two main schools in the study of communication, the first of which views communication as the transmission of messages. It is concerned with how senders and receivers encode and decode, with how transmitters use the channels and media of communication, and with matters of efficiency and accuracy. This school sees communication as a process by which one person affects the behaviour or state of mind of another. If the effect is not that which was intended, communication failure has occurred at some stage. This has been called the process[2] approach

(Fiske, 1982).

The second school sees communication as the production and exchange of meanings. It is concerned with how messages or texts interact with people in order to produce meanings. It uses terms like 'signification' and does not consider misunderstandings to be necessarily evidence of communication failure; they may result from the cultural differences between sender and receiver. For this school, the study of communication is the study of text and culture and the main method of approach is semiotics (the science of signs and meaning).

The process school tends to draw upon the social sciences, psychology and sociology in particular, and addresses itself to acts of communication. The semiotic school tends to draw upon linguistics and the art subjects and addresses itself to works of communication.

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(2) In Communication Theory, the term 'process' is used in a different way from the same term used in an educational context. Here, emphasis is upon the process of an act of communication as opposed to the meaning of communication. In educational research, distinction is made between the process and the product of teaching and learning.

Each school interprets communication as social interaction through messages. The process school defines social interaction as the process by which one person relates herself to others or affects the behaviour, state of mind or emotional response of another, and vice versa. Semiotics, however, defines social interaction as that which constitutes the individual as a member of her culture or society.

The two schools also differ in their understanding of what constitutes a message. The process school sees a message as the intended meaning of the sender, conveyed by whatever means. For semiotics, the message is a construction of signs which, through interaction with the receivers, produce meanings. The emphasis shifts away from the sender towards the text and how it is 'read'. Readers with different personal experiences and cultural backgrounds may discover different meanings in the text, but this is not necessarily evidence of communication failure.

Parallels may be drawn between the two schools of thought in Learning Theory, behaviourist and cognitive, and the two schools of thought in Communication Theory, process and semiotic. The first in each case (behaviou-

rist and process) tend to be simple, linear, simplistic and mechanistic in nature. The second in each case (cognitive and semiotic) are more complex, holistic, interactive and humanised. Each represents an extreme position. A comprehensive view of both learning and communication needs to draw upon both schools of thought.

Models of the Communication Process

Certain components are common to all acts of communication and these form the basis of various models of communication which attempt to describe diagrammatically what is involved in complex acts of communication.

Aristotle in 'Rhetoric' defines three communication components, the speaker, the speech, the audience. Contemporary models can be seen as an embellishment of these essential elements.

Communication models can be placed on a continuum from the process models at one extreme, where communication is seen as a simple, linear transmission of messages in a one-way direction, to the semiotic models at the other extreme where communication is a complex interactive exchange of meaning. A selection of communication models

will be presented, to indicate the ways in which the act of human communication has been conceptualised by various theorists. One's approach to teaching will be different according to one's conception of communication.

Figure 6

A Continuum of Communication Models

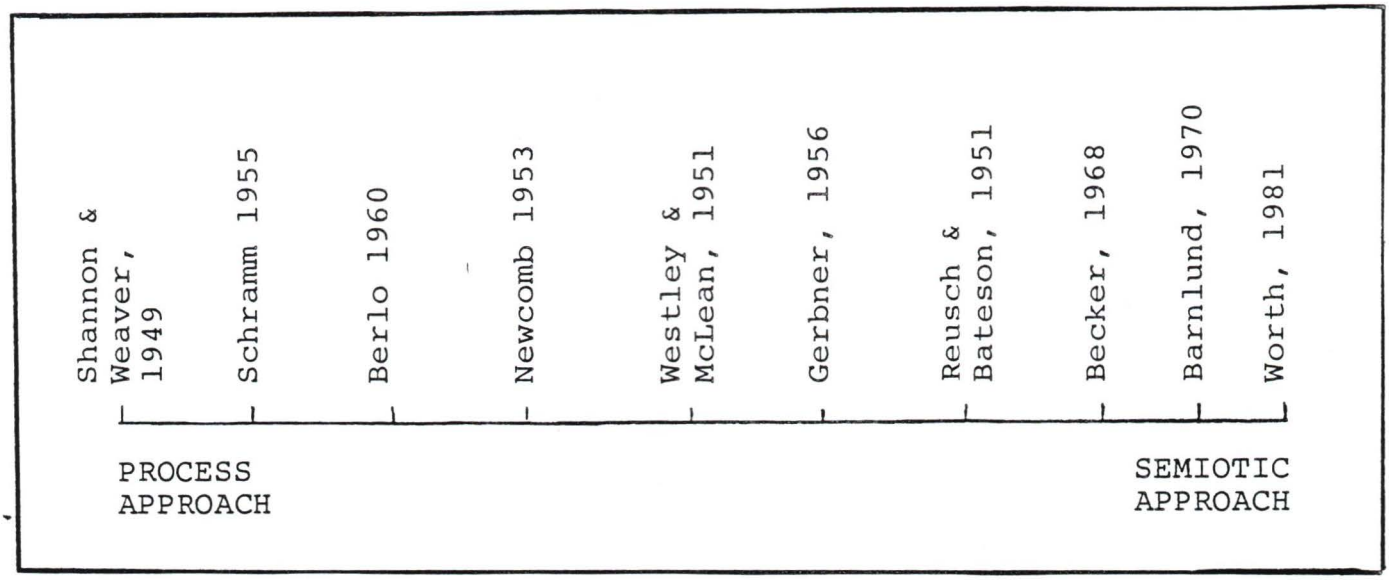
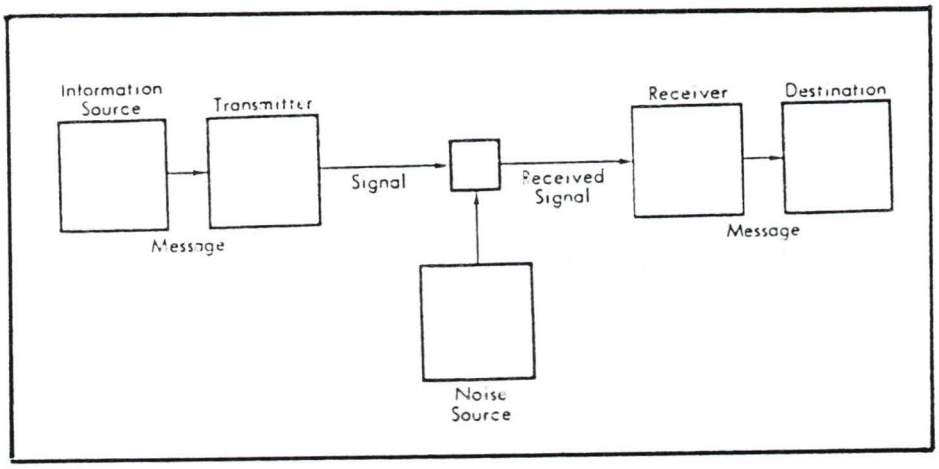


Figure 7

Shannon and Weaver's Model of Communication



Shannon and Weaver's 'Mathematical Theory of Communication' (1949) is one of the main theories influencing current approaches. It is a clear example of the process school, seeing communication as the transmission of messages. Their work developed during the Second World War in the Bell Telephone Laboratories in the United States, and their main concern was to find a way in which the channels of communication could be used most efficiently. For them, the channels were the telephone cable and the radio wave; the task was to send a maximum amount of

information along a given channel and to measure the capacity of any one channel to carry information. This concentration on the channel and its capacity was appropriate to their engineering background but they claim their theory is aplicable also to human communication.

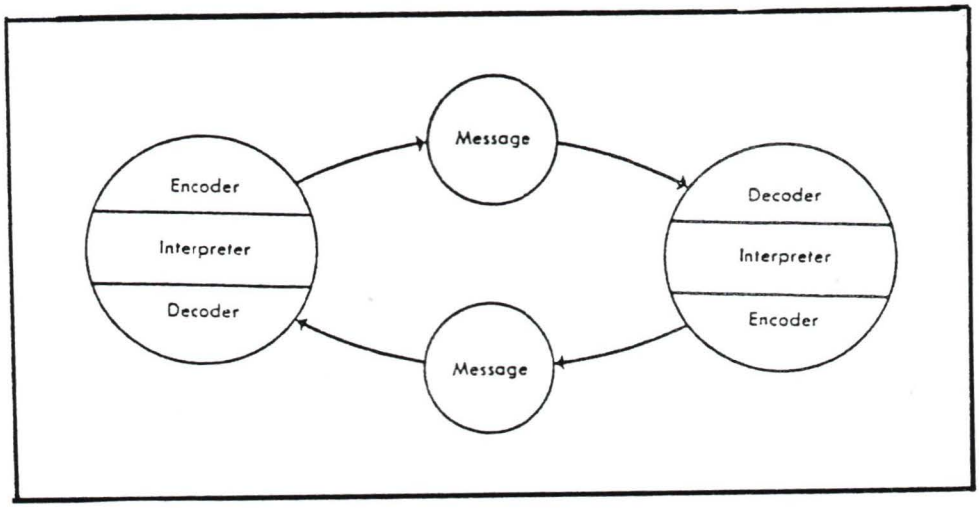
In this simple, linear model, 'source', 'signal' and 'destination' correspond to the elements speaker, speech and audience in Aristotle's description while 'transmitter' and 'receiver' represent the technological channels through which the message is relayed. The source selects the message which is changed by the transmitter into a signal which is sent through the channel to the receiver. In face-to-face conversation, the transmitter is the mouth; the signal is sound waves, the channel is the air, the receiver is the ear. In a telephone conversation, the channel is the wire, the signal is an electronic current unit, and transmitter and receiver are the telephone handsets.

'Noise' is anything in the channel not intended by the source to be there and which may interfere with the clarity of transmission. This can be distortion of sound or crackling in a telephone wire, static in a radio, or

'snow' on a television screen. However, the concept of noise has been extended to include any physical or psychological factors which interfere with message reception, such as hunger or preoccupation with other thoughts.

Figure 8

Schramm's Model 1955

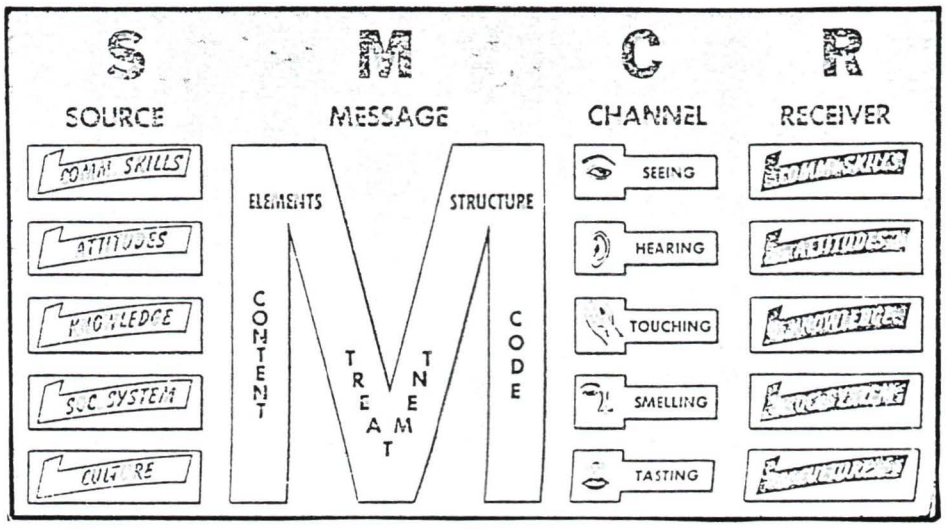


Wilbur Schramm was among the first to modify the mathematical model of Shannon and Weaver. He conceived of decoding and encoding as activities maintained simultaneously by sender and receiver; he also made provision for a two-way interchange of messages. The inclusion of an interpreter is an attempt to represent the problem of meaning. Schramm provided the additional notion of 'field

of experience' or the psychological frame of reference, referring to the attitudes of interactants to each other. Other model designers also sought to represent the interactive nature of communication in a variety of ways: a series of loops (Mysak, 1970), 'speech cycles' (Johnson, 1953), co-orientation (Newcomb, 1953), and overlapping 'psychological fields' (Fearing, 1953).

Figure 9

Berlo's Model 1960

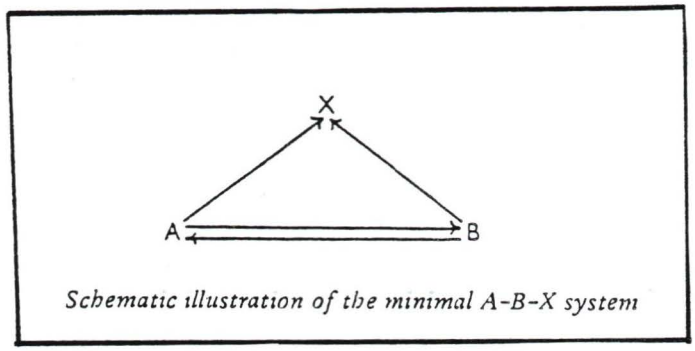


Berlo proposed a further linear or process model of interpersonal communication. The relationship of mutual dependence and compatibility between source and receiver is illustrated. Messages are encoded and decoded accord-

ing to the communication skills, attitudes and knowledge of source and receiver and their place in the social and cultural setting.

Figure 10

Newcomb's Model 1953



Schematic illustration of the minimal A-B-X system

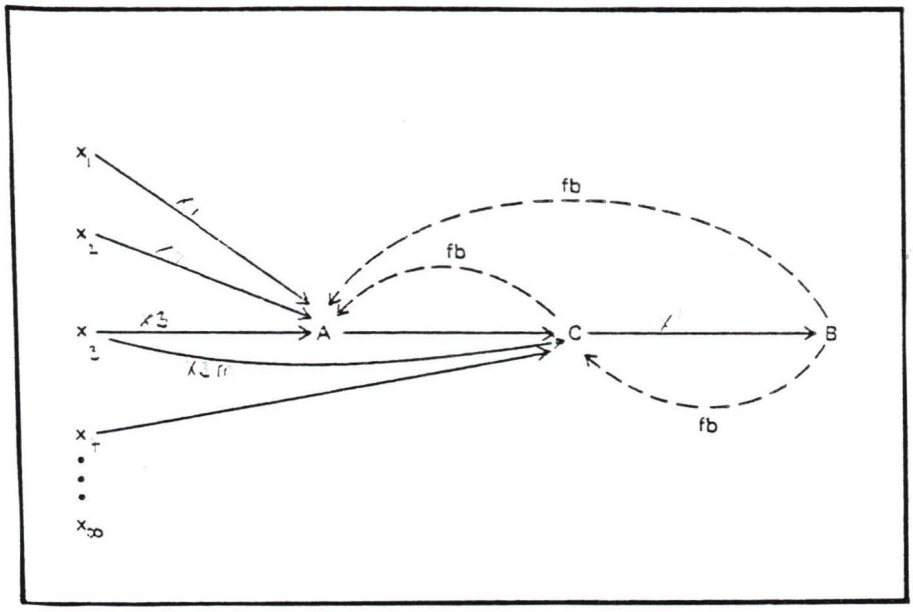
The emphasis of Newcomb's triangular model is upon the role of communication in a societal setting, where communication functions to maintain equilibrium within the social system.

A and B are communicator and receiver; they may be individuals or groups. X is part of their social environment. ABX is a system whose internal relations are interdependent. The system remains in equilibrium where there is agreement between A and B regarding X. Where there is disagreement between A and B, they come under pressure to

communicate until a state of equilibrium is reached. Newcomb's perspective is similar to Festinger's (1957) Congruence Theory of communication, where communication is seen as an attempt to reduce 'cognitive dissonance' or disagreement amongst people.

Figure 11

Westley and MacLean's Model 1957

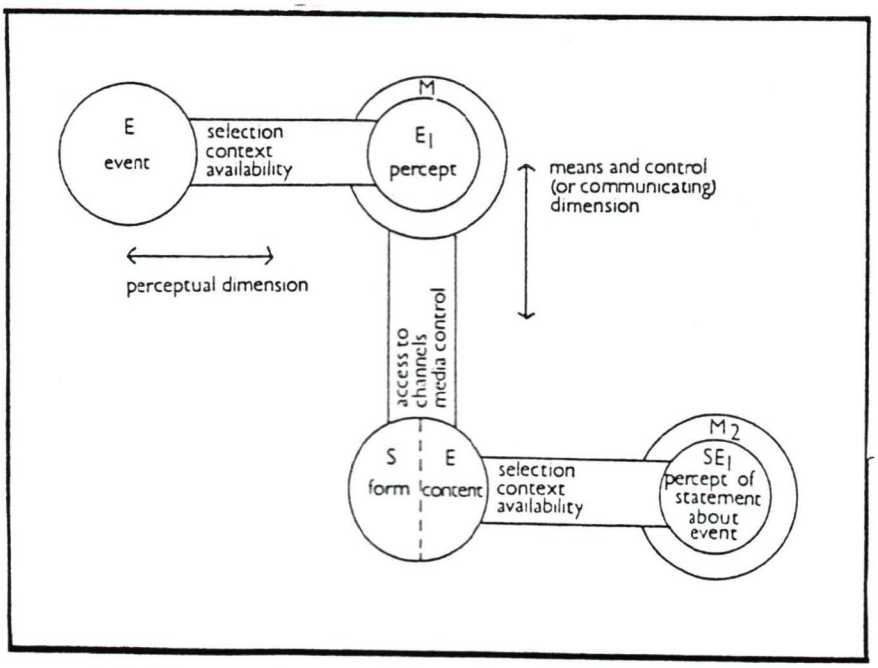


Westley and MacLean, drawing upon Lewin's idea of the gatekeeper (one who serves the 'editorial' function)

extended Newcomb's A-B-X model (of A communicating to B about X). The social need for information underlies this model, which Westley and MacLean adapted further to apply to the mass media. They maintain Newcomb's idea that the need to maintain a shared orientation toward X is a motive for communication and they allow for restricted opportunities for feedback (fb). Feedback is defined as the transmission of the receiver's reaction back to the sender. Models that emphasise feedback are ones with a cybernetic bias (the science of control). More will be said later about the concept of feedback and of cybernetic theory.

Figure 12

Gerbner's Model 1956

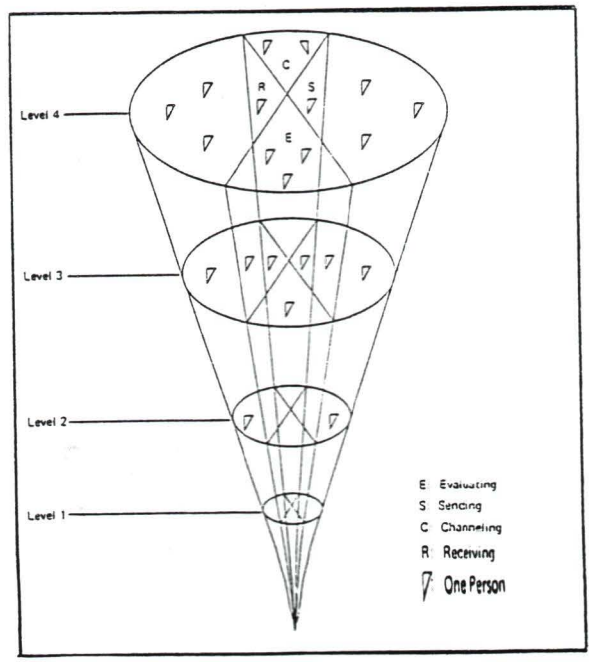


Gerbner's model is an elaboration of Shannon and Weaver's linear process model where communication is viewed as the transmission of messages, although it looks beyond the process itself to events (E) in the real world, which are perceived by someone or some machine (M). It conceives of the communication process as consisting of two alternating dimensions, the perceptive or receptive, and the communicating or means and control dimension. This model comes closest to combining the process and semiotic approaches to communication, and enables us to approach the difficult areas of perception and meaning.

Figure 13

The Functional Model of Communication

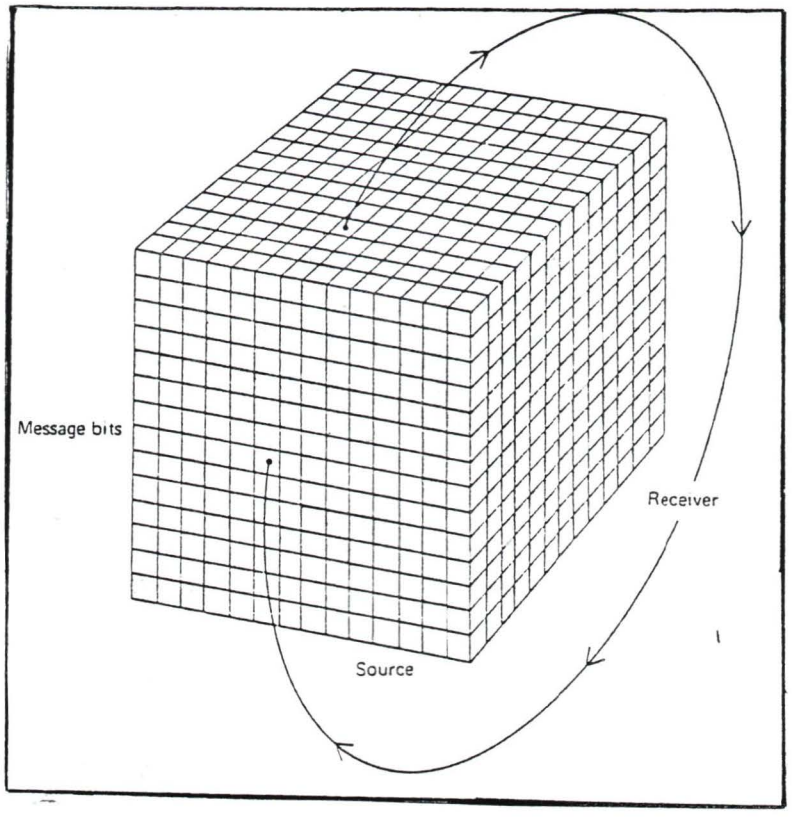
Reusch and Bateson, 1951



A number of models underscore various functional aspects of communication. One of the earliest was designed by Reusch and Bateson (1951) who conceived of communication as functioning simultaneously at four levels of analysis: intrapersonal, interpersonal, group and cultural. Each level of activity consists of four communicative functions: evaluating, sending, receiving and channeling. This model focuses less upon the structural attributes of communication and more upon the actual determinants of the process. A similar concern with communicative functions can be traced through the models of Carroll (1955), Fearing (1953), Mysack (1970), Osgood (1954) and Peterson (1958). Peterson's model is one of the few to integrate the physiological and psychological functions at work in all interpersonal events.

Figure 14

Becker's Model 1968



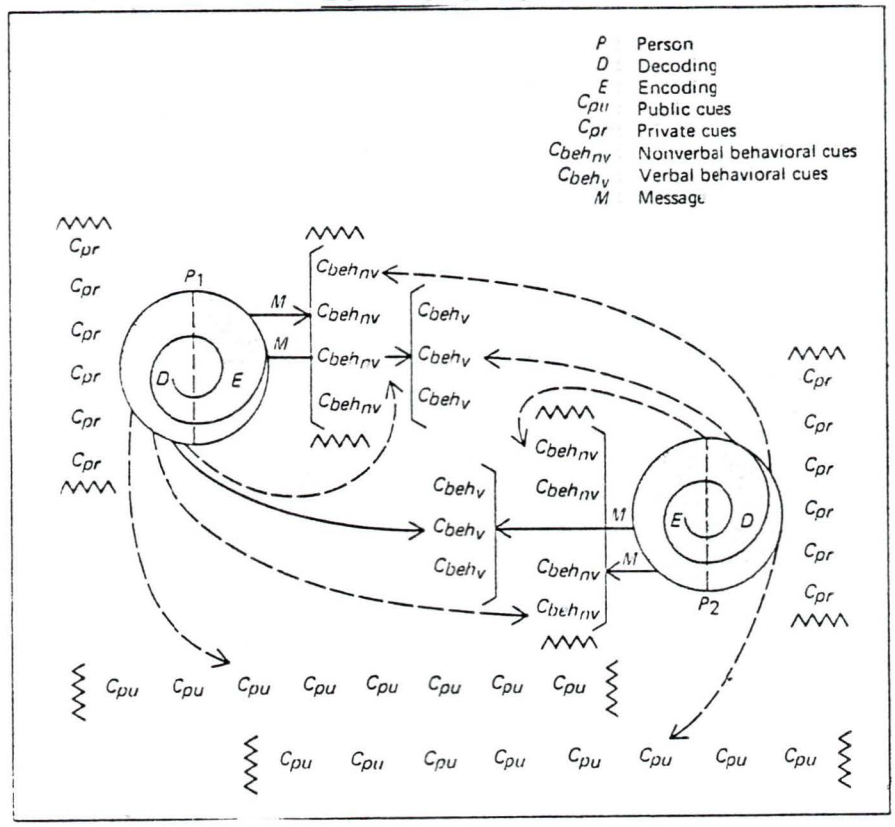
Most of the models advanced so far describe a process whereby a single message is transmitted from a sender to a receiver or receivers. However, few communicative acts end with the interpretation of a single message. The 'communicative mosaic' given by Becker is an attempt to

account for composite sets of messages as they interact over time and across social situations.

Becker likens complex communicative events to the activity of a receiver who moves through a constantly changing cube or mosaic of information. Each section of the cube represents a potential source of information, some of which are not available for use, hence they are blocked out. It may be useful to conceive of personal communication as an interaction between two mosaics, one comprising the private store of information, internal to the receiver, the other comprising the information in a given social milieu.

Figure 15

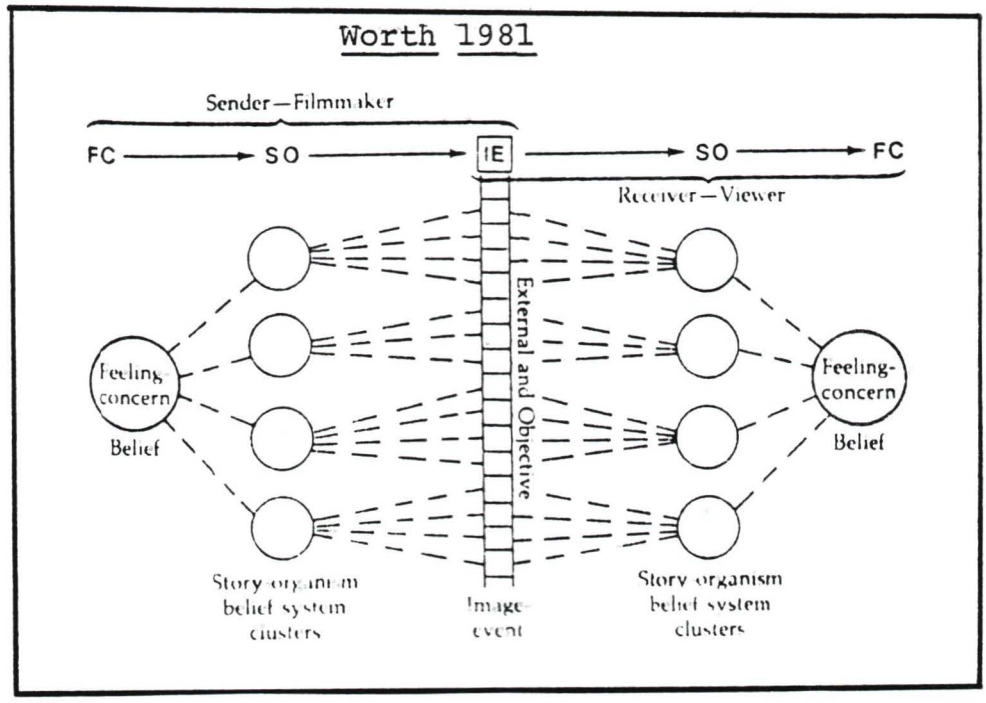
Barnlund 1970



The most systematic of the functional models is the transactional approach taken by Barnlund which posits a view of communication as 'transactions in which communicators attribute meaning to events in ways that are dynamic, continuous, unrepeatable, irreversible and complex.' Barnlund translated these assumptions into diagrammatic form in two pilot models, the first of intrapersonal communication, the second of interpersonal communication, given here.

This transactional model is one of the most comprehensive analogues of human communication, distinguished by the number of factors it incorporates into a single schema, including the verbal, non-verbal and paralanguage elements. Barnlund's model is most representative of the semiotic approach to the process of communication.

Figure 16



More recent models of the communication process, for example, that proposed by Worth (1981) stress the social and behavioural aspects of communication, and belong to the semiotic approach. The sender (filmmaker) has a mes-

sage (belief) which is encoded into the elements of a story (story-organism), transmitted through the medium of film (image-event). The story told in the film is decoded by the receiver into a personal message (belief).

The model suggested by Worth describes the process of film communication where a distinction is drawn between the external and objective image-event of the film itself, and the internal processes of sender and receiver, called 'feeling concern' and 'story-organism' in each case. The meaning of the film represents a function of both external meaning contained in the image-event and internal meaning in the viewer. Thus, Worth's model represents an advancement of Becker's in its representation of communication as an interaction between private or personal information and public or social information.

The Function of Models and the Development of a Theoretical Orientation Towards Communication

The models reviewed are valuable in providing a survey of attempts made to understand and graphically repre-

sent the nature of communication. They are useful in that they give a simplified account of a complex human activity, but their value is limited because of their subjectivity and tendency towards over-simplification.

Most striking of all the changes that have occurred in the understanding of communication is the movement from static classification systems represented by the process approach, to forms of representation that more fully account for the complex nature of communication, given by the semiotic approach. Assumptions associated with linear and two-way exchange have been superceded by assumptions of multi-dimensional forms of communication. The early preoccupation with structural aspects of communication is now replaced by the concern with communicative functions and the search for constituent processes. There has occurred a shift away from purely psychological and individual units of behaviour, to more dynamic properties of people acting in interdependence with others. The concepts of feedback, mosaic, reciprocity, complementary exchange and multiple message-sets all reflect a significant movement in theoretical orientation.

No longer is human communication described in terms better suited to account for mechanical communication, although the study of cybernetics reveals interesting parallels between communication and control in automated systems, such as computer, and in living organisms. Furthermore, contemporary theories of human behaviour and communication seek to understand humans as integrated wholes, rather than as products of isolated components. Concern is with the general context in which events occur. The key assumption is that every part of the system is so interrelated with every other part that any change in one aspect results in dynamic changes in all other parts of the system (Hall and Fagen, 1956). It is necessary, then, to think of communication, not as individuals functioning under their own autonomous power but rather as persons interacting through messages. This conceptualisation of communication has clear implications for teaching and learning in Distance Education environments, where exchanges take place through a connecting technology where opportunity for spontaneous two-way interaction is severely limited.

Feedback in Communication

According to general systems thinking, a system is open if some exchange takes place between the organism and the environment; if it is closed, no such exchange takes place. It is virtually impossible for people to be solipsistic; people are social animals. The discussion of interpersonal communication which follows takes place within the context of general systems theory, which regards communication as an 'open' system.

Engineers refer to the re-entrance of the sound from the speaker to the microphone as 'feedback' and this is something to be avoided. In human communication, feedback is a necessary part of the process. In intrapersonal communication, feedback occurs when a communication source decodes the message that she encodes; the message is 'fed back' into her system. In interpersonal communication, feedback occurs when the receiver decodes the message sent, and encodes some kind of response, intentional or unintentional, verbal or nonverbal. When we communicate, we constantly seek feedback. We check on ourselves, decode our own messages to make sure we encoded what we intended. We observe the effect of our message upon the receiver to ascertain whether it has been received and

correctly understood. The nature of the feedback, or response generated, will shape the way in which we encode our next message.

The results of experiments conducted on the effects of feedback on communication were reported by Leavitt and Mueller (1951). They found that feedback increases the accuracy with which information is transmitted, increases sender and receiver confidence in what they have accomplished and establishes a sense of amity. Lack of opportunity for feedback engenders some hostility in the receiver and also produces doubt in the sender.

The contexts for communication can be organised hierarchically according to the ease with which feedback is obtained, with face-to-face communication permitting maximum feedback, and mass media communication permitting minimum feedback. In face-to-face communication, all available communication channels can operate. The source is able to changer her message immediately, according to the nature of the feedback given. But when sender and receiver are separated in time and/or distance, communicating through some intervening channel such as print, telephone, radio or television, they have little opportunity to gain feedback from the responses of the other.

An awareness and utilisation of feedback increases the communicative effectiveness of the individual. The ability to respond to the signs given by others, verbal and nonverbal, as they react to our messages, is what makes us sensitive and effective communicators. Our task is made more difficult when some technological medium is interposed between ourselves and the receivers of our communication, blocking the 'completeness' of the communication cycle.

Effects of Channel and Code of Communication

Numerous research studies have been conducted to measure the effect of type of channel or medium of communication on the way in which messages are transmitted. In particular, educators have been extremely concerned to discover the effects on learning in students of variations in the medium of communication of information (Bloom et al., 1956; Skinner, 1957; Ausubel, 1962; Tyler, 1964; & Gagne, 1965). Repeatedly, the same conclusion has been drawn, that selection of channel makes no appreciable difference to the effectiveness with which information can be conveyed. Receivers of information appear to be equally

able to understand messages, whether they be relayed through lectures, through print or through television. However, Dwyer (1978) has listed criticisms of many of these research studies for weaknesses in their theoretical foundation and experimental design. Salomon (1974) makes the important distinction that it is the symbol system rather than the technology of transmission that is crucial for instruction. The symbolic code (digital, analogic, iconic) affects to a large extent the nature of the messages and their meanings. Salomon postulates that different modes of information extraction and processing are activated to the extent that different media 'code' information in different ways. Where critical information is presented via symbolic features unique to a medium, unique information is extracted and hence unique cognitive effects may be expected. Hence, a more potentially profitable area of research may be to study the effects upon communication of the encoding of information into a particular symbolic code. More detailed explanation of the influence of symbolic code on the communication of meaning will be given in the next section of the Literature Review 'Adult Learning Through Educational Television', and in Appendix C.

Communication Theory: Summary

1. There are two principal approaches to the understanding of communication. The process school views communication as a simple linear flow of information from sender to receiver. The semiotic school sees communication as the production and exchange of meanings through interaction between senders and receivers, and the signs encoded in the text. Neither of these approaches is seen here as the correct or true interpretation. Rather, a balanced view of the nature of communication draws upon both schools of thought.

   Models of the communication process can be arranged along a continuum from the most straightforward and mechanistic of models at the 'process' end, to the most complex and humanistic of models at the 'semiotic' end. Ten communication models are given which were developed between 1953 and 1981. The most recent of the communication models takes a semiotic approach where meaning is a function of the interaction between internal processes and external events.

2. Communication is said to be dynamic, irreversible, proactive, interactive and contextual. The goal of communication is human interaction. The discussion of interpersonal communication takes place in the context of general systems theory which considers interaction to be central to meaningful communication. Opportunities for feedback in educational contexts increase accuracy and ease of learning in students.
3. Mediated learning environments in which technological systems intervene between instructor and learner decrease opportunities for feedback and interaction.
4. Research conducted into the effect of choice of medium upon communication indicates that selection of channel makes no appreciable difference to the effectiveness with which information can be conveyed. It appears that learners derive equal educational benefit, regardless of whether the material is delivered through lectures, through print or through television.
5. It has been suggested that understanding of a message may be influenced according to the symbolic code through which it is delivered. Different media are thought to 'code' information in distinct ways,

requiring particular processing skills in senders and receivers for the 'encoding' and 'decoding' of messages. Thus, new thinking skills may be required in the use of new media.

Communication Theory: Evaluation Criteria

From this review of the literature in Communication Theory, the following four principal criteria were drawn, and used later in the assessment of the data.

1. To what extent and in what ways are general communication principles followed?
2. In what way is the approach to communication consistent with programme goals?
3. How much and in what way is opportunity provided for interpersonal communication?
4. How much and in what way is emphasis given to the development of mental skills?

Section III : Adult Learning Through Educational Television

Introduction

The literature pertaining to the specific area of learning through the use of media, especially television, was reviewed in order to establish some criteria for the assessment of Knowledge Network programmes and practices. Emphasis was given to the literature dealing directly with adult learning in a Distance Education context. Section III subdivides into three areas: (a) Research from Britain's Open University (O.U.); (b) Visual Literacy and Learning from Television and (c) Active Learning from Television.

(a) Research from Britain's Open University

A great contribution has been made to the field of learning from media by research conducted over a period of 30 years by the Audio-Visual Media Research group at Britain's Open University. Many of the ideas contained in the first part of this subsection are taken from Towards A

Better Theoretical Framework for Studying Learning From Educational Television (1981) where Dr. Anthony Bates, leader of the Audio-Visual Media Research group explores the factors determining the effectiveness of educational television programmes. Included in this first section is discussion of approaches to research in learning from media; the importance of developing learning skills; a summary of the appropriate teaching functions for television; Salomon's (1979) work on symbol systems; television and the learner and the importance of context of study.

(b) Visual Literacy and Learning From Television

The second subsection explains the concept of visual literacy and proposes that development of skills in visual literacy are vital for the distance educator communicating through the television medium. Also discussed are the topics of visual language, visual thinking and visual learning - all of relevance to the area of education through television.

(c) Active Learning from Television

The final subsection deals with Active Learning from Television. Here are reviewed articles discussing the concept of interaction, as it relates to communication through educational television for distance learning. The necessity for Distance learners to take an active or deep-level approach to their studies is argued, if learning is to be meaningful and gainful.

(a) Research from Britain's Open University

In his 1981 paper 'Towards a Better Theoretical Framework for Studying Learning from Educational Television' Bates draws together information from research and the wisdom gained through experience at the Open University.

The principle factors which govern the effectiveness of educational television programmes are considered to be organisation of teaching, the programmes and the learner. Although all of the discussion included in Bates' paper is of interest to any study on Distance Education through television, of most relevance to this study are the observations on the programmes themselves, and in particular on symbols and codes.

Research in Learning From Media

In recent years, a general theory of learning from media has begun to be developed, which has been based on research into the unique characteristics of each medium, and which has addressed the question "What do students learn from television (or radio, etc.) that cannot be learned from other media?"

Much of the research that has been conducted into educational television, especially in the United States, has been based on laboratory-controlled comparative studies, where no account is taken of the students' general learning context (Schramm, 1977). Studies of this kind are considered of little value in demonstrating how television communicates meaning, stimulates learning and thinking in specific contexts, or of the specific strengths and weaknesses inherent in the use of the television medium as an educational tool (Bates, 1981).

As stated in Section II, Communication Theory, the studies that have been conducted to measure the influence of technology upon academic grades almost without exception have concluded that choice of medium makes no appreciable difference to learning. Schramm (1977) has summar-

ised abundant evidence that indicates that 'knowledge' can be adequately transmitted with equal effectiveness through any medium, or rather the converse, that there is little evidence to suggest that any single medium is more effective than any other for this purpose. Studies of this kind have been repeatedly criticised (Mielke, 1968; Solomon & Clark, 1977) on the grounds that when all other variables are held constant, sheer technological variations cannot have any meaningful effect, aside from the self-evident and the trivial.

Given the lack of consequence in studies of this kind on the effect of instructional technology on learning, the focus of more recent research has been upon the unique characteristics of the various media and their ability to (1) represent knowledge; and (2) develop mental skills in learners. Increasing attention is being given to the importance of the latter, that is, the way in which elements inherent in the channel or medium of communication and manner of presentation of information affects the ways in which students learn.

Epistemological Considerations - Knowledge and Skills

An educational telecourse may be considered as a means by which course objectives are converted into teaching material and presented to learners. The way this is carried out reflects the course designer's instructional philosophy, and in particular by the extent to which a distinction is drawn between knowledge and skills. Knowledge or 'content' - facts, ideas, relationships - are considered to be independent of the means by which they are experienced (Olsen & Bruner, 1974). However, knowledge can be obtained only through some form of human activity, experience, observation, or through some form of symbolic learning such as words or pictures. These activities themselves are skills which must be learned, in order that knowledge may be acquired. Teaching, therefore, is an attempt to help students to learn both knowledge and skills in obtaining that knowledge, for the skills, once learned, can be used by the learner in the acquisition of new knowledge. Teaching may now be seen as a means by which students are helped in (to use Pask's phrase) 'learning to learn'.

Learning to Learn

Gordon Pask in 'The Generality of Problem-Solving' (1978) argues in favour of problem-solving as a means of promoting 'learning to learn'. Tribus, Cohen and Bock in 'A New Approach to Teaching Adults at a Distance - Problem-based Learning' also distinguish between 'knowledge' and 'know-how' and they document a new case-study approach to learning, where engineering students are provided with the basis for formulating and solving problems, with the use of computers (PROCEED: Project for Continuous Education for Engineers).

There are major differences of opinion amongst educators about the relative importance of knowledge and skills (that is, knowing 'what' and knowing 'how'), and about the best methods of helping learners to gain these. Emphases shift according to philosophical approaches to education, whether education is considered primarily as the transmission of knowledge from those who know to those who do not know (or what Paulo Friere calls the 'banking concept' of education), or as a 'voyage of discovery' on the part of the learner. The approach which encourages learners to be self-reliant, to engage in active problem-solving and 'discovery learning' is especially favoured amongst those

involved in adult education, open-learning, non-traditional and distance education. There is nothing new in the idea that learners should have active control of their learning experience for effective learning to occur. The dialectical process of the Socratic method was based upon teacher guidance aimed at self-discovery of truths already known by the student. Contemporary educational theories such as Bruner's (1966) are rooted in the same philosophical approach to knowledge and education.

Media and Cognitive Skills

It has been suggested that a medium such as television has two functions in the learning process:

a. the presentation of knowledge in a different way from the presentation of the same knowledge through another medium, thus providing a broader base for knowledge acquisition - knowing 'what' in different ways:

b. the development of certain mental skills in using knowledge - knowing 'how' in different ways.

(Olsen & Bruner, 1974; Salomon, 1974).

Clearly, teaching is concerned with more than simply presenting or representing knowledge of the world in a

variety of ways; it is concerned also with putting that knowledge into practice.

Olson and Bruner (1974) have used this distinction between acquiring and using knowledge to argue that whilst knowledge (or content) is invariant across media, mental skills are more dependent on the right choice of medium for their development. Thus, learners can acquire facts, ideas, principles, opinions, relationships from any medium, whereas skills such as observation, analysis, problem-solving are developed better by some media rather than others.

> The choice of a means of instruction, then, must not depend solely upon the effectiveness of the means for conveying and developing knowledge; it must depend as well upon its effects on the mental skills that are developed in the course of acquiring that knowledge. (Bruner & Olson, 1974, p. 149).

A refinement of this hypothesis is Salomon's proposition (1979) that the symbol systems unique to different media do not facilitate learning in a simple, unidimensional manner, but can facilitate learning in one of three ways:

a. by activating already existing mental skills, through providing practice in their use.

b. by short-circuiting difficult mental processes, through symbol systems representing knowledge in a new way.

c. by supplanting or modelling the mental elaborations required to incorporate new knowledge.

This leads Bates to hypothesise that, if different media are more appropriate to developing mental skills, even if there is little difference in various media's effectiveness in teaching knowledge, then 'programmes that are more concerned with the development of mental skills are likely to be more effective than programmes that are more concerned with the straight transmission of knowledge.' (Bates, A. W., 1981, p. 6). Also, 'television is more likely to be appropriate to the development of some mental skills than others.' (Bates, A. W., 1981, p. 7).

There are two important points here, neither of which has yet been substantiated by research evidence. The first is that development of mental skills is more important than transmission of knowledge. Educators have traditionally been concerned with the communication of 'content', whether they are

teaching face-to-face or using media. The suggestion that development of mental skills is more important than the conveyance of 'content' fits with the philosophical orientation which views education as 'discovery' of knowledge rather than 'bestowing' of knowledge. The second point is that the television medium may be more effective in developing certain mental skills than others. As yet, we have no understanding of which specific thinking skills television may best promote. Further research is needed in this area.

Assessment of Learning

Further to this is the implication that, if teaching is regarded as a means by which mental skills are developed in learners, then it is precisely these skills, and not 'content' that need to be tested in any final evaluation. This is what Bates means where he warns of the danger of evaluating irrelevant learning outcomes:

> ...it would seem to me that a crucial criterion when assessing the effectiveness of a television programme would be the success or otherwise of the programme in stimulating or developing (specific kinds of thinking and learning). Otherwise, one risks meas-

> uring irrelevant learning outcomes.
> (Bates, A. W., 1981, p. 22)

As well, material presented in a particular format, for example, visually, should also be tested visually.

Appropriate Teaching Functions for Television

The aim of the educator is to find a suitable means of conveying or representing knowledge and skills to learners. Knowledge of the same topic or concept may be represented in many ways: verbally, numerically, physically, conceptually, symbolically. Television offers an alternative means of representing knowledge which differs from traditional face-to-face classroom methods in several important aspects. For example, concepts or processes may be represented 'filmicly' through television, whereas classroom presentation tends to rely heavily on the spoken word. It is important for educators using media for instructional purposes to understand and to make use of the unique features of their chosen medium to represent knowledge in appropriate ways.

Bates (1981) identifies the appropriate teaching functions of 'television' (based on a post-hoc analysis of successful bids for television resources at the Open University). These eighteen functions are listed in full

because they were considered in the assessment of Knowledge Network programmes.

1. To demonstrate experiments or experimental situations, particularly

   a. where equipment or phenomena to be observed are large, expensive, inaccessible or difficult to observe without special equipment;

   b. where the experimental design is complex;

   c. where the measurement of experimental behaviour is not easily reduced to a single scale or dimension (e.g. human behaviour);

   d. where the experimental behaviour may be influenced by uncontrollable but observable variables.

2. To illustrate principles involving dynamic change or movement.
3. To illustrate abstract principles through the use of specially constructed physical models.
4. To illustrate principles involving two-, three-, or n-dimensional space.

5. To use animated, slow-motion, or speeded-up film or video-tape to demonstrate changes over time (including computer animation).
6. To teach certain advanced scientific or technological concepts (such as theories of relativity, or quantum theory) without students having to master highly advanced mathematical techniques, by using instead animation, physical models, televisual representation of two, three or n-dimensional space, and of dynamic change or movement.
7. To substitute for a field visit (e.g. to a factory, museum, archeological or architectural site, geographical location, etc.). Field visits may be used for a number of purposes, for example:

    a. to provide students with an accurate, comprehensive visual picture of the site, or to provide an overall visual context or environment for certain phenomena, in order to place their study in context.

    b. To demonstrate the relationship between different elements of the particular system being viewed

(e.g. machinery, production processes, ecological balance).

c. To observe differences in scale and process between laboratory and mass-production techniques.

d. To assist students to differentiate between different classes or categories or phenomena in situ.

8. To bring to students primary resource material, or case-study material, i.e. film or recordings of naturally occurring events, which, through editing and selection, demonstrate or illustrate principles covered in the units. This material may be used in a number of different ways, for example:

a. to enable students to recognise naturally occurring categories, symptoms, phenomena, etc. (e.g. teaching strategies, mental disorders, examples of certain kinds of human interaction, etc.);

b. to enable students to analyse a situation, using principles or criteria established elsewhere in a unit; or to test students in this way.

c. to enable the course team to demonstrate ways in which more abstract principles or concepts established elsewhere in a unit have been applied to the solution of "real-world" problems, where visualisation of the application in its total environment is necessary to understand the way the principle has been applied, and the difficulties encountered.

9. To demonstrate decision-making processes.

   a. by filming or observing the decision-making process as it occurs;

   b. by dramatisation;

   c. by simulation or role-playing.

10. To change student attitudes

   a. by presenting material in a novel manner, or from an unfamiliar viewpont;

   b. by presenting material in a dramatised form, enabling students to identify with the emotions and viewpoints of the main participants;

c. by allowing the students to identify closely with someone in the programme who overcomes problems or himself changes his attitudes as a result of evidence presented in the programme or televised exercise.

11. To bring students examples of films or television programmes, where the critical study and analysis of film or television itself is the subject material of a course.

12. To record specially events, experiments, species, places, people, buildings, etc. which are crucial to the content of units, but may be likely to disappear, die or be destroyed in the near future.

13. To explain or demonstrate practical activities that students are to carry out themselves (e.g. home experiments, interviewing, project work).

14. To condense or synthesise into a coherent whole a wide range of information which would require considerable length in print, and which in print would not provide the richness of background material necessary for students to appreciate fully the situation.

15. Through the performance, to demonstrate methods of techniques of dramatic production, or different interpretations of plays and novels.
16. To teach sketching, drawing or painting techniques (e.g. the sketching of 3 dimensional engineering components, the construction of fresco, the drawing of perspective, etc.).
17. To demonstrate the way in which instruments or tools can be played or used; to demonstrate the skills of crafsmen and their relationship with the materials and tools which they use.
18. To analyse, through a combination of graphics and sound, the structure of music.

Most of the functions listed are concerned with providing educational material which enables students to develop skills. There are, however, some instances where television is used to give an alternative symbolic way of presenting knowledge, such as the use of animation for presenting mathematical problems.

Symbol Systems

A summary of the research carried out into media's 'symbol systems' (Salomon, 1979) is included in this lit-

erature review because the findings suggest that the 'symbolic code' used to convey information affects understanding, knowledge and learning. This is particularly important in the use of television which can employ three symbolic codes. It is concluded that there is insufficient knowledge as yet in this area to be able to make any definite statements about the influence of the symbolic code used in any given programme on thinking or learning. Nevertheless, it is considered important to make reference to this area of research. A more detailed account of this area is provided in Appendix C.

Conclusions from Salomon's 1979 research

Salomon's findings can be summarised thus:

1. When a person learns, she deals with the media's symbol systems.
2. A learner gets different content and different meaning from different symbol systems.
3. A learner must make different mental transformations and use different mental skills with different symbol systems.
4. One can cultivate in a learner specific mental skills by using coding elements of a symbol system to activate or supplant these skills.

5. Symbol systems are generic to media. Each medium develops its own blend of symbol systems.
6. Television uses all three symbolic codes, digital, analogic, iconic.
7. In instruction, one should choose the most appropriate medium according to how closely it can symbolically represent or model the learning task.

Implications for Distance Educators

It seems that to understand fully how learning from television takes place, one has to understand the unique ways in which knowlege is presented and transmitted through television. However, it has to be recognised that there is a good deal of confusion and controversy in this field. It is by no means clear that in practice, content, modes of representation and symbol systems can be meaningfully differentiated. The findings of Salomon's research are of relevance to this study because they indicate the importance of attempting to include consideration of the media's symbolic code as a criteria in the evaluation of Distance Education programmes. However, this is a problematic area. Little empirical research has been conducted on the meanings and processes stimulated by the blends of

symbolic systems employed in educational television programmes. Hence, it is extremely difficult to hypothesise the effects on learning of the encoding of educational content into a particular symbol system. In the light of the present state of knowledge (or the lack of it) in this field, it was considered premature to include a criterion relating to symbolic codes in the evaluation, for, as Schramm (1977) commented upon Salomon's work 'We have only the foggiest of ideas about the area that Salomon is opening up.' However, the informed researcher in this area should at least be cognissant of Salomon's work. For this reason, discussion of Salomon's research has been included in this literature review. It is suggested that this is an important area of future research.

Television and The Learner

There is evidence that not only do students differ in preferred learning styles (as discussed in the first section, Learning Theory), but that they also differ in their experience of, and abilities to learn from, different media. Thus, in studying learning from television, it is important to look at individual differences between students in the way they learn from and react to media.

Olson and Bruner (1974) and Salomon (1979) have argued that media tend to develop mental skills or processes, and that these skills can be learned. This suggests that it may be worthwhile to train students in the skills of learning from media. Bates and Gallagher (1977) found that few Open University students were able to carry out certain higher order mental activities required in learning from television, such as application of principles learned in the text to an analysis of the material presented in the programme. As the ability to 'transfer' knowlege amongst educational media is crucial for successful learning, it seems that there is some convincing evidence of the need for students to be trained in making the best use of media of instruction.

Based on a number of studies (Bates, 1974; Koumi, 1975; Gallagher, 1976; Grundin, 1978; Brown, 1980) the following learner characteristics seem to be important determiners of successful learning from educational television.

1. age
2. general mental or learning abilities

3. ability to recognise accurately the educational function of a specific programme
4. students' preferred learning styles
5. students' experience in television watching
6. the development of students' ability to handle different symbol systems.

Although within the limitations of this study, it was not possible to gather this kind of information on individual Knowledge Network students, nevertheless, it is acknowledged that the characteristics of the learner are a vital component to consider when making a thorough evaluation of the projected effectiveness of Distance Education programmes.

The Context of Study

Earlier in this section, it was shown that criticism has been made of studies conducted into learning from media which failed to take account of the general context of learning.

Of relevance to the predicted success of learning from telecourses are such 'contextual' factors as mode of study, preparation and follow-up studies, timing and relation of programmes to examination and student support ser-

vices. It has been suggested (Bates, 1981) that interaction with other learners, for example in a discussion group is more conducive to 'rounded' learning, than independent study. Careful advanced preparation and follow-up work by learners is necessary in order to obtain the most value from a programme. Convenience and flexibility of the broadcast time and/or access to play-back equipment decreases the likelihood of learners falling behind schedule. Students are thought to learn more efficiently from a programme they clearly perceive as being relevant to examination or assessment procedures.

With reference to Knowledge Network programmes, it is noted that viewing is increasingly done alone and at home, without interaction with other learners. The popularity of home video-recording units means that programmes are recorded and reviewed by learners to a greater extent than ever before. However, viewing a recordinging of a programme is a different experience from viewing a 'live' programme, where the immediacy and interactive facility are lost. Strong student support services are thought to be an important factor in ensuring a high rate of course completion.

Summary of Research from the Open University

According to research conducted over a period of thirty years at Britain's O.U., a variety of factors, organisational, pedagogical and human or social combine in determining the effectiveness with which students learn from educational television programmes. Such fundamental issues as scheduling and broadcast quality may be deciding factors in whether the programme is viewed at all.

Of greater significance than considerations of the professional, aesthetic and artistic judgements made by broadcasters, are the more academic concerns of the structure, educational function and symbol systems of programmes. There is reason to suggest that learners may benefit from training in how to make the best use of the television medium as an educational tool.

General theories of learning are thought to be of little value in their application to the situation of learning from television, because they fail to take account of the specific kinds of thinking and learning which are particularly stimulated or developed by television. For this reason, this review of the literature pertaining to the context of adult learning through educational television has been included.

Research from Britain's Open University: Evaluation Criteria

This part of the literature review generated the following two criteria used in the evaluation:

1. To what extent is the medium used for appropriate purposes, as defined by Bates (1981)?
2. How much emphasis and in what way is attention given to individual differences in learning from media?

(b) Visual Literacy and Learning From Television

Importance of Visual Literacy in Distance Education

Numerous researchers have referred to the 'attention-grabbing' quality of television (Fisher, 1978). Once television is switched on, it is difficult to prevent the eye from being drawn to look at the screen, and for the mind to become interested in the visual signals, even with the sound turned off. Television makes its impact largely through the power of its moving images.

Because television is a highly visual medium, and because educators recognise the power of visuals to communicate, to influence, and to teach, a discussion is given here of the concepts of visual literacy, visual language,

visual thinking and visual learning and their relevance to Distance Educators.

In 'Visual Literacy and Distance Education', Heckscher (1975) examines the nature of visual communication, particularly as it relates to adult education. He submits that visual literacy is as essential to Distance teaching as verbal literacy and 'that distance educators have overlooked the most powerful language for such education and training, because they themselves are visual illiterates.' (Heckscher, E., 1975, p. 123). His conclusion is that we should stop regarding visual language as the poor relative of verbal language and recognise its immediacy and richness in communication.

Visual Literacy Defined

John Debes first coined the term 'Visual Literacy' in 1969 and listed the skills of a visually literate person:

> To read visuals with skill.
> To write with visuals expressing oneself effectively.
> To know the grammar and syntax of visual language and be able to apply them.
> To be familiar with the tools of visual literacy and their use.
> To appreciate the masterworks of visual literacy.
> To be able to translate from visual language to verbal language and vice versa.
> (Debes, J., 1969, p. 27)

Hortin (1977) offers the most straightforward of the innumerable definitions that have been proposed:

> Visual Literacy is the ability to understand (read) and use (write) images and to think and learn in terms of images. (Hortin, J., 1977, p. 13)

Thus, there are two aspects of visual literacy; competency as a consumer of other people's created images, and competency as a producer of one's own images in order to communicate one's ideas. People involved in learning and teaching through the visual medium of television, clearly need to possess a level of visual literacy.

Visual Language

Visual elements and their subsequent composition into visual statements are thought to be analogous to verbal language (Debes, 1970; Barley, 1971; Turbayne, 1970(a), Ausburn & Ausburn, 1978; Lamberski, 1976; Dondis, 1973; and others). The descriptive theories of transformational-generative grammar proposed by Chomsky (1957) (and subsequently retracted) suggested a model for the interpretation of visual language. Thus, visuals may be considered as having a deep structure (the semantic level, or meaning, in the abstract); and grammatical rules for the transformation of deep structures into surface structures

(syntax). Visual language, like verbal language is 'generative' in that infinite numbers of 'meaningful utterances' or statements, can be generated from the application of a finite number of syntactic rules to a finite number of linguistic elements. Whereas in verbal language, linguistic elements are morphemes, phonemes, syllables, words, phrases, sentences and paragraphs, the 'building blocks' of visual language are line, dot, perspective, tone, shape, colour, grain and so on.

Further to this, a visually literate person should be able to understand (read) images and use (write) visual language, and to be able to process information visually in order to think visually.

Visual Thinking

Flory (1978) made the important connection between visual language and visual thinking when he wrote 'If we can accept the premise that a visual language exists, we can easily extend the notion that this language can be utilized for visual thinking.' (Flory, J., 1978, p. 5). Many researchers have written about visual thinking, including Haber (1970) who discusses in 'How We Remember

What We See' the difference between linguistic (words and numbers) memory, and pictorial (scenes and photographs) memory. Haber (1970) found that the recognition of pictures is essentially perfect (p. 105).

For Arnheim (1969) visual perception is visual thinking, the ability to process information in the visual mode, without recourse to verbal language. Visual thinking is characterised by visual imagery; the kind we see (sensory), the kind we imagine (the mind's eye), and the kind we draw (generative) (McKim, 1972). The visually literate person is able to communicate through visual images, both as a receiver and as a sender, and is able to think and to learn visually.

Visual Learning

Nelson (1975) cites recent research that indicates that 83% of all sensory learning is visual, while some researchers project as much as 90% (Dale, 1969). Writers and researchers such as Paivio (1969, 1971), Anderson (1974) and Lorayne and Lucas (1974), have demonstrated the use of imagery in aiding memory and facilitating learning. Dwyer (1979) has conducted extensive research into strategies for improving visual learning. However, Fleming

(1977) cautions that research in imagery processes has been limited, and that the relationship between imagery process and verbal process is still unclear.

> While it may appear self-evident that pictures facilitate learning, until we know more about the mechanisms and processes involved, we are at risk in predicting when (which tasks, learners, content) pictorial types of signs are apt to be more effective in instinction than verbal or than a combination (Fleming, M. L., 1977, p. 47)

We believe that visual learning precedes verbal learning and provides the foundation for the development of verbal literacy (Debes, 1968). Our present educational system relies heavily upon the print medium for dissemination of information, to the detriment of visuals. An argument in favour of increased use of visual modes of instruction is that this reflects the earliest developed of our learning strategies, and the one considered most dependable - 'seeing is believing'.

There is considerable evidence (Bruner, 1967 & Piaget 1952) that visual/imagery processes are an essential part of any learning. Bruner suggests that learning proceeds through three stages:

1. Enactive - involving manipulation of objects.
2. Eidetic - involving imagery and visualisation.
3. Symbolic - representation in abstract symbols.

Visualisation in many areas of mathematics, for example, is not only an accompaniament to understanding, it is fundamental to the ability to generalise and transfer the learning. Use of mental imagery, analogy or metaphor can be an essential part of creative thinking, understanding and discovery, for example, Newton's apple, Einstein's trains, Kekule's snakes and so on. (See Ortony, A., 1980)

Visual Literacy and Symbolic Systems Theory

Salomon's findings, discussed previously, are also relevant to the development of the visual literacy concept (Levie, 1978). A symbol system has elements in common with a language system, in being 'a set of elements that refer in specifiable ways to domains of reference and are interrelated according to some syntactic rules or conventions.' (Salomon, 1979).

Pictures and images are representations of the iconic code, a 'dense' symbol system where inferred meanings may be many and varied, according to the characteristics of the viewer. Salomon (1979) explored the idea that visualisation processes could be taught. Practice in 'reading' iconic codes may heighten the viewers' perception of levels of meaning, literal and symbolic and lead to increased skills of visual literacy.

As Heckscher (1975) writes:

> It is both the making and the unmaking of visual language that it is linguistically richer than verbal language. One more reason to learn how to read it, how to write it, how to structure it purposively. (Hecksher, E. E., 1975, p. 124)

Conclusions

Visual literacy, that is, competency in thinking, learning and communicating through the use of visual images, is therefore, an essential competency, most especially for educators and learners dealing with the visual media, for example television. Writers such as Heckscher urge that those people involved in Distance Education through television should make themselves familiar with the elements, structure and style of visual language, and become fluent in its use. His argument for visual language is that:

> Its particular genius is not in illustrating the verb, or in decorating the page, or in reinforcing the verbal statement. Its particular genius lies in its immediacy, its richness, its greater semantic stability, its ease of translation, its ability to communicate affective as well as cognitive information with much greater economy than words. Isn't that enough for us to learn it? (Hecksher, E. E., 1975, p. 131)

Visual Literacy and Learning from Television: Evaluation Criterion

The review of the literature in this area generated the assessment criterion:

3. To what extent and in what ways is visual information provided to facilitate learning?

(c) Active or Deep-Level Learning From Television

General theories of learning refer to the need for learner participation in the instructional process. Communication theories emphasise the importance of 'feedback' or interaction to complete the communication cycle. However, participation and interaction are severely curtailed in the context of Distance Education, where the learners and instructor are physically far apart, connected through the intervening technology. Therefore, Distance Educators need to seek ways of imparting to students a sense of involvement in their programmes, and to encourage and enhance valuable interaction. Communication of content needs to be carefully organised to avoid comprehension problems, because Distance learners have a reduced capacity to respond or to ask for clarification.

The third and final subsection of the review of the literature on adult learning through educational television, therefore, is concerned with active and interactive learning or 'deep-level' learning (Marton, 1977). Three articles are discussed which deal specifically with the problem of interaction in the Distance Education context, and from this, evaluation criteria are abstracted. Two papers presenting some simple guidelines for organising and presenting information for television are then reviewed.

Interaction in the Mediated Environment

Interaction is most facilitated in face-to-face communication in which both parties are actively involved in the exchange, and a two-way, free flow of dialogue is possible. Interaction is least facilitated in the mediated environment.

Attempts are then made, to make an essentially non-interactive medium interactive, by the addition of a secondary linking system, the telephone. Knowledge Network students are encouraged to 'Phone in!' and 'Get involved in talking back to your TV!'

Two-way television (as in some Knowledge Network broadcasts) was expected to be superior to one-way television (as in the Open University programmes) because it is interactive. However, according to certain research evidence, (Dubin & Headley, 1969) two-way television has proved to be significantly inferior to one-way television, as measured by student achievement on written examinations.

Martin (1980) in 'An Analysis of An Experimental University Course Via Satellite: Implications for Interactive Teaching-Learning Systems' considers the impact upon communication between instructor and students in an interactive Distance Education television programme. She argues that the effects of the use of electronic and mechanical media may be sufficiently substantial to affect the dynamics of interaction, and perhaps to justify the development of new frameworks of analysis for distance study.

Martin points out that little study has been conducted into the dynamics of teacher-student interaction in Distance Education. Specifically, there appears to be little qualitative or quantitative descriptions of the

dynamics emerging when interaction is via mechanical and electronic devices. She calls for an examination of the implications of these emerging patterns of interaction for learning, in the light of relevant literature.

A post-hoc analysis of two sessions, where communication was via a two-way audio and one-way video system, led to the following conclusions. First, the system allowed a fairly close facsimile of face-to-face communication, but the lack of non-verbal feedback to the instructor was disconcerting. Second, the onus of control was placed on the instructor who tended to dominate the session verbally to a greater extent than is normal in the face-to-face situation, and this runs counter to current notions of distance study, where the assumption is that there exists a greater degree of student initiation, choice and control, especially with adult students, than exists in face-to-face settings. Third, it appeared that the technology proposed the conditions for the instruction throughout, including the dynamics of student-instructor interaction. Finally, although unrelated to the question of interaction, was the observation that students and instructors bring to the experience of distance education by televi-

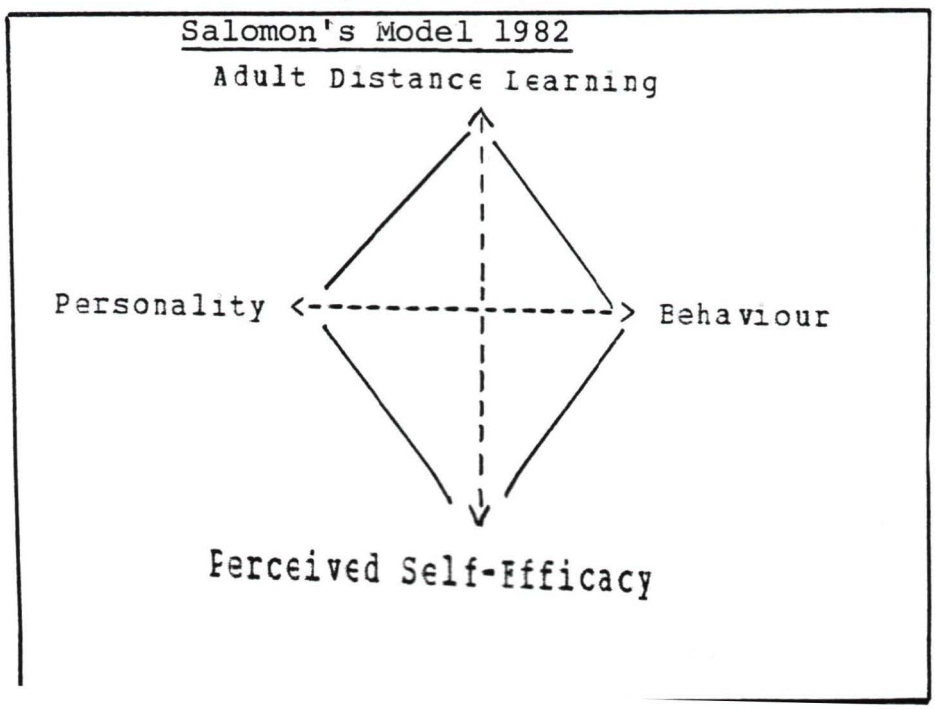
sion, expectations and assumptions from two settings: classroom teaching and television viewing, and that these had an effect upon the experience of the programmes. Martin ends by recommending that:

> 'teachers should be trained specifically to work in this kind of setting, and students be briefed thoroughly about the kind of involvement on their part that the medium necessitates.' (Martin, Y., 1980, p. 297)

The Adult Distance Learner: Lonely, Mindless and Helpless, or Interactive, Engaged and Efficacious?

In his paper written from the Hebrew University of Jerusalem, Israel, presented at a symposium of The American Educational Research Association in March 1982, Gavriel Salomon considers the problems faced by the adult distance learner. He proposes a model of the four factors involved:

Figure 17



Within the framework of this model, he considers the factors of relevance to adult distance education, that is: interactive programmes, mindlessness, social support and perceived self-efficacy. His concern is that adults returning to study in the distance mode, lacking in social support 'can easily come to feel somewhat inferior, not very efficacious, or even a bit helpless.' (Salomon, G., 1982, p. 3). Being on the receiving end of adult distance education programmes can have adverse effects on the amount of mental effort adults invest in learning, make them feel passive or 'mindless', and this has a depressing effect on their personal esteem or 'perceived self-efficacy (PSE)'.

Salomon concludes:

> If sustained mindful participation in adult distance education is a desirable objective, and if another objective is the cultivation of the participants' belief in their own ability to learn and grow, then adult distance education must
>
> a. be interactive, rather than a technical unidirectional delivery system; and
>
> b. be addressed at existing groups of people who engage in learning as groups. (Salomon, G., 1982, p. 5)

The first recommendation (a) promotes increased feelings of mastery, control and efficacy through interaction with the instructor. The second recommendation (b) provides for the need for social contact and peer group support. If these two conditions are met, Salomon argues, neither mindlessness nor declines in PSE should take place.

What is Interaction?

So far, discussion of 'interactivity' has been limited to one sense of the word only, that is, exchange of dialogue amongst participants, particularly between instructor and learner. But there are other ways in which learners can be considered to be 'interacting', for example, by 'actively' attending, listening, silently questioning, seeking to understand, thinking, reading, writing, talking with friends and family after the programme and so on. It is probably never the case that learners are passive and silent, unquestioning, uncritical recipients of knowledge. Or if they are, then there is truly something amiss.

An Active or Deep-Level Approach to Learning From Television

Morgan, Taylor and Gibbs (1982) investigated students' approaches to study at the Open Unviersity (OU) in Britain and the implications for improving student learning. They conclude that helping students towards what had been called by Marton (1977) a 'deep-level' or active, as opposed to a surface level or passive, approach to study is of critical importance in ensuring that students derive the maximum benefit from their courses. In designing Distance teaching materials at the OU, educational technologists pay particular attention to designing self-assessment questions, etc. to develop such an approach. Also, students are helped to change their conceptions of learning and increase their awareness of how they study.

Interaction in the Distance Education Context

The question of interaction may be seen as the weak point in Distance Education. It is becoming increasingly apparent that the more students are aware of their own metacognitive processes, (that is, their ability to think about thinking) and the more 'active', involved and in control they are in relation to their studies, the greater will be their personal sense of success and the greater their degree of meaningful learning.

However, it may not be necessary to be vocally interactive, in that students must 'talk back' to the instructor during the programme or even after the programme, in order for them to be 'actively' or 'interactively' engaged. It seems that Distance Educators who are uncomfortable with the lack of verbal or non-verbal feedback from students and anxious to seek ways of encouraging 'phoning in' and 'talking back' may have to shift their conceptions. Instead of considering that students are interactive only if they are talking to their instructor or to each other, we should perhaps recognise that they are 'interactive' at all times - it's just that we can neither see nor hear it, and that makes us worried. It may be the case that the student is far less concerned about being interactive than is her instructor.

This part of the literature review generated the assessment criterion.

4. To what extent and in what ways is an active or deep-level approach to learning encouraged?

Design and Presentation of Programmes to Ensure Learning From Television

Witt (1981(a), 1981(b)) presents some simple guidelines for effective approaches for organising and presenting information, based upon findings in media psychology, and how that information can best be communicated through a visual medium such as television. His overriding philosophy is stated simply, thus:

> Respect the mental needs, desires and limitations of your viewers. The easier you make it for them to learn, the more they will remember. (Witt, G. A., 1981a, p. 43)

In the 1981(a) article, Witt offers eight guidelines for conveying information to an audience:

1. Consider the limitations of your viewers and their viewing situation.
2. Help the viewer select a useful learning strategy.
3. Help the viewer understand the message by presenting it as an integrated, organised set of ideas unified by a common theme.
4. Suggest useful encoding/retrieval cues for each topic.
5. Relate new facts and ideas to familiar ones.
6. Don't overload the viewer with unnecessary facts.

7. Ask questions that highlight critical facts and ideas, then answer those questions.
8. Close with a summary of the major ideas, presented as an organised, integrated overview.

In the 1981(b) article six guidelines are suggested for translating the script into an effective visual media production:

1. Rely on the visuals and use mental imagery to 'lock in' the facts.

   a. translate abstract information with concrete, vivid terms.

   b. link visuals closely with explanatory narration.
2. Make the message interesting, e.g., use stories, analogies and examples to illustrate the material concretely. Use dramatisations to involve viewers.
3. Don't rush - give the viewer time to process information.
4. Keep the structure and the language simple - these should reflect the viewer's level of sophistication and knowledge.

5. When facts or ideas must be compared/contrasted, present them together.
6. Repeat major points more than once, using both visual and aural channels.

These 'rules of thumb' may be somewhat oversimplified for the context of higher education, however, they provide a useful 'checklist' of what to do when compiling information for a script to be presented on television.

Witt concludes by relating the anecdote of the successful television producer who, when asked by a viewer of one of his programmes how he had done it so well, answered:

> I took a tip from that old backwoods preacher who, when asked how he preached the Word, replied, 'I tells 'em what I'm going to tell 'em. I tells 'em. Then I tells 'em what I told 'em.
>
> 'An informational producer should do no less.' (Witt, G. A., 1981a, p. 43)

In Chapter 3, Section 3, of the review of literature, a series of articles and papers concerned with Adult Learning Through Educational Television have been discussed. Section 3 subdivides three areas (a) Research from Britain's Open University, (b) Visual Literacy and Learning from Television, and (c) Active or Deep-Level

Learning from Television. Four evaluation criteria were generated from these areas.

Adult Learning Though Educational Television: Evaluation Criteria

1. To what extent is the medium used for appropriate purposes, as defined by Bates (1981)?
2. How much emphasis and in what ways is attention given to individual differences in learning from media?
3. To what extent and in what ways is visual information provided to facilitate learning?
4. To what extent and in what ways is an active or deep-level approach to learning encouraged?

CHAPTER 4

Research Design

Data Gathering

The data for the study was gathered by two methods: I a literature review and II field work.

Section I : Literature Review

A review of the literature in the following areas was conducted:

(a) Educational Theory,

(b) Historical documents and reports.

(a) Educational Theory - Learning Theory; Communication Theory; and Adult Learning Through Educational Television, for the assessment of Part A of the study, Curricula.

Section (i) Learning Theory

It was considered necessary to begin with a review of the literature in the area of general Learning Theory, in order to understand the nature of the process of learning, especially as this pertains to

adult education. Special consideration was given to the area of interaction in learning.

Section (ii) Communication Theory

The activities of learning and instruction are part of the process of communication, where a sender (teacher) conveys a message through some channel to a receiver (learner). A review of the literature in the area of Communication Theory was carried out, to understand the nature of human communication, especially in the mediated environment, and the importance of interaction or 'feedback' for meaningful communication.

Section (iii) Adult Learning through Educational Television

Having described the nature and processes of human learning and communication, it was necessary to look at the specific context of relevance to this study, that is, the lone adult learning from televised courses at a learning centre, or, more commonly, at home.

This section was subdivided into three minor sections:

(a) Research from Britain's Open University
(b) Visual literacy and visual learning
(c) Active or deep-level learning from television.

From the review of the educational literature in these three areas, principles governing effective learning and communication were drawn out, particularly as these relate to the context of adult distance learning. The following were the criteria used in the evaluation of the video-taped programmes and interviews with Distance Education instructors, learners and programme designers, to see how far Distance Education programmes are consistent with the principles drawn from current educational research and thinking.

Figure 18

Evaluation criteria drawn from the review of educational literature for Area A - Change in Curricula

LEARNING THEORY:

1. To what extent, and in what ways, are general learning principles followed?
2. How far is the apparent approach to learning consistent with programme goals?
3. How much, and in what way, is attention given to individual differences in learning style?
4. How far, and in what way, are attempts made to attract and sustain audience attention?
5. To what extent, and how, is generative learning encouraged?

COMMUNICATION THEORY:

1. To what extent and in what ways are general communication principles followed?
2. How far and in what ways is the approach to communication consistent with programme goals?
3. How much and in what ways is opportunity provided for interpersonal communication?
4. How much and in what ways is emphasis given to the development of mental skills?

ADULT LEARNING THROUGH EDUCATIONAL TELEVISION:

1. To what extent is the medium used for appropriate purposes, as defined by Bates (1981)?
2. How much and in what ways is attention given to individual differences in learning from media?
3. To what extent and in what ways is visual information provided to facilitate learning?
4. To what extent and in what ways is an active or deep-level approach to learning encouraged?

(b) Historical documents and reports

A review was made of documents and reports giving the historical, institutional and environmental context for Part B of the study, Organisational Structure.

In order to assess the changes that are being effected on the learning system in British Columbia, it was considered necessary to understand how the system evolved and the nature of its present structure. This background information is reported in Appendices A and B and the findings were summarised in Chapter 1.

Two main types of publication were consulted here, first, research documents on Distance Education and new information technologies in B. C. and throughout the world, to understand the 'global context' of which the system under study is a part. Second was a selection of publications describing the historical development of the post-secondary education system in B. C. including a series of Ministerial reports which were instrumental in shaping the development of the learning system and specifically the kind of Distance Education provision that was introduced.

The description of how the learning system in British Columbia has evolved provides the background for Area B, change in organisation structure.

Section II : Field Work

Field work was also conducted. This was of two kinds:

1. Personal and telephone interviews with Distance Education administrators, instructors, and learners.

A series of interview questions (see Appendix D) was put to the selected respondents which varied according to who was being interviewed. The names of interviewees appear in Appendix E.

Face-to-face interviews were conducted with five senior administrators concerned with the Distance Education programmes within their respective institutions, that is, at the three Universities, the British Columbia Institute of Technology (B.C.I.T.) and the Open Learning Institute.

For the historical context of the study, Deans of Education at the Ministries were interviewed.

Distance Education personnel were interviewed at the Knowledge Network offices of the three universities.

University of Victoria instructors who had been involved in preparing courses for Distance delivery in a variety of academic disciplines were interviewed.

Telephone interviews were conducted with five Distance Education students in the Nursing programme of the University of Victoria. These students were selected because they had extensive experience of Distance Education Study in a variety of modes over a period of several years. Names were drawn from class lists held by Dr. Faith Collins of University Extension, and participation was voluntary. An evaluation questionnaire completed by students in one couse (Crisis Intervention) was reviewed as well as a paper summarising the experiences of those involved in the first credit nursing course prepared for the Knowledge Network.

2. Analysis of Video-Taped Knowledge Network Programmes and Print Packages.

Thirty hours of viewing of a sample of Knowledge Network programmes produced at the University of Victoria was carried out. Programmes and supporting print materials were assessed in the light of the criteria drawn from the

educational literature. Programme titles are listed in Appendix F.

The Post-Hoc Nature of the Study

The present study is based upon the findings of two earlier studies conducted by this author, whilst employed as a Research Assistant at the University of Victoria.

The first project was carried out in the Autumn of 1981 and Spring 1982 for the Knowledge Network, entitled 'The Principles and Practices of Good Television Teaching.' This involved a review of the literature in the three areas of Learning Theory, Communication Theory and Adult Learning through Educational Television, and the subsequent abstraction of evaluation criteria. These criteria were applied to the field work in (1) evaluation of 30 hours of video-taped Knowledge Network programmes, and (2) interviews with Knowledge Network instructors.

That is, most of the data collected for Area A of this study (Curricula) was gathered in the course of the first research assignment.

The study was designed and led by Dr. Margaret Haughy, Distance Education Programme Co-ordinator, University

Extension, and Dr. Geoff Potter, Faculty of Education. The findings of the study led to the presentation of a paper at an International Conference on Distance Education, Sydney, Australia, by Dr. Potter in July 1982. The report itself has not yet been published, but copies are available from the two project supervisors.

The second assignment was a study commissioned by the Organisation for Economic Co-operation and Development (O.E.C.D.), Centre for Educational Research and Development based in Paris, and was part of a survey conducted amongst several countries (including Australia). The report was prepared for Project 1: Education and New Information Technologies, Area B: Changes in curricula and institutional structures. The study was undertaken during the late summer of 1983 and published in November 1983, entitled Case Study: British Columbia - Higher Education and the Integration of a New Technology. It was funded by a grant from the Universities Council of British Columbia, and supervised and co-authored by Kathleen Forsythe, Executive Director, Knowledge Network, Victoria, B. C. Copies are available from the Knowledge Network office at the University of Victoria.

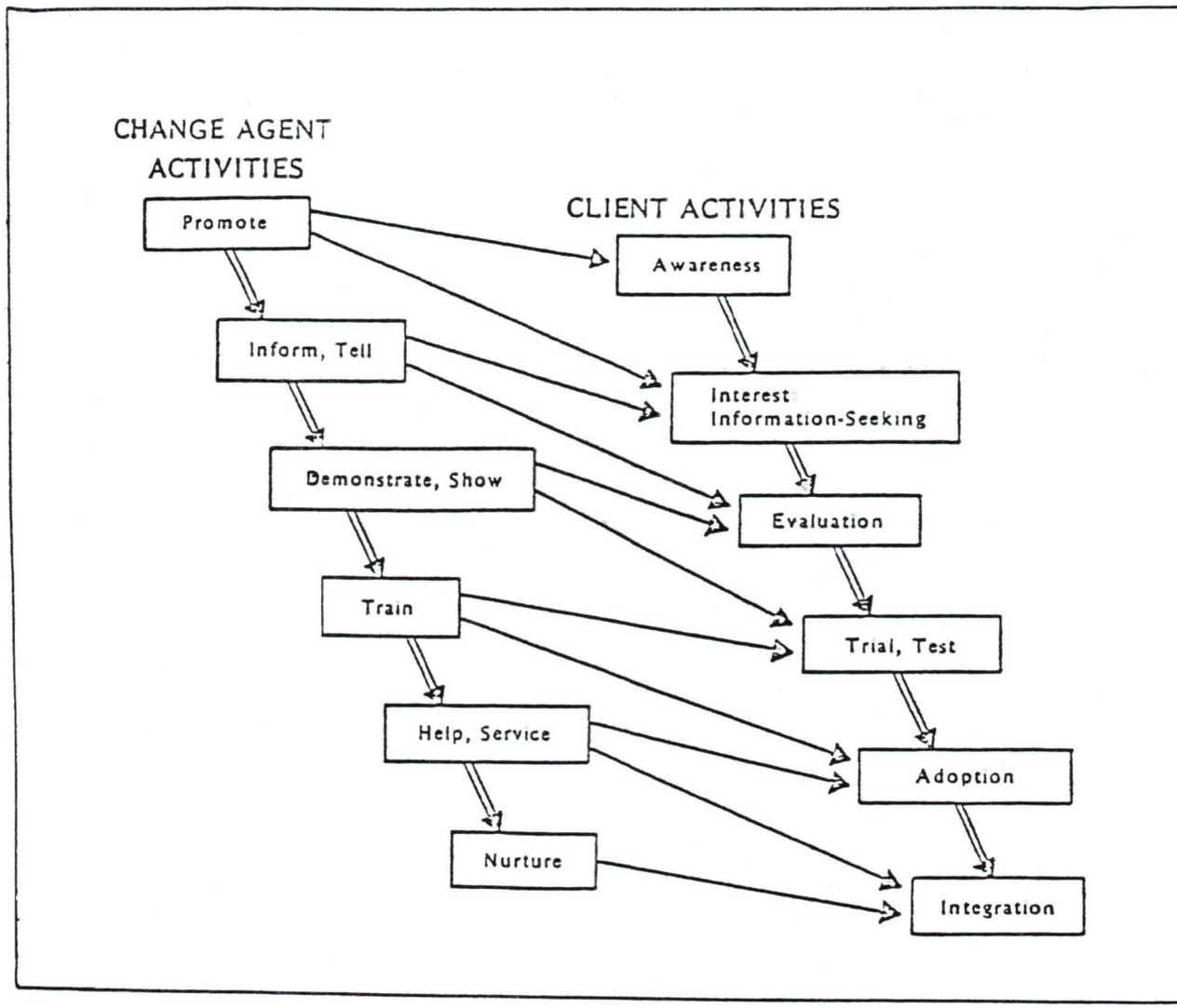
All the data collected for Area B of this study (Organisational Structure) was gathered in the course of this second research assignment, which required a reading of historical documents and reports, and interviews with high-level administrators, instructors and learners in Distance Education. Some material was also gathered on Curricula, which was used in addressing Area A of the present study.

Knowledge Network as Change Agent

Essentially, the study is concerned with how change takes place within a system as a result of the introduction of some new element. Specifically, it deals with the impact of Distance Education and new technology, particularly Knowledge Network and satellite telecommunications on the university system. Thus, a model is needed to illustrate in what respects the Knowledge Network functions as an agent of change within university system. The model used is taken from Havelock (1975) The Change-Agent's Guide to Innovation in Education.

Figure 19

Knowledge Network as Change Agent



Here, the 'Change Agent' is the Knowledge Network, the 'Client' is the three universities. The role of the Knowledge Network as Change Agent will be elaborated upon in Chapters 5 and 6.

Limitations to the Study

The study is limited to the involvement of the three universities in Distance Education, rather than to the colleges and institutes. In particular, the study was restricted to an examination of Knowledge Network programmes produced at the University of Victoria. The instructors and students interviewed were also from the University of Victoria. However, some Knowledge Network programme co-ordinators and administrators at the University of British Columbia and Simon Fraser University were also interviewed, and their responses used as data.

Sample sizes of interviewees were necessarily small and limited, owing to constraints of time and accessibility.

Thirty hours of viewing of video-taped programmes was conducted, and it is recognised that only a limited cross-section of programmes could be seen in this time. A sample of recent programmes made during the last three years was selected, dealing with a range of subject areas, most of which were unfamiliar to the author.

Primary consideration is given to the role of B. C.'s Knowledge Network, using satellite telecommunication. The work of B. C.'s other Distance Education body, the Open Learning Institute, which relies principally on printed materials will be mentioned, but is of lesser concern in this study.

The area of cost analysis of Distance Education is not addressed in this study as it is very difficult to assess the true cost of Distance Education in British Columbia. (The early satellite experiments carried no charge for the satellite use and it was only at the transfer to ANIK-C in February, 1983 that the Knowledge Network had to assume commercial tariffs of $1 million a year for satellite usage.) In comparing student participation, again it is difficult to assess exactly which students are affected by new technologies. As with any emergent inno-

vation, there are still a variety of terms used to describe and quantify students, such as credit/non-credit, full-time/part-time, head count/enrolments.

CHAPTER 5

Findings

The findings can now be assessed in the light of the criteria drawn from the educational literature, to see how far the process and product of Distance Education are consistent with the theory to which they relate.

The principal research questions of this study were illustrated diagrammatically in Figure 2 (Chapter 1):

- Impact of Distance Education and New Information Technology
  - A Curricula
    - 1 Process
    - 2 Product
  - B Organisational Structure
    - 1 Internal Functions
    - 2 External Functions

The findings will be presented following this schemata, that is, examining the impact of distance delivery on the process and product of the curriculum, then the impact of distance delivery on the internal and external functions of the three Universities.

The method of illuminative evaluation was used, where no single means of data collection is used in isolation,

but where different techniques are combined to throw light on a common problem. Besides viewing the problem from a number of angles, this 'triangulation' approach facilitates the cross-checking of otherwise tentative findings. As this researcher was working principally by herself, the use of triangulation for the corroboration of evidence from several different sources was considered particularly appropriate.

Area A. Curriculum Process and Product

Learning Theory

1. To what extent and in what ways are general learning principles followed?

It was found that the most significant area where the Distance Education process fails to correspond with the general principles drawn from the literature on learning is in the difficulty of facilitating interactive learning or active involvement in the mediated learning environment. Instructors expressed dissatisfaction with a style of presentation that involved their 'telling' rather than 'teaching' information to students and the inability to

check for understanding. Instructors had a sense that if students were not given a chance to share their perceptions, then they were being offered an inadequate learning experience. One instructor likened the process to 'teaching through a key-hole' because of the lack of verbal and visual 'feedback' from students. However, some students enjoyed the 'anonymity' of the situation, feeling uncompelled to respond unless they really wanted to. The resulting feeling of being relaxed and unpressured can make the learning experience more positive, especially for 'shy' learners.

Generally, the Distance Education product was found to be in keeping with fundamental learning principles, such as suitability of programmme material to the audience in terms of level of complexity, relevance, relationship to prior knowledge and programme goals, particularly in more recently developed programmes (e.g. Nursing 301).

Two students enthused about the comprehensive nature of print materials which enabled them to read and prepare ahead. Having an outline of the whole course in advance provided greater flexibility of study time. There were some instances where the presentation style was question-

able, however, and it was considered that the material was overly demanding of attention or unnecessarily detailed or complex for the projected viewing group, for example lengthy periods of 'talking heads' on television presenting data in several different courses including Public Administration, Philosophy and Language Arts Education.

Learners commented on the inappropriateness of the lecture style presentation for the television medium.

> The lecture format does not work well on television. Despite the fact that the material was interesting, we got quite bored with the presentation. (Crisis Intervention Course Evaluation: Port Alberni)

A programme designer/co-ordinator spoke of the need for Distance Education presenters to excite, interest and challenge students in their manner of presentation.

2. How far is the apparent approach to learning consistent with programme goals?

Individual programmes were found to vary in the extent to which they adopt a predominantly Behaviourist or a predominantly Cognitive approach to the learning process. However, the restricted facility for personal interaction in the Distance Education context means that,

frequently, more time is spent in the delivery of content than in discussion and development of the cognitive skills. It appeared that difficulty was more likely to be experienced by the instructor taking a Cognitive view of learning. For example, in programmes in counselling, the goal was often to elicit a point of view, change an attitude or explore alternative ways of handling psychological problems, and this called for a free exchange of ideas, which was not possible to instigate with this technology.

The product of Distance Education in terms of programmes and packages was thought to reflect a range of approaches, as philosophical orientation to the learning process varies amongst instructors. Those television programmes and print materials that took account of individual differences in the way students would interpret content, and which sought to develop skills of 'learning to learn' were considered by this writer to reflect a more Cognitive approach.

3. How much and in what ways is attention is given to individual differences in learning style?

It is difficult for instructors to take account of individual differences in learning style in the process of Distance education where they have very little opportunity to get to know the student as an individual. The point was made by a programme co-ordinator that Distance Education is based on a broader model of education than regular classroom teaching. Instructors have no specific information on the knowledge levels and range of learning styles of Distance Education learners. It was added that there is a need for instructors to have clearer information on their students so that further account may be taken of individual differences.

Some recently developed print packages were considered by this researcher to be well designed to take account of individual differences in learning style, e.g. Nursing 301 where the instructor includes a preface on her orientation towards teaching, referring to the importance of taking responsibility for one's own learning, and there are activities and guidelines throughout designed to assist the self-instructional process. However, the general conclusion reached by this researcher was that insufficient use was made in the product of the curriculum, of

techniques designed to encourage learner participation and to allow for individual differences in learning style.

4. How far and in what ways are attempts made to attract and sustain audience attention?

A programme designer noted that "Material needs to be presented in an 'attention-grabbing style' for delivery in the distance mode."

The potential exists to make use of devices likely to attract and sustain attention, such as stimulating visual or audio effects, film animation, video inserts, role play, use of novelty or surprise, verbal or visual metaphors and analogies, all of which may improve understanding and learning. Some creative use of such devices was seen, for example, in a Nursing programme, the comparison of blood flow to a kitchen whisk, and a mime involving the use of appropriately labelled people moving along corridors to represent the components of blood and its circulation. Any attempts made to illustrate concepts in concrete or visual terms, were found welcome by this reviewer.

It became apparent in the course of interviewing that there exists a 'gap' between the worlds of the educator and the technologist, in particular, a resentment amongst instructors of what they perceive as a pressure to compete with commercial television programmes in the production of sophisticated looking programmes. One instructor complained, "I didn't enjoy being told to 'smile'." Another said she resented the compulsion to look 'aesthetically pleasing.'

Production managers are aware of the need for programmes to be technically well-produced and professional looking. As one programme co-ordinator commented "No one will listen if you don't look as though you know what you're about."

5. To what extent and how is generative learning encouraged?

Wittrock (1977) referred to learning as a process in which the learner participates, to create or generate their own learning. Where learner participation is restricted, such as in the Distance Education mode, generative learning is less likely to occur. Methods involving

learner participation such as debate, discussion, question-and-answer, brainstorming, problem-solving and group work are difficult or impossible and few examples of these kinds of activities were seen. Therefore, it was considered by this writer to be particularly important for learners to be given opportunities to interact with the educational product and derive their own meanings from it.

When the supporting print materials to the television programmes were reviewed, only some of the packages contained the kinds of stimulus questions and exercises inviting learners to draw upon personal or practical experience, and suggestions for further research that would encourage generative learning. The overall conclusion from the review of television programmes and print packages was that communication of content tends to be over-emphasised at the expense of promoting 'discovery' in learning.

Communication Theory

1. To what extent and in what ways are general communication principles followed?

In order to communicate effectively, consideration has to be given to such matters as technical quality of sound and vision; presenter's voice quality; facial and bodily expression; eye-contact with and 'projection' to the audience; knowledge of material and student group; familiarity with technology; interest in material; orderly presentation of materials; enthusiasm for teaching; the logic and clarity of explanation; pacing; use of language and text readability.

According to Distance Education project managers, fewer technical problems are experienced now than was the case in the early years of Knowledge Network programming. Some examples were seen of blurred graphics and instances of delay in connecting telephone calls or even loss of telephone connections, and these, when they did occur, were found frustrating and distracting.

There is a particular need for the Distance Educator to project her 'personality' through the television medium. Several students made remarks such as "I liked the instructor", "found her very personable", "she seems so human" and "she's relaxed and can talk to you." It is important for the instructor to maintain eye-contact with

the viewer through the camera lens, and to avoid reading from notes. A programme co-ordinator noted that "A special type of instructor is needed for Distance Education; they need to be logical and focussed, with the ability to transmit information in a flexible manner."

Where the instructor had taken the trouble to find out something about the individual viewers, this was acknowledged and welcomed by learners "She's aware of the background of the student."

Appropriateness of pacing was also considered an important factor in communicative competence. Generally, a tendency towards uninterrupted flow of information was noted by this reviewer, possibly because instructors are aware of time limitations and because of the lack of student interruptions. Pausing to allow time for assimilation of content was found helpful by the reviewer.

It is not uncommon for instructors to experience difficulty in adjusting to television teaching. Instructors said that they felt physically constrained, having to sit still in their chair, and mentally constrained, from the necessity of following a carefully prepared script and observing time limitations on air. This can result in an over-formal, stilted presentation.

An important part of the communication cycle is 'feedback' from the receiver. The Distance Education communicator often compensates for the lack of personal interchange by providing highly informative, detailed, well-structured print packages and televised programmes. Instructors tended to dominate communication and to present more information than they would in the classroom environment. Although instructors, students and production staff commented on the comprehensive nature of the Distance Education product, and the careful organisation and presentation of materials, it was noted that there may be danger of communication breakdown occurring as a result of 'overload'. For example, two learners commented on 'heavy reading loads' which were 'too dry and theoretical.' Courses could involve great amounts of time spent in reading and writing assignments.

2. How far and in what ways is the approach to communication consistent with programme goals?

Later models of communication emphasise the role of reciprocity or interaction, the importance of the social context of the communicative act and the nature of the

relationship between sender and receiver. Because of the restricted opportunity for verbal interaction, and for non-verbal feedback which reveals much about feelings and thoughts, the instructor taking a semiotic view of communication is likely to feel stymied in the Distance Education context.

For example, where a programme goal is to draw upon the professional knowledge and experience of the learner group as 'input' into the programme, things can easily go wrong. On one occasion, an instructor in a counselling course for social workers attempted to set up a role play situation, where learners would call in to suggest the course of action to be portrayed. The attempt failed when no calls were forthcoming, and the role play was continued without the benefit of learners' contributions.

Lack of opportunity for reciprocation did not appear to give rise to problems, however, in programmes where transmittal of content was the primary objective (e.g. a recent programme in Canadian Government). It was considered problematic mainly in 'issues' courses such as 'Issues in Biomedical Ethics' or 'Counselling.'

Frequently, a 'process' rather than a 'semiotic' model was seen to dominate, where communication is seen as the sending of messages from sender to receiver, rather than the generation of meaning by the interaction amongst sender, receiver, message and context, e.g. programmes in Public Administration, Education and Philosophy.

3. How much and in what ways is opportunity provided for interpersonal communication?

Constraints placed upon human interaction in the Distance setting have been said to be the weak point of the Distance Education process. The percentage of time allocated to telephone interaction with students varied from 0% to 33% with an average of 20% (i.e. 12 minutes in an hour of programming.). Some programmes were non-interactive.

Because of the difficulty of interaction in the mediated environment, instructors, expressed concern that the Distance learner may somehow fail to 'get the message'. Generally, there was greater concern amongst instructors than amongst learners concerning the lack of interaction. This perception is, of course, heightened by the fact that the instructor is seen, whereas learners are not. Some of

the Knowledge Network students interviewed commented that interactive periods were not the best use of the limited time available and they would have preferred even more 'lecture' time. Other students' questions were found irrelevant to their own needs, 'some questions seem to come out of left field', and learners were reluctant to phone, either because they had already understood, or because they had not, but were to embarrassed to publically expose naivety or ignorance. One of the Nursing students interviewed commented "I liked the feeling that I could call most any time" ... but "was too shy at first."

4. How much and in what ways is emphasis given to the development of mental skills?

The review of the television programmes and print packages revealed a greater emphasis upon content than development of mental skills in learners. This writer considered that it is particularly important to pay attention to helping students improve their understanding of their own cognitive and learning processes in the Distance Education environment, where learning has to be independent.

More recently developed materials (e.g. Nursing 301) were judged to be superior to earlier programme materials in developing learning skills. Here advice is given on such study skills as note-taking and precis writing. Learners are encouraged to synthesise theoretical and practical knowledge.

Adult Learning Through Educational Television

1. To what extent is the medium used for appropriate purposes, as defined by Bates (1981)?

Bates defines the appropriate use of the television medium in education as including such functions as demonstration, illustration, visual explanation, to show practical activities or processes, substitute for field trips, to incorporate drama, role-play, film or animation for clarification or exemplification, to describe abstract or complex topics in concrete terms and so on.

The review of the programmes revealed noticeable disparity amongst instructors and courses in making the best use of the medium of instruction. In some cases, imaginative use was made of techniques such as video-inserts or

role-play which enhanced the subject matter; at other times, their inclusion seemed unhelpful and gratuitous.

Examples were seen where television was used to convey material of a non-visual nature that would have lent itself better to presentation by a different medium, such as, audio-cassette (e.g. a course in Canadian Government).

The practice of conveying the bulk of the information in the print packages, and reserving television programmes for highlighting, demonstrating, exemplifying and discussing the key points is in keeping with the literature on appropriate functions of media.

One high-level administrator expressed concern that research in the use of instructional technology is poor and fraught with assumptions about what is good television. He believed that, contrary to our assumptions, educational television programmes do not have to be entertaining and visually sophisticated to be successful. According to him, students may learn as much from simple presentation such as 'talking heads' as from the elaborate production. This raises an important question about what students find acceptable methods of presentation in educational broadcasts, and whether this is different from their expectations of commercial television.

2. How much and in what ways is attention given to individual differences in learning from media?

The literature suggests that students vary in their ability to learn through the different media, and interviews with students support this finding. One Distance learner reported that, having had experience in learning from television, she could not return to learning in a correspondence mode, which previously she had found adequate.

Programmes on the Knowledge Network are to some extent 'multi-media', being managed by television, telephone and print. With technological advancements, increasing thought is being given to use of computer assisted learning and instruction (CAL and CAI). Hence there are various options in media available to Distance learners.

3. To what extent and in what ways is visual information provided to facilitate learning?

Although there is greater opportunity for inclusion of visuals in the Distance Education product, less use of stimulating and informative graphics was found than was

expected, especially on television. So, although learning in the Distance Education mode should involve visual thinking, visual processing and visual learning, in fact the learning that takes place is predominantly verbal, from the spoken and written word.

Programme designers referred to the 'increased need for a visual component for the television medium.' However, in practice, programmes were judged to be weak in this respect. Graphic information was less imaginative and stimulating than is appropriate for a primarily visual medium, and sometimes, no graphics were used at all.

4. To what extent and in what ways is an active or deep-level approach to learning encouraged?

Researchers investigating leaning in the Distance Education environment have been concerned about the greater risks of Distance students becoming passive recipients of knowledge, rather than active participants in learning. This may in turn lead to a decrease in motivation, and even to failure to complete the course.

If students cannot become directly involved in the Distance Education process through talking to instructor

or peers, then instructors need to find ways to keep them 'active' in their approach to learning and interactive with mateials, so that learning is deep-level, thoughtful, critical and meaningful.

The review of the Distance Education materials revealed a disparity amongst individual instructors in their awareness of this need. Some of the programmes and packages included study guides, self-assessment questions and learning activities, all of which are designed to make learners more accountable for their own learning and to increase 'generative' learning. However, other recently produced programmes were reviewed which do none of this (e.g. Canadian Government).

The above findings are summarised in Figure 20

Figure 20

Matrix of evaluation criteria and research findings

Area A Curriculum

EVALUATION CRITERIA	SUMMARY OF FINDINGS
LEARNING THEORY	
1 To what extent and in what ways are general learning principles followed?	Lack of personal interaction. Fundamental principles followed but presentation often weak.
2 How far is the apparent approach to learning consistent with programme goals?	Technological constraints made cognitive approach difficult. Variation amongst individual instructors/ programmes.
3 How much and in what ways is attention given to individual differences in learning style?	Difficult in D E context. Increasing use of techniques to assist learner in taking individual approach found in some recent print packages.
4 How far and in what ways are attempts made to attract and sustain audience attention?	Insufficient awareness of need to attract and sustain audience attention.
5 To what extent and how is generative learning encouraged?	Communication of content emphasised of expense of promoting discovery in learning.
COMMUNICATION THEORY	
1 To what extent are general communication principles followed?	Technological constraints can lead to instructor-dominated communication, danger of 'over-load' and formal or rigid productions.
2 How are and in what ways is the approach to communication consistent with programme goals?	'Process' not semiotic model dominates. Consistent where goal is communication of content, inconsistent where goal is to produce cognitive change.
3 How much and in what ways is opportunity provided for inter-personal communication?	0-33% Average 20% interaction. Instructor-dominated communication with insufficient learner feed-back. Instructors more concerned than learners.
4 How much and in what ways is emphasis given to the develop-ment of mental skills?	Tendency to stress content rather than development of mental skills.
ADULT LEARNING FROM EDUCATIONAL TELEVISION	
1 To what extent is the medium used for appropriate purposes as defined by Bates (1981).	Disparity amongst programmes. Frequent 'inappropriate' use of t v medium.
2 How much and in what ways is attention given to individual differences in learning from media?	Knowledge Network programmes use t v , telephone and print. Planned use of computers will make wider range of technologies available.
3 To what extent and in what ways is visual information provided to facilitate learning?	Often lacking in visual stimulation.
4 To what extent and in what ways is an active or deep-level approach to learning encouraged?	Disparity amongst individual instructors in awareness of need for active/deep-level learning reflected in D E products.

This matrix also appears in Appendix G.

Area B: Institutional Organisation

The second area of attention of this study is now addressed, that is, the impact of Distance Education and new information technology on the internal and external functioning of the Provinces three universities. (See Figure 2)

Figure 2

Research Questions

- Impact of Distance Education and New Information Technology
  - A Curriculum
    - 1 Process
    - 2 Product
  - B Organisation
    - 1 Internal
    - 2 External

To set the context for the findings in this area, on the organisational structures of the universities, it needs to be understood that the innovations under study have been introduced only recently, during the last decade, and that organisational change is a slow and gradual

process. There is no literature that can be documented as evidence of the changes that have taken place. The review of historical documents and reports given in Appendices A and B, and summarised in Chapter 1, illustrate how the post-secondary system of education evolved into its present structure and describes introduction of Distance Education systems, in order to provide a 'backdrop' for the assessment of the changes that are taking place. The data that can be cited as evidence of change is found in the policy and practice of Distance Education, and was gathered through the face-to-face interviews with those involved.

In comparison with Area A Curricula, the evidence in support of Area B, Organisation, is rather 'thin'. Also, its nature is transitory, for what is practised and believed at one time, is subject to modification and change the next. Responses given in the course of interviews held for the purpose of this study, may be different from the responses that would be given if the same questions were to be asked now, several months later.

Interviews were conducted with personnel concerned with Continuing and Distance Education in B. C., that is,

administrators and instructors working within the Universities and Institutes and Government Ministries (see Appendix E for list of names). The purpose of the interviews was to ascertain the understanding of and concerns about the university system as it undergoes gradual change, amongst those people who are a part of that system and whose daily work has contributed or is contributing to its development.

Internal Organisation

The Principle of Open Learning

One of the underlying assumptions of the study is that the university system in B. C. has become increasingly 'open' in response to the introduction of Distance Education, Knowledge Network and the new information technology. Indicators of 'openness' would be changes in such areas as admission requirements, transfer of credit and number of 'contact hours' required of Knowledge Network instructors.

Need for Institutional Change

As the new information technology is introduced, changes can be expected in the internal and external functioning and policies of the educational institutions.

Several Distance Education administrators commented on the need for change to occur within traditional learning environments in their philosophy and orientation towards education. This change is necessary in order to accommodate developments in technology, instructional methodology and different student needs. However, educational establishments tend towards conservatism and they are often slow to adapt and respond to a changing environment. It was considered by some interviewees that there is resistance to change in some quarters of the learning system in British Columbia. This is compounded by significant shifts in the Provincial economy and resulting feelings of job insecurity amongst faculty and other staff.

One administrator made the following observations on the effects of social change on education.

1. Major technological developments including the advent of the computer are revolutionising the face of society in the 1980s. People now can expect to hold down

two or even three different careers in one lifetime; and the nature of work has changed in keeping with a 'high-technology' world.

2. Women have 'entered the market place' in significant numbers and are now returning to education for retraining and updating of skills.
3. Demographic patterns are having an effect on education institutions. A decline in high-school graduates is being experienced, so fewer numbers of students are competing to enter the universities. These numbers are not expected to rise again for another decade.
4. Competition amongst universities is keen, and universities are now faced with external competition from the private sector in the provision of professional training. Crown corporations, Government Ministries, business and private schools all offer training programmes to employees, so that educational establishments no longer have a monopoly.

His conclusions were that the universities cannot afford to remain as 'ivory towers' serving an elite. If the university is to serve the people in a democratic way, government subsidies will be needed so that special educa-

tion courses can be developed where the user cannot pay for services. Also, universities in small population areas cannot afford to compete with each other. They need to find areas for each to offer services and any competition should be a competition for excellence in the delivery of those services. His final point was that the universities will have to ensure that its services are in keeping with the real needs of the populace in order to survive in the future.

Programmes

Some issues of concern to those involved in the university system were apparent. For example, there is a lack of adequate needs assessment being undertaken. One Distance Education programme co-ordinator and a Director of Continuing Education at the Ministry of Education expressed doubt regarding whether programme offerings are really relevant to the needs and interests of the learner.

The programme co-ordinator thought that courses may be offered simply because there is faculty able and willing to run them, rather than because there are indications that students need them (e.g. a programme in 'Apiculture'

offered at Simon Fraser University). All too often, the student voice is not heard. The above mentioned Director of Continuing Education noted in particular, that there is a lack of educational provision for those who have most need, such as the under-educated and those in socio-economic need. There is a tendency to provide further education for those who already have it. An area to be addressed is the provision of Adult Basic Education to enable learners to re-enter the system.

He went on to say that a special area of need is in Adult Special Education to provide for physically handicapped and institutionalised students. Use of sophisticated technology can help the handicapped to overcome their communication problems. Other areas of course development which were suggested are English as a Second Language and the tutoring of new Canadian immigrants, the unemployed and Native Indians.

It was felt by one programme co-ordinator that a balance should be found between creation of original programmes in British Columbia and the borrowing and adaptation of existing programmes from elsewhere, for example, Great Britain and the United States. Production of origi-

nal programmes is expensive, especially where high-level, specialised, rather than mass introductory courses are concerned, and it is often more economical to purchase existing products. There may, however, be a danger of losing the Canadian and British Columbian experience if too many imported programmes are used.

A question that needs to be resolved, according to two interviewees is that of the copyright or ownership of jointly produced programmes. Where experts from various institutions collaborate in a team production, it may be difficult to establish who 'owns' the product.

Institutional Involvement in Distance Education

There was a certain degree of concern expressed by one programme co-ordinator and one professor regarding the motivations of the institutions to become involved in Distance Education pursuits, and whether this was educationally (unselfishly) or politically (selfishly) driven. "Political decisions are made as to courses...few people care about student needs...there"s no real needs analysis.' It may be the case that the need for universities to search out new 'consumer groups' and the sudden availability of the technology to reach people in distant locations

has led the universities to 'jump on a new bandwagon' namely 'Distance Education'.

Admissions Policy

A programme designer noted that University entrance requirements need to become more flexible so that mature students are not debarred from access to educational opportunity because of a lack of formal academic qualifications. It may be the case that the typical Distance Education student cannot meet the entrance requirements of the university, so allowances will have to be made.

In practice, however, it appears that, although changes in policy have taken place during recent years, these changes are totally unrelated to the influx of Distance Education students. These adult learners are expected to meet the same standards as any other student applying for entrance to the university.

Faculty and Personnel Involvement and 'Contact Hours'

Two programme designers/co-ordinators noted that faculty members involved in Distance Education projects need

'release' time and financial renumeration in order to attract good quality instructors. This issue of 'contact hours' was not raised during the course of the interviews, but it is of significance in the Distance Education context. Faculty members are obliged to teach for a certain number of contact hours per week or per course, in their face-to-face classroom duties. However, there cannot be a direct equivalent in Distance Education teaching, which requires greater time in planning and preparation but fewer 'contact hours' because of limited broadcast time. At the University of Victoria, a policy statement was issued, recognising that Distance students spend more time reading their print materials, and that it was inappropriate to demand a precise equivalent of contact hours between face-to-face and Knowledge Network instruction.

Another programme designer referred to the fact that the requirements of Distance Education programmes have to be understood amongst the personnel responsible for the physical plant of educational establishments, such as print and television services.

Student Evaluation

In a paper discussing the experience of preparing, delivering and evaluating its first credit distance learning course launched on the Knowledge Network by the University of Victoria's School of Nursing, an instructor expressed concern about suitable means of evaluation and grading of adult distance students:

> Learners are older, often out of touch with academic expectations, out of practice in assignment writing, exam-taking, etc. Moreover, resources to assist them, for example, opportunities for close-contact with teachers and peers, are not available. Students, therefore, are handicapped compared to on-campus students. How should they, therefore, be graded? (Attridge, 1982, p. 32)

Internal Organisation: Summary

It was determined from the interviews with a variety of personnel involved in Distance Education that increasing recognition is given to the importance of Distance Education activities throughout the administrative hierarchies of the universities. Technological developments in 'hardware' and 'software' and changes in instructional design have enabled institutions to respond in some measure to the changing needs of its clientele. It is advocated that universities become more open and accessible to account for these needs. However, there is little real

evidence of increased openness within the university system in such areas as credit transfer, student evaluation and admissions policy, in response to the introduction of Distance Education technologies and the needs of adult learners.

There were two major reservations expressed concerning certain issues. First is the motivation for institutional involvement in Distance Education pursuits, whether this was educationally or politically driven.

Second was the fear of academic elitism; that Distance Education bodies, notably those who use the Knowledge Network, provide high level courses for the already educated, and fail to bring general or beginning level courses to those in most educational need, such as in the areas of Adult Basic Education, Special Education and English as a Second Language. This was said to be a result of the lack of proper needs assessment being conducted. Educational institutions can all too easily become self-serving instead of existing to serve the requirements of the consumer.

External Organisation

A second assumption of the study is that the university system in B. C. has become increasingly co-operative and collaborative in response to the introduction of Distance Education, Knowledge Network and the new information technology. Indicators of co-operation and collaboration would be found in such areas as statements of policy, jointly produced programmes, sharing of resources and inter-university Distance Education projects.

The relationships between the three universities and the Knowledge Network are examined, as well as the relationships amongst the universities. The role of the Knowledge Network as a 'Change-agent' (Havelock, 1975) is illustrated, that is, that the Knowledge Network acts as a co-ordinating body, encouraging the universities to work together in new ways. Pask's Conversation Theory is used to describe these collaborative efforts. The state of 'Conversation' (or co-operation amongst the universities in using Knowledge Network as a disseminator of their Distance Education programmes) can be regarded as a goal. Dubrov's (1977) model is used to describe the means by which this end is being achieved.

If the Knowledge Network is to operate with maximum efficiency, then it is necessary for the institutions using its services for the broadcasting of their programme offerings to 'converse' with each other.

Co-Operative Individuality

The term 'co-operative individuality' is used to describe the balance between the shared and autonomous nature of operation amongst the universities. This collaboration is considered necessary to ensure a comprehensive range of programme offerings, to avoid duplication of effort, and to allow learning from each other's experiences.

Evidence of Co-Operation: Policy Statements

There are signs that the universities are working together to offer their services to students whilst retaining their autonomy and self-governance.

This co-operative effort is apparent in both the policy and practice of Distance Education programming, for example, the Knowledge Network's mandate is:

> To assist, and collaborate with, universities, colleges, provincial institutes, school districts, ministries and agencies of the Province in the development, co-ordination and delivery of educational programs and materials. (Constitution of Knowledge Network of the West Communications Authority, Registered unde the Societies Act, May 29, 1980)

The Scheduling Policy for the Network establishes its operating principles, amongst which are stated:

> Given that the Knowledge Network is mandated to work 'for the benefit of the people of British Columbia, in co-operation with universities, colleges, provincial institutes, school districts and other institutions and agencies concerned with education', it is important that a process of scheduling access to the Knowledge Network's resources be based on a principle of equity. (Constitution of Knowledge Network of the West Communications Authority, Registered under the Societies Act, May 29, 1980)

and

> Institutions using the Knowledge Network are autonomous. However, when utilizing the Knowledge Network as a province-wide delivery system respecting other institutions for their individual and unique contributions. The principle of co-operative individuality will apply. (Constitution of Knowledge Network of the West Communications Authority, Registered under the Societies Act, May 29, 1980)

Collaborative Course Development

The principle is also apparent in collaborative course development amongst the universities. In minutes

recorded at a meeting of the Learning Systems Working group (Universities and Institutes), December 15, 1983, Dr. Hardwick refers to this:

Minute 6

International Co-operation in Course Development

> Dr. Hardwick briefed the meeting of the recent visit by Dr. David Blackburn of the British Open University Foundation. The visit included meetings with the Minister, representatives from UBC, the Open Learning Institution (OLI) and Knowledge Network. Dr. Hardwick reported that the Minister was anxious for co-operation in the development of some courses of excellence. That might include one project per institution. Examples might involve the University of Victoria in the area of computer science, UBC in resources or graduate engineering, etc. (Scheduling Policy for the Public Service of the Knowledge Network, September 1, 1983)

There is a proposal for a tri-university project for 1984-1985 mentioned in Simon Fraser University's outline of recommended activities. Further to this, there are current discussions to implement a Provincial consortium for Distance Education programming, including the three universities, Knowledge Network and OLI.

Also, there have been several experimental projects conducted at the University of Victoria during the last year, including the first Closed-Circuit Television (CCTV)

broadcast using the public system linking all three universities, and two UBC/SFU programmes where guest speakers gave special topic presentations (Decker Walker: Microprocessors in the Schools; Madeleine Hunter: an address to B. C. teachers).

Some courses are offered jointly, for example, a recent Nursing course (Nursing 404) produced by UBC and the University of Victoria.

The University of Victoria and O.L.I. are co-operating on a CBIS programme 'Common Development.' Collaborative efforts are made also in the course offerings for off-campus non-metropolitan programming.

Further evidence of institutional collaboration is seen in such areas as briefs to the Minister of Education concerning three universities and the Ministry. The Deans of Engineering of the three universities meet regularly to share programming and it is anticipated that this consultation will be ongoing in the future. Most recently, the universities have jointly produced a Distance Education publicity poster advertising 'Home Study' soon to be distributed throughout B. C.

Transfer of Credit

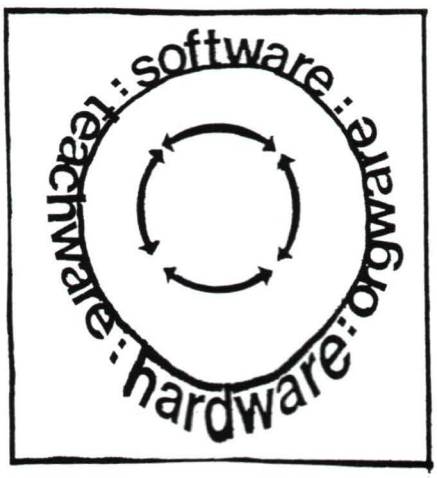
Repeatedly, the view was expressed that a credit banking system should be introduced where credit is given for work and life experience, as well as for educational experience. "There's a need for more flexibility especially in transfer of credit' as one project manager stated. Academic and professional institutes should now seek common agreement to implement the system, she concluded.

Shared Resources

Dubrov's (1977) model describing the four elements necessary for technological innovation to be accepted and integrated into an existing structure was used in the establishment of Knowledge Network (Forsythe, 1983).

Figure 3

Dubrov's Systems Model



There is a sharing of these four elements between the universities and the Knowledge Network, and amongst the universities 'teachware' (instructors); 'software' programmes; 'hardware' (equipment/resources); and orgware (administrative procedures and policies), particularly now there are increasing examples of jointly produced programmes.

Many of those individuals interviewed (see Appendix E for list of names) emphasised that inter-institutional co-operation and co-ordination is essential now that the educational system is becoming increasingly complex and technological. The view was expressed by several respondents that mobility and interchangeability of personnel, knowledge, programmes, students and credit needs to be increased. One programme co-ordinator remarked that "Greater collaboration is needed so students can sample courses."

The Role of Learning Systems Working Groups

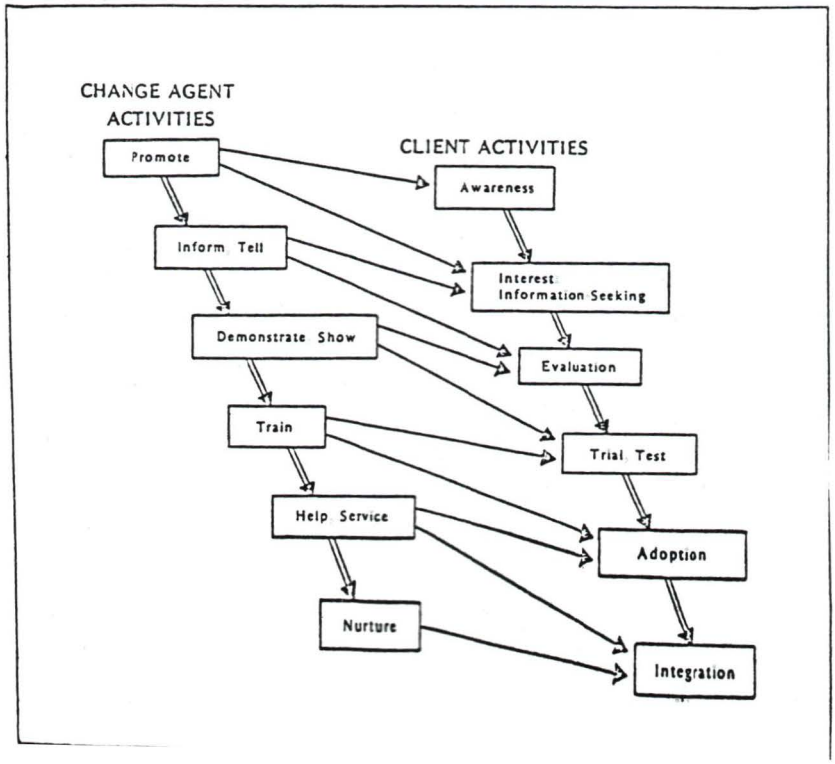
The Learning Systems Working Groups (LSWG) operate to ensure that collaborative efforts are made. The LSWG's are formed by a member from each community college, five

institutions, and the three universities. They meet regularly to carry out their mandate which is done in the absence of any formal agreements.

The mandate is to assist in programme development; to act as a forum for the determination of standards of levels of support; to act as a vehicle for the development or acquisition of television programmes; to develop short and long-term plans for the LSWG and the Knowledge Network; and to act as a vehicle for the dissemination and sharing of information between the LSWG members and the Knowledge Network. In short, these groups are problem-solving forums directly involved with the co-operative efforts of the institutions.

Figure 18

Knowledge Network as Change Agent



The Knowledge Network is considered here as an agent of change which has sought to accomplish the following:

1. Promotion of awareness of the need for Distance Education programming and of the availability of the technology.
2. Provision of information to the universities on the operating principles and utilisation of resources.
3. Demonstration of instructional protocols and evaluation of programme offerings.
4. Training of participating faculty and support staff and testing of their performance.
5. Acting in a facilitating role for development and improvement of new programmes until their final adoption.
6. Nurturing the endeavours of professionals and institutional representatives so that Distance Education programming becomes an integrated and integral function of the universities' activities.

It was concluded from the evidence found in policy statements referred to above and 'real-life' examples, noted earlier, that is, jointly produced programmes shared resources and Distance Education ventures, as well as per-

ceptions offered in interviews, that the three universities to some extent co-exist in 'Conversation' with each other but that further sharing of resources, experience, personnel and ideas is needed before a true 'state of balance' between integration and autonomy is reached.

CHAPTER 6

Discussion

The purpose of this study has been to assess the impact of the introduction of new technology on the university system in British Columbia, at the macro level (teaching and learning experience) and the micro-level (functioning within and between the institutions). A 'systems impact' perspective is taken which provides an overview of the university system, rather than a focus upon any specific institution.

In researching the study, many views and perspectives were elicited. The researcher was left with an impression that those people working in Distance Education feel that 'something is happening' in British Columbia, and take pride in the fact that the Province is in the vanguard in its experimental use of the telecommunications satellite. These experiments with satellite telecommunications for Distance Education have provided an unique opportunity for institutions to co-operate in providing learning for the adult population distributed throughout B. C.

In Chapter 1 there was reference to the historical quest to deal with the problems of providing equal oppor-

tunities for learning over vast territories and rugged terrain. Following the lead of the British Open University in the early 1970's, this quest was accelerated and there were many initiatives to establish 'Distance Education' as a means to solve the problems of serving a dispersed population. Concomitant with these initiatives was the development of geostationary telecommunications satellites and their subsequent availability for experimental use by the Province's higher education institutions.

> These experiments not only proved the ability of the satellite as a carrier of television signals. In a more important, psychological sense, they dissolved the problem of distance. Each community was equidistant as long as it could receive the signal. (Forsythe, K., 1983, p. 3)

There has been a growing institutional involvement in Distance Education using new information technology during the last five years. The availability and use of a wide variety of technologies including satellite, broadband cable for video, audio and data conferencing is spreading rapidly and every post-secondary institution in B. C. is involved to some extent.

The introduction of any innovation into a system is likely to give rise to numerous questions.

Although there is apparently no quarrel with the notion that Distance Education is 'a good thing', nevertheless problems have been experienced at various levels within the learning environment, in adjusting to the innovation. Certainly in this study, more questions have been raised, at least in the mind of the author, than solutions discovered, and there are areas where further research is considered to be much needed.

This final chapter will address the major findings that have been discovered in the process of investigation and seek to point the way forward for future researchers.

Area A. Curricula

Summary of Findings

Learning Principles

With regard to principles drawn from the literature on effective learning, the strengths of teaching in the Distance mode seem to be that the product, in terms of both television programmes and print materials, is comprehensive, well-ordered and carefully prepared. Care is

taken to anticipate comprehension problems, provide advance organisers and summaries and clearly explain complex topics. The availability of print packages and now home video recordings of broadcast programmes so that materials may be reviewed is a further strength, compared with 'once only' classroom lessons.

The process of Distance Education is less satisfactory, because of the difficulty of human interaction and the constraints of the technology. It is difficulty for instructors to know and treat learners as individuals and to account for differences in learning style. Active learner involvement is difficult or impossible to accomplish, which makes certain activities such as practical experiments, debates or discussion impracticable. Generative learning, where learners are able to create, discover or generate their own learning is also less likely to occur in the Distance Education environment, in spite of the fact that Distance learners are more dependent upon their own resources than are on-campus students. This is because the instructor tends to dominate communication, and to give more information than would be the case in the classroom, where the student is there to contribute.

Although the Distance Educator supposedly is less of a 'teacher' and more of a 'guide,' 'resource' and 'motivator,' in fact, she often assumes the role of 'lecturer' and 'information giver.'

Communication Principles

When the practice of Distance Education was compared with the principles drawn from the literature on Communication Theory, it was noted that communication via education television can easily appear 'wooden' and constrained. This is particularly true when instructors are unfamiliar with the use of this technology for teaching.

Communication breakdown may occur as a result of over-burdening viewers with information and attempting to cover too much material at an accelerated pace, particularly as viewers have a very limited capacity to respond or interrupt.

The interactive component of programmes was often found to be an unprofitable expenditure of time, where students failed to call in, and/or found others' questions a waste of time. Learners sometimes expressed a preference for lecturing, rather than interactive time, because

they felt they were learning only when receiving instructor information. Instructors were more concerned than learners about the inadequacy of worthwhile interaction.

The use of television for teaching was found to favour the process rather than the semiotic approach to communication, where communicating is perceived as a process of sending and receiving messages, rather than sharing meanings. This was considered to be appropriate for the instructor whose objective was to deliver content, but to disfavour the instructor seeking to share experience, change attitude or opinion, challenge perceptions or bring about cognitive changes.

Development of thinking skills in learners is therefore sacrificed to the delivery of content, and this is not in keeping with what is recommended in the literature. Further research is needed in the area of the symbolic codes of various media and their effect upon the development of thinking skills.

Adult Learning Through Educational Television

There was a disparity amongst programmes regarding the extent to which the medium was put to 'appropriate

use' as defined by Bates (1981), but it was considered that there was some oversight in this area, with frequent examples of inappropriate use of educational television. In particular, the importance of visual learning has apparently been neglected, in some instances, and many programmes were found visually dull and uninspiring. The potential of television to record and convey elements and episodes, processes and personalities that could not otherwise be experienced was often wasted. Active or deep-level learning was de-emphasised in favour of passive reception and superficial recording of information. Fundamental principles concerning the use of instructional media were broken. Programmes showed evidence of careful planning and organisation, however, it was considered that this effort was often wasted because the style of presentation was inappropriate for television.

More than one medium is used in conjunction, generally television, telephone and print, and this is in keeping with the research that shows that there are different abilities amongst students in learning from media. The planned use of newer technologies, such as the computer is considered advantageous in offering other alternatives of medium.

Thus, lack of visual stimulation and strategies for attracting and maintaining audience attention were considered weak areas in the Distance Education product, where the practice of instruction was found to be inconsistent with the literature which suggests the importance of visual illustration to effective comprehension, learning and memory. However, the question remains as to whether viewers' expectations of educational television productions are different from their expectations of commercial television productions. It may be the case that the highly motivated and interested student will learn, regardless of the level of sophistication of the presentation.

It appeared that in many programmes, attention had not been given to encouraging an active or deep-level approach to learning. Thus, it was considered that learners could easily become passive and uninvolved with the materials, which could ultimately lead students to drop out of their courses.

Discussion and Implications

Learning Theory

The principal conclusion that can be drawn from the results is that there exists a lack of knowledge or understanding amongst educators of how to present their materials in the Distance context, in order to facilitate learning in their students. Guidance or training in this area is therefore needed.

Specifically, educators need to understand the different characteristics of the instructional process in the face-to-face and Distance Education settings. Compensation has to be made for the lack of student 'feedback' verbally and non-verbally. The urge to present more information should be resisted, in favour of presenting less material, but in an attractive, interesting and informative fashion.

Attention should be given to individual differences in learning style, once the instructor has ascertained what these are, if this is possible to do. Learning activities which invite the students to develop and use their own preferred strategies show recognition of the fact that learning is not a single, but a multi-faceted process. Thus, questioning, discussion, experimentation and activities that can be carried out by the individual

learners working on their own, employing their preferred methods to generate responses are a means by which educational practice can be kept consistent with aspects of learning theory. There was some evidence of greater awareness of this area amongst instructors who have recently produced materials for the Knowledge Network. This was thought to be a result of the greater consultation taking place amongst instructors and students, for example, by telephone conversation and course evaluations and questionnaires to students for completion.

Instructors should understand the effects of media upon their materials and their own role as teacher. From the review of the educational literature, it seems that the model of instruction which is best suited for the Distance Education context is one which places learners in a position of active involvement with the learning materials, generating their own understanding and interpretation, developing confidence and competence in learning skills, with the instructor acting as guide, motivator and knowledge resource. The aim is to make the learner increasingly interested in learning and able to learn independently.

Television is considered an intrinsically 'attention-grabbing' medium (Fisher, 1978), however, if audience attention is not sustained by what is shown, television can quickly be switched off, thus the Distance Education product can be considered to be more 'disposable' than the product of classroom teaching.

The introduction of new forms of technology has a certain novelty value in itself and may lead to increased motivation in students (e.g. use of computers). However, educators cannot afford to rely on novelty value to sustain audience attention.

The conclusion was that further thought needs to be given by instructors and programme designers preparing educational material for television to ways of presentation that are stimulating, entertaining and informative, and that are most likely to arouse and sustain audience attention.

It is acknowledged, however, that no evidence exists to indicate that an increase in dollars spent in production of sophisticated programmes leads to an increase in amount of student learning. It may be that there is a more substantial correlation between degree of student motivation and amount and quality of learning.

Communication Theory

To avoid the production of 'wooden' presentations, instructors need guidance and practice in their manner of projection 'on camera' in such areas as maintaining eye contact with the audience, assuming a relaxed manner and having the confidence to 'be themselves.' Instructors also need to learn how to give out their information in 'digestible' pieces and to induce a sense of audience involvement in the topic. Otherwise, the viewer may be left with a feeling of helplessness, unable to cope with a barrage of information, and unable to interrupt the flow.

Both learners and instructors may benefit from increased awareness in how to make valuable use of telephone interaction, by advanced planning and consideration of their questions and answers. It may even be the case that telephone interaction linked with television is simply not workable, and alternative means could be sought to involve learners.

A recommendation of this study is that interaction should be encouraged and facilitated by whatever means available and that computer technology be increasingly incorporated to enable people to 'talk' to each other.

There are signs that this is now happening in British Columbia.

Care should be taken in defining what is meant by interaction. As long as learners are attending to a programme or print materials, they may be considered to be 'interactive.'

The more the instructor involves learners in the educational process, by guiding, discussing, questioning and encouraging learners to 'think things out for themselves', rather than lecturing, informing, and telling, without reference to the learners' perceptions and interpretations, the more she assists students in their development of learning skills. In courses designed specifically for adult learners, helping students develop skills of 'learning to learn' may be equally as important as teaching content. Attempts made to promote more interaction and which elicit learners self-generated responses to material presented by the instructor, move the communication approach towards a more semiotic model.

Communication through educational television will be enhanced by the instructor having some prior knowledge of the viewing group. It helps for instructors always to

know the student in terms of their background, knowledge, experience, motivation for enrolment and learning needs. This may be even more important in the Distance setting, where learners are more 'faceless' and 'anonymous' than in the classroom. Knowledge of the student's individual learning style and preferred choice of educational method and media help the instructor to choose appropriate instructional strategies.

In the future, an increased understanding of the symbol systems generic to particular media may indicate the kinds of mental skills activated by media, how knowledge is represented differently by the various media, and for what kinds of educational task each medium is best suited.

Adult Learning Through Educational Television

Contrary to what instructors and programme designers alike may claim, use of educational technology does have an effect upon the product of the curriculum, that is in the content of what is taught and learned and on the style of presentation and of understanding. Frequently, interviewees asserted that use of the technology 'makes no difference' to the curriculum. The findings did not support

this assertion, for many differences were perceived in both the process and product of Distance Education, when compared with face-to-face teaching. These differences need to be acknowledged and understood.

Educators need to understand what media can and cannot do, and to plan their strategies accordingly. To make use of the strengths of the television medium, instructors should employ stimulating audio and visual 'cues', ensuring that these two are mutually complementary and supportive, and avoiding repetition or redundancy. 'Talking heads' can serve a legitimate and valuable function on instructional television, particularly to transmit 'content', but this strategy should be kept to a minimum if audience attention is to be held over periods of time, and to ensure that the medium is being used to its full advantage. Duplication of materials in print packages which have already been shown on television is wasteful and pointless.

Educational media such as television should be put to appropriate use, for example to show people, places or events that could not be encountered at first hand (e.g. an inteview with the Prime Minister, a visit to the Pro-

vincial Museum, the procedures of a board meeting.) Graphics may be used to simmplify or concretise complex or abstract topics or processes (e.g. a bureaucratic hierarchy, blood circulation). Surprise, novelty, creativity and originality in conceptualisation and design of programmes makes for a product that viewers will want to watch.

Because so much of what is learned comes through the visual channel, television can be considered a 'natural' choice of instructional media. However, if what is viewed is visually static, dull or irrelevant to the educational objective, then the power of television to teach is largely wasted. Instructors should learn how to make use of the potential of this medium to attract and sustain audience attention, and to enhance learning and memory through the use of graphic material. This can range from the most simple of hand-drawn sketches, to sophisticated computer animation.

Educational content has to be carefully scrutinised for its suitability for the medium, and appropriate choices made. Often, the simplest medium will be most effective (e.g. print only, or audio-cassette). Ideally,

material to be conveyed will dictate choice of medium and not vice versa. In this way, 'technological determinism' is avoided (that is, where the availability of technology dictates choice of system to be used). In the real world, however, use will be made of existing technologies.

Distance Education is an 'open-door' situation, where the presence of a general viewing audience may influence what is said and what is left unsaid. As television is essentially a 'one-way' medium of communication, learner difficulty has to be anticipated and complex topics explained carefully or even omitted. Controversial or sensitive issues may be left out. Learners should be made aware of such omissions. Material should be current, factual and kept relevant to the goals of the course and to the goals of the mature learner. Substantiation and exemplifiation of theory can be made by reference to 'real-life' situations and problems. Adult learners should be invited to draw upon and to share their own professional and possibly personal experiences and concerns.

Active, deep-level or generative learning can be facilitated by the use of questions, interactive components, activities, self-check exercises and tests.

It is all too easy for Distance learners to become 'spoon-fed', dependent upon the instructor for information, passive receptors of knowledge. They may need assistance in being weaned away from dependency, towards independency in learning.

Viewing audiences have come to expect high standards of technical production from their experiences of watching commercial television. Production managers are well aware of the necessity for smooth and professional-looking programmes. Knowledge Network instructors have expressed a reluctance to allow technical considerations (such as the need to look aesthetically pleasing) to dominate the educational message. Some degree of mismatch can occur between the perceptions of production teams and those of educators as to what constitutes 'good television.' The question remains concerning whether viewing audiences will accept different standards in educational television, because of its different function.

Further communication is called for between educators and techologists. At present there exists a 'gap' between these two worlds that will have to be 'bridged' if the best use is to be made of Distance Education technology.

Rather than a prolongation of the apparent conflict of interest that exists between them, educators and technologists should seek to work in increasing co-operation recognising their common goals, which can be achieved only through a mutual understanding. Openness to and empathy with each other's needs, rather than closedness and antipathy may be the key to successful products.

Area B. Institutional Organisation

Internal Organisation: Summary of Findings

It was noted that Distance Education technologies are a recent innovation and that institutions tend towards conservatism so that dramatic changes cannot be expected, nor were they witnessed. There is no literature that can be cited as evidence of change. The data came from policy statements and the practice of Distance Education, as described in the interviews. There was not a great deal of data to be presented in this section, also, its nature was said to be transitory, itself subject to change.

The assumption that had been made that the universities were becoming more 'open' and flexible in structure and organisation was not borne out by the findings. Indicators of openness were considered to be change in areas such as admissions policies, credit transfer and faculty contact hours. No change was found in university entrance requirments to accommodate adults returning to education or in student assessment procedures; credit transfer amongst the universities, and credit for 'life experience' was much talked about, but little practised. At the University of Victoria, faculty involved in Knowledge Network activities were required to teach fewer 'contact hours' than they would have taught in the classroom, through the introduction of a new policy statement. This was some evidence of intra-institutional change as a result of Distance Education projects.

There was general, although not universal, agreement amongst interviewees concerning the need for institutional change in response to social, economic and technological developments. There was said to be an increasing awareness throughout the administrative hierarchies and support staff of the universities of the needs of Distance Educa-

tion personnel. In practice, however, little appeared to have changed.

Two major concerns about Distance Education provision were expressed. One was with regard to the motivation for institutional involvement in Distance Education pursuits, and whether this was politically driven, and given false justification on educational grounds. The other was the fear of academic elitism; that Distance Education bodies, notably those who use the Knowledge Network, provide further education for the already educated, at the expense of the under-educated. The lack of proper needs assessment was considered to be an issue in this connection.

Discussion and Implications

What emerges from this part of the study, is that a minimum of impact has been felt internally as a result of the involvement of the universities in Distance Education. One could go so far as to say that, unless personnel at the universities have become directly involved in Knowledge Network activities, these activities go on almost unnoticed. The innovation has been quietly integrated,

without 'shaking the foundations' of the universities' internal organisation.

In a sense, the apparent lack of need to make major adjustment in the administrative procedures to accommodate programmes and activities in Distance Education may be a good thing. Perhaps entrance requirements and grading procedures should not have to be changed to provide an equal chance of access and success to mature learners. Perhaps credit should not be given for work or 'life' experience, or standards of academic excellence compromised in any way. These are philosophical issues that will need to be debated.

However, the conclusion reached by this writer is that if the changes that were referred to in the course of interviews are to be implemented, then a further openness and flexibility will have to be witnessed, within the universities. The institutions will need to become more responsive to the changing needs of those whom they serve, if they are to provide a useful service in society. It is not that standards will decline, but that procedures will be more flexible; ultimately everyone stands to gain by such changes, both the institution and the learner.

Universities are not obliged to react to accommodate each new passing trend outside their walls, but they should exist to meet a need in the populace, rather than to be self-serving. Thus, universities must resist taking a 'rear view mirror' mentality, looking to the past to inform the future. The question of needs assessment emerged as an important concern, of which insufficient heed is taken at present. This issue will have to be dealt with by the universities in the coming years unless they are to become academically elitist.

The claim that Knowledge Network programmes provide for the already educated rather than the under-educated will need to be answered. Of course, the universities, rather than the colleges and institutes are the prime users of the Knowledge Network at present, and the universities are the focus of this study. And it is the function of universities to offer advanced and specialised courses rather than mass introductory courses. However, the opportunity exists to use the new technology for 'democratic' purposes (i.e. to serve the needs of the people) and to supply those people in greatest need, such as the handicapped, new immigrants to Canada, and those requiring

Adult Basic Education for 're-entry' into the educational system, or retraining for a changing job market. Thus administrators responsible for Distance Education programming bear a burden of social responsibility, and it is incumbent upon them to use their positions of power and influence with attention to the 'customer demand.'

Personnel within the universities need to be alerted to the specific needs of Distance Education programming so that the necessary support services such as secretarial, printing and library services will be made available. Members of faculty participating in Distance Education activities need release time from their other teaching, research and administrative duties, and appropriate financial reimbursement for the work involved in the preparation and delivery of Distance courses.

Care should be taken to protect the 'Canadian content' of Distance Education programmes, and to preserve a balance between 'home produced' and 'imported' goods. The question of the ownership of jointly-produced programmes will need to be resolved in a manner acceptable to all the institutions involved.

The point was made that universities are now faced with competition both from the private sector and from each other, especially considering the geographical proximity of the Provinces' three universities. A fall in the number of high school graduates would have led to a decline in enrolments, but this has been offset by students unable to find employment, opting to enter university. A fear was expressed that the universities may be seeking new 'markets' amongst the adult population, and those distant from the learning centres.

The concept of 'technological determinism' arose in the course of interviews, where some individuals voiced their 'suspicions' that in B. C. the coming of satellite technology preceded a perceived need for it. It was suggested that institutional involvement in Distance Education may have been selfishly driven, and that the need for Distance Education was 'manufactured' and not 'real.' This argument is not answered within the limitations of this study, but future researchers might care to investigate further.

External Organisation: Summary of Findings

The assumption that the university system has become increasingly co-operative and collaborative in response to Distance Education innovation was found to be to some extent supported by evidence, but further sharing of resources, programmes, faculty, learners and credit transfer was advocated to bring the institutions into closer relations. Indicators of co-operation were sought and found in statements of policy and collaborative efforts to produce Distance Education programming. The relationship amongst the three universities was discussed.

Pask's Conversation Theory (1980) was used to illustrate the 'overlap' in the universities external functioning, and the term 'co-operative individuality' described the balance between the shared and autonomous nature of operation amongst the universities. The state of conversation was said to be the end toward which the universities might be working; Dubrov's (1977) systems model described the means by which this may be achieved, with a sharing of the four elements 'hardware,' 'software,' 'teachware' and 'orgware'.

Also, the relationship between the three universities and the Knowledge Network was described, particularly the

role of the Knowledge Network as a Change-Agent (Havelock, 1975).

Discussion and Implications

The introduction of the Knowledge Network acting as a carrier for the Distance Education programmes for the Province's educational institutions provides the opportunity for the universities (as well as the colleges and institutes) to work together in a way that was previously not possible. The use of increasingly sophisticated interactive technology, such as close circuit television, audio and video-teleconferencing and computers facilitates the trend towards inter-institutional co-operation.

At the policy and planning level, there is recognition of the need for grater consultation, particularly in the current discussions to introduce Province-wide consortium for Distance Education. All the indications are that inter-institutional co-operation is already underway and it is projected that it will increase in the future. Further openness and flexibility within the organisational structures of the individual universities may be needed to keep pace with inter-institutional collaboration.

Some Final Comments

Adapting Educational Material for Television Presentation

Valuable research has been conducted in the area of the adaptation of educational material for television presentation. Macdonald-Ross (1979) from Britain's Open University examines the way educational technologists can help improve the quality of students' learning experience.

The problem with current methods of adapting educational material for television presentation, according to Macdonald-Ross, is that a 'production-line system' is in operation whereby many different people help create the teaching material: authors, educational technologists, editors, designers, illustrators, photographers, television producers.

The model recommended is that of 'transformation'. Transformation is 'a process whereby complex information is organised for the reader's benfit.' The transformer is 'the skilled professional communicator who mediates between the expert and the reader.'

The transformer works closely with the content expert (instructor) until she is sure of what is to be said. Then she decides on the best method of saying it. The model to be followed will be different in each case, for as Romiszowski warns: 'Not all learning problems can be solved by applying the same instructional model.'

The transformer is overseer of the whole process of communication - what is said, how it is said and what its effect is. Having ascertained the educational message, and made sure that facts are correct, arguments logical, claims substantiated by evidence, concepts are clear and unbiased, the transformer next plans the presentation of the message. Consideration is given to such issues as text readability (print), use of advance organisers linking old with new knowledge, use of analogy or metaphor, typography and graphics, the special characteristics of learner and instructor. The transformer depends upon illustrators, photographers, compositors, film editors and television production teams to assist in the task of bringing the information to the learner in the most effective manner. Formative and summative evaluation of the programme is carried out, so that mistakes can be corrected and lessons learned for future productions.

The notion of transforming does justice to the complexity of the task of preparing educational material for television production. Procedures can be specified for how the process of transformation is to be carried out. Also, it places the students' interest in the foreground, for uppermost in the transformer's mind is the question of how this material will be received and understood by the reader.

The 'transformer' approach is close to that currently used at the University of Victoria, and therefore, is one which might be formally adopted in British Columbia. This model might be particularly useful in resolving the apparent conflict of interest that appeared to exist between educators and technologists. Essentially, the transformer is a mediator between teacher and learner, making use of the technical expertise which serves to unite the two in the Distance Education context.

Technological Determinism

Hamblin (1974) discusses the issue of technological determination: "All technologists have a vested interest in applying high-technology solutions rather than low-technology ones." (p. 32) and "In the specific case of education, therefore, all educational technologists seek to make educational systems more mechanized/automated/pre-programmed/dehumanized." (p. 32).

Certainly, in British Columbia a highly sophisticated and costly delivery system is in place and the idea has been suggested that involvement in Distance Education projects may be motivated by the need to put the technology to use; to create an audience and a need for the technology. Romiszowski (1981) describes such a process as "predetermined solutions seeking a problem to solve" rather than "scientific method applied to practical problem-solving in education." He advocates that "educational technologists should develop and apply methods which are appropriate to the educational purpose or problem under study."

Frequently, the most appropriate technology to use is the most simple and least expensive, such as audio-cassettes (Bates, 1981). Some research evidence exists for

the appropriate use of educational technology, and specifically the medium of television. It is urged that all those involved in Distance Education pursuits be familiarised these principles, and put them into practice, making allowance for the differing needs of various geographic and educational environments.

A Model for Distance Education?

It is becoming apparent that Distance Education is an issue of central concern not just in Canada but throughout the world, in developing as well as already developed countries. Soon the world may be looking to B. C. to see how it has handled its particular Distance Education problems. Although B. C. has come a long way in its initial six years of Distance Education programming and constant improvements have been made, there is still a great deal of room for progress and improvement.

Nowhere is there a Distance Education system that has 'got it right', that has solved all its problems. Britain's Open University is often looked to as a model for

others to follow, and indeed it has produced programmes and research of high calibre. But Macdonald-Ross, for one, doubts whether the O.U. has any real answers.

> The Open University works - an entire university of fifty thousand students based on home study. Remarkable. How is it done? Because we have solved the problems of distance teaching and embody this knowledge in the features of our organisation? Some people think so; but I hold a different view. In my opinion the system works mainly because the staff and students make it work, despite everything. As a social machine for teaching at a distance...the University strikes me as being remarkably incompetent. Little genuine know-how is embodied in the operating procedures which are, all too often, just stupidly wooden...So it comes about that while the university publicly offers a bland, self-satisfied smile, privately many of its staff spend their time in agonised self-appraisal. (Macdonald-Ross, M., 1979, p. 1)

This is one person's view, but one which probably contains more than a grain of truth. There is no panacea for the problems inherent in integrating a system of Distance Education and its technology. Probably, it will never be possible to develop a single model of instructional design for Distance Education that will be sufficiently flexible to adapt to the particular needs of diverse countries and users. As far as British Columbia's Distance Education systems are concerned, it will be necessary to critically observe future developments so that weaknesses

can be identified and remedied. Ultimately, 'agonised self-appraisal' is likely to lead to a better system than the 'bland self-satisfied smile' of congratulation.

Finally, this study has been undertaken in a spirit of questioning and discovery. Its function is to look as dispassionately as possible at the ways in which Distance Education is being conducted in B. C. and how it is affecting the university system, at the levels of curriculum and organisation. Perceived weaknesses and strengths have been noted, and suggestions made for what might be done in the future, with the purpose of providing 'feedback' into the system to enable it to become the best it can be. Ultimately, more questions are raised than solutions proposed, and soon even the questions will be out of date as advances are rapidly made. If the study succeeds in promoting further awareness and concern than previously existed, then it will have served a useful purpose. If affirmative action is taken, as a result of this concern, then it will have been worthwhile.

Some suggested areas for future research:

1. Impact of technology on curricula.

   What are the specific changes that occur in the process and product of the curriculum in the 'mediated' learning environment, compared with face-to-face learning?

2. Adaptation of educational materials for Distance delivery.

   What are the most effective ways of preparing education material for delivery by Distance Education technologies? Development of a model of the procedures involved in preparing educational materials for delivery to Distance learners, through the use of technology particularly television. (The model to be sufficiently open/flexible to be useful in a variety of contexts, where variables such as instructors, learners, content, technology etc. are subject to change.)

3. Development of thinking skills.

   How best may mental or critical thinking skills be developed in learners in the Distance Education context?

4. Media's Symbol Systems.

What is the effect on learning of the symbolic codes (Salomon, 1979) inherent in various media? Specifically, what kinds of thinking skills are best developed through the use of educational television?

5. Interaction in the mediated environment.
   How can meaningful interaction between instructor and learner and amongst learners be facilitated in the Distance Education setting?
6. Deep-Level Learning
   How can materials be presented so as to encourage an active or deep-level approach to learning in the Distance Education context?

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APPENDIX A

The Environmental and Historical Context

The natural geographic and climatic conditions of the Province of British Columbia, with areas of rugged terrain, and seasonal extremes of temperature, play an important part in the distribution of the population.

British Columbia is the third largest of the Canadian provinces, having a population of approximately 2.75 million distributed over an area of 948,544 square kilometres. Almost 60 per cent of the total population is concentrated in the southern coastal areas of the Mainland and Vancouver Island, close to the United States border. There are some pockets of high density population in the central interior valleys, but much of the extensive territory of B. C. is unpopulated.

It is a challenge to the educational system of British Columbia to provide learning opportunities for the 40 per cent of the Province's inhabitants who are scattered over immense distances, isolated by the physical barriers of mountains, sea and extremely

harsh weather conditions. It is an even greater challenge to ensure that the educational provision that is made is not of inferior quality to that enjoyed by the city-dwellers.

The Historical Context

Introduction

Canada has an interesting history of "passionate educators" who have pioneered many innovative and challenging means to meet the educational needs of widely scattered often isolated communities. 'Whether radio, telecommunications or satellite, float-plane or "downtown study-centres" the stories permeate the history of all our provinces' (Faris, 1975).

Background

The Historical Context

British Columbia has sought innovative ways to advance the ideals of democracy and equal opportunity through education. The last eight years have wit-

nessed the birth of two separate open learning and Distance Education bodies and the rapid development of quantities of high quality materials and multi-media packages. The last three years have seen the involvement of the whole post-secondary system in delivery of Distance Education through satellite telecommunications. Its pioneering experiments in the use of communication satellites for educational television eventually led to the development of the Knowledge Network.

British Columbia is one of the world leaders in its use of satellite technology for educational broadcasting. This study makes reference to the ways in which the introduction of satellite telecommunication has affected the development of Distance Education provision in the Province. It also shows how the nature and function of the Knowledge Network making use of this technology has effected change in the higher education system.

The growth of the higher education system in British Columbia that has been affected by a series of changes in government policy, educational philoso-

phy and the creative initiatives of several key individuals. It is a history that is still 'in the making', for, as the nature of post-industrial society undergoes changes, the educational needs of the people and the means available to meet that need also change, and so evolves a new kind of educational system. This study reflects the nature of the system as it exists at the present and provides a 'snapshot in time' of an environment in flux.

Development of the Distance Education System

The Government of British Columbia, whatever its political stripe has always been committed to the goal of education over distance and this level of support at senior levels has been vital to the continued development of a Distance Education system. Few other Provinces in Canada have enjoyed such uninterrupted political commitment to the provision of learning at a distance. (The term "Distance Education" has only been in common usage for this activity for the past seven or eight years.)

Since the 1920's, British Columbia has sought new and better ways to bring educational opportunity to the learner at a distance, with observance of ventures taking place elsewhere in such places as Great Britain, California, Ontario and Quebec. This included significant involvement in use of radio in the 1930's and 40's.

By the late 1950's there was debate as to whether the system in British Columbia should be established as an integrated one with a central locus of control, or a diverse system with self-governance of the separate and newly-created institutions. John Macdonald, then president of the University of British Columbia, envisioned the latter. It was the report conducted by Macdonald in 1962 entitled 'Higher Education in British Columbia and a Plan for the Future' that provided the basis for a decentralised post-secondary education system of community colleges and universities. The report recommended the rapid expansion of opportunity in higher education in B. C. in terms of both diversity of content and geographical dispersion to meet the expected

increase in student demand of the coming decade. Recommendations were made for the establishment of several degree-granting colleges in metropolitan and rural locations to overcome the barriers of distance.

In the early 1960's, a time of rapid technological expansion, the potential for the use of radio and television for Distance Education delivery was recognised, but the rugged, mountainous terrain of British Columbia meant that delivery costs were high, and reception in some remote locations would be difficult or impossible, so the idea was laid aside.

Individual initiatives were made, however, by certain institutions, with the University of British Columbia in the vanguard. By the late 1960's UBC had created an institutional services centre, fully equipped for audio and video production. By the mid 1970's the University of Victoria and Simon Fraser University were involved with the University of British Columbia in a demonstration project concerned with technological and organisational issues pertaining to Distance Education.

Decentralisation of education

British Columbia has a history of central governance of education, following the British tradition. Administration of the Provincial education system from the 'top down' remained, with only minor alterations into the 1960's. But in the mid and late sixties, the public consensus upon which the system rested had begun to change, and by the early 1970's major structural pressures were being felt. Reflecting changing circumstances, the Department of Education began to release its central control (Hardwick, 1983).

The 'decentralisation' issue became most pronounced following the 1972 general election, which witnessed the installment of a New Democratic Party (NDP) government, and a transformation from an 'authoritarian' to a 'participatory' model of education.

This brief period from 1972-75 saw keen interest in de-centralisation and means to achieve it. Reports were commissioned on a Communications Policy and the Open University model was investigated. However, the College Task Force Report of 1974, "Towards

the Learning Community", really set the stage by describing how colleges could be regional centres, and promoting non-traditional approaches for four new colleges. Only one of these colleges, North Island College, fully accepted the challenge and established an open learning environment using a learning centre approach with no central campus. This was the first full non-traditional "model" to emerge. During this period, the Provincial Education Media Centre, (PEMC) developed its first television projects in the post-secondary sector.

A change in government in 1975 from N.D.P. to Social Credit (S.C.) followed an election in which education was a principal issue. The newly elected cabinet reacted to public concern about education by re-asserting central authority. Education Minister, Dr. Patrick McGeer, gave support to measures to re-assert standards in the classroom, fiscal restraint, and an expansion of vocational training programmes.

The third way: A co-management model

The centralisation/decentralisation issue continued to be argued and at this time the Deputy Minister, Walter G. Hardwick, proposed a co-management model as a third alternative. The aim was to design a system that could, on the one hand encompass diversity, and on the other provide cohesion sufficient for the system to meet its principal mandate, to serve the learning needs of the people of British Columbia. Educational delivery was regarded as a system and all the participating agencies were to be drawn into a systems design. However, the proposed co-management model, which sought out the middle-ground between the extremes of centralisation and decentralisation was not generally accepted (Hardwick, 1983).

Co-operative Plan for Distance Learning

A number of reports on social and geographic barriers to learning and proposed solutions to overcome these obstacles were commissioned by the Ministry of Education between 1975 and 1979. In 1976 the Ministry of Education introduced a Province-wide co-

operative system of Distance Education, the specifics of which were described in March 1977 by Deputy Minister Hardwick in 'Co-operative Plan for Distance Learning'. Again, this was not accepted by the education institutions (Education Today, Vol. 3, No. 6).

Ministry of Education Commissions

The Weingard Report

In the same year as the launching of the first telecommunications satellite, the Weingard Commission was established by the Minister of Education to advise on the delivery of academic and professional programmes outside the metropolitan districts of Vancouver and Victoria. The Weingard study, 'Report of the Commission on University Programmes in Non-Metropolitan Areas' was submitted to the Ministry of Education in 1976. One of the principal recommendations of the Commission was that outreach and directed study programmes be made available for students in the interior of B. C. who were undertaking degree programmes.

The Faris Report

Also, in June 1976, the Ministry had set up a committee, chaired by Dr. Ron Faris to study and recommend future policy on funding, administration and programming for Continuing Education. The 'Report of the Committee on Continuing and Community Education in British Columbia' was presented to the Ministry of Education in December 1976. The 1971 census was cited to show that only 16% of the British Columbian population over the age of fifteen had completed Grade 12. The level of education tended to be higher in urban than in rural areas. Therefore, the committee recommended that there was a need to strengthen basic educational opportunities, especially in rural communities.

The Stuart-Stubbs and Carter Report

As a result of a report presented in 1976 entitled 'The Needs of Libraries and Post-Secondary Education in British Columbia', the Ministry of Education provided funding for a library holdings and an inter-library loan system amongst the various insti-

tutions. This provided greater accessibility to library materials for students and faculty residing outside the Lower Mainland.

The Carney Report

However, the study that made significant impact upon the development of the learning system was the 'Report of the Distance Education Planning Group on a Delivery System in Distance Education in British Columbia', which appeared in 1977. The Distance Education Planning group, led by Patricia Carney stressed the need for more Distance Education programmes in the Province, particularly in Community Education, Basic Education and Vocational Training. The study outlined a number of barriers to the implementation of Distance Education and made several recommendations for the development of Distance Education and delivery systems. The primary goal of the proposed delivery system, it stated, was to provide Distance Education. A secondary objective was to provide the basis for a Province-wide communication system, which should be co-ordinated, flexible, multi-modal and interactive.

Further, the Carney Report recommended the establishment of a new institute or agency to assume provincial responsibility for the delivery of Distance Education in the Province. Thus, the Carney Report can be seen as playing a major role in the subsequent development of the Open Learning Institute (1978) and Knowledge Network (1980), each of which carries out some aspects of these functions, the former as an institution, the latter as a telecommunications network.

The Dewey Report

The last major report to appear in the 1970's was the study on 'Link of Institutions for Video Education' (1979) by John Dewey, Dean of Graduate Studies of the University of Victoria. The major recommendation was that the Provincial Government should set up an interactive television microwave network to provide increased access to educational programmes. It was proposed that the teaching hospitals in Vancouver be linked to the University of British Columbia, and that the law courts in Vancouver and Victo-

ria be linked to the network. Such a network would enable a sharing or programmes and expertise amongst the instituions and provide new opportunities for professional development. These kinds of services are currently being supplied by the Knowledge Network's subsidiary, Knowledge-West using a broad-band cable network service.

Implications of the Government Commissions

Whatever action may or may not have taken place to implement the recommendations of these five government reports, they were valuable in stimulating consideration of the system of delivery of education to be introduced in British Columbia. Their production served to create public awareness of the issues, and to allow decision-makers to identify the means by which the system could be introduced and the personnel who could assist in its creation.

The birth of the Distance Education system identified in this study has been a lengthy and gradual one, that would not have been possible without the political commitment of successive government parties

and leaders with a clear vision of why such a system was necessary.

A variety of discoveries were being made simultaneously during the last decade, sociological, educational and technological. The arrival of the new technology enabled educators to overcome the barriers of distance and terrain and make the philosophical ideal of equal educational opportunity a reality. The technological innovations served to 'open the door' to learning for a dispersed and educationally disadvantaged population with no previous access to higher learning.

The many reports and commissions of this period served to alert the educational environment; the opportunity to experiment with technology led to the development of new working models.

The period of the 1970's was dominated by questioning leading to the emergence of at least two new institutions designed for non-traditional education and a growing interest among the entire educational community in the issues surrounding Distance Education.

Changes in Organisation and Management of the Education System

The period 1976 to 1980 witnessed some modifications to the internal organisation of educational management and a change in Ministers. In 1979 the Ministry of Education was divided to form two Ministries: the Ministry of Education and the Ministry of Universities, Science and Communication. Internal modifications included the creation of data bases to provide wider knowledge of the system as a whole, both internally and externally, and a more open system of management. The move towards an open system was resisted by many, but the development and administration of information systems continued into the 1980's after the departure of the Deputy Minister of Education, Dr. W. Hardwick, a driving force behind these measures.

The trends of the 1980's were anticipated and plans were made for a smaller, more versatile and streamlined educational enterprise. It was designed to take account of declining enrolments in schools and emerging needs of part-time learners.

This period also saw the increasing involvement of both University of Victoria and Simon Fraser University in Distance Education.

Whereas the 1970's were a time of critical questioning and the emergence of new technologies, the 1980's in British Columbia have thus far been characterised by new forms of organisational relationship and changes in the teaching/learning environment made possible by technology.

Since 1980 there has been increased collaboration among institutions as well as a growing involvement in non-traditional methods of educational delivery. The main challenge is that of delivery, which involves creating many interwoven networks, such as communications, administration and instructional systems, which are at once flexible and responsive to the students.

Although the eventual outcome might not have been predictable, it is arguable that the emergence of the Distance Education system in British Columbia could not have been projected or planned in a more rigorous fashion. It benefited from the experiences

of others whose ideas dominated the 1970's such as Britain's Open University and Canada's TVOntario, but these were always considered in the context of British Columbia and its geography.

Experimental Satellites

The communications technology satellite, 'Hermes' (named after the messenger of the Greek gods) was launched in 1976 as a co-operative venture involving NASA and the Canadian Department of Communications. British Columbia joined in experiments with the Hermes project in May 1977, organised by the Distance Education Planning Group. However, by the end of that year, the Provincial Government had launched a satellite-tele-education project (S.T.E.P.), which brought together most of British Columbia's universities and colleges. Sixty-four hours of colour programming at six sites went out over an eight-week period, with a telephone facility for interactive communication between instructors and students. The experiment had its successes and its failures, as Potter writes:

> In some cases Hermes brought people together in a way that was every bit as emotionally moving as it was intellectually stimulating. In other cases students became bored, technical problems made effective interaction impossible, information seemed colourless and static. (Potter, G., 1981, p. 3)

However, the ramifications of the Hermes project were immense. "One may reasonably conclude that this single but powerful satellite significantly altered Canadians' perceptions of their country, their access to information, and their ability to share their cultures." (Potter, G., 1981, p. 3)

Canada became the first country in the world to have a nation-wide telecommunications system using satellites in geostationary orbit in 1972 with the launching of Anik A.

Canada's Anik B satellite was launched in 1978, designed to bring about the transition from experimental to operational satellite systems. Located in geostationary orbit, 36,000 km. above the earth's surface, in approximately the same area as Hermes, this satellite provided a commercial telecommunications service in the higher interference-free frequency ranges (14/12 GHz). Experimentation with Anik-B has been extensive. It has been used by Ontario and Alberta, as well as British

Columbia's Knowledge Network, for delivery of Distance Education programmes.

By the end of 1982, the Anik C and Anik D satellites had significantly increased the channel capacity available to educational authorities in Canada, channels that can be used in providing programmes for learning at a distance.

These experiments led to the formation of a new organisation, the Knowledge Network, to co-ordinate the use of, and to operate the telecommunication's network.

The Impact of Satellites on the Development of the Distance Education System

The availability of satellite communication which emerged in the late 1970's and early 1980's for the delivery of Distance Education, had a major impact upon the learning environment. It led to the increasing involvement in Distance Education projects of British Columbia's post-secondary institutions.

Satellite telecommunications were not the only major technological innovation having an impact upon education at that time. Personal computers (Apple II, 1977-78), computer conferences (EIES network, 1978), and widespread

use of audio-teleconferencing were also introduced during the same period. And yet it was only satellite technology that made any major change in the development of the educational system, not simply by means of its availability, but because of the way in which it was used by the institutions and incorporated into their organisational structure. The increasing involvement of British Columbia's post-secondary system in Distance Education is directly linked to the availability of satellites to overcome the barrier of distance in educational delivery.

APPENDIX B

The Institutional Context

The University of British Columbia

The University of British Columbia is the oldest of the Universities, established in 1915, and it offers a comprehensive range of academic and professional programmes. The total number of students enrolled in full and part-time studies at the University of British Columbia in 1983-84 was 26,935. A further 36,231 students were engaged in Continuing Education programmes consisting of Guided Independent Study (G.I.S.) courses, degree programmes, Certificate and Dipoloma courses and in non-credit courses. Sixty percent of Continuing Education students are female, 40% male. The majority of Continuing Education students (80-85%) reside in the Greater Vancouver area.

The University of British Columbia's Centre of Continuing Education is responsible for management of the University's correspondence programme. Students enroll on a part-time or full-time basis for credit and non-credit courses at undergraduate or graduate level. Programmes are offered in the Arts, Education, Forestry, Learning

Skills and general interest courses. Ninety percent of the curriculum materials are in print format, sometimes supplemented with audio-cassettes. Since 1981, Telecourses are also offered through the Knowledge Network.

Since the inception of the Open Learning Institute in 1978, the development of new Correspondence Courses has been curtailed, and instead, existing programmes have been revised and updated. In 1979, programmes in Education and Forestry were developed and offered through the Knowledge Network and further courses are being created at present.

The University has recently begun to centralise its efforts in Distance Education and the use of new technology and to concentrate on learning systems development in specialised professional disciplines. The emergence of a campus cable grid and sophisticated data networks further characterise some of the highly innovative approaches emerging in this most 'traditional' environment. Work in Biomedical Communications has been highly advanced and all five teaching hospitals are electronically linked to the universities.

Technical facilities include at least four television studios, (one originating "live" programmes for the Knowl-

edge Network) a major campus cable grid allowing for both a video and data network that is linked to a broadband cable network.

University of British Columbia
Sample of Programmes Offered Using Satellite Technology, 1983-84

- Education 317 - The Exceptional Child in the Regular Classroom
- Education 312 - An introduction to the Study of Exceptional Children

Simon Fraser University

Simon Fraser University on Burnaby Mountain was established in 1963 and offers undergraduate and graduate programmes to the doctoral level. The number of full and part-time students enrolled in 1983-84 was 24,775. More than 20% of Simon Fraser's total student enrollment is in their credit and non-credit Distance Education courses. Simon Fraser University has had two-and-a-half years of

involvement with Directed Independent Study Courses (DISC) which offers a still expanding programme of over 30 credit courses for learning at a distance. The number of students enrolled in DISC courses in 1983/84 was 4,484. Its main offerings are in Crimonology, Education and Kinesiology, with supplementary courses from the Faculty of Arts and the Faculty of Science. DISC courses are primarily print based; some also include audio and video tapes. The Knowledge Network supplies support materials for some DISC programmes. Ninety-eight undergraduate and 3 graduate programmes are offered.

The non-credit courses are managed by the Department of Continuing Studies. These consist of packages of print materials, audiotapes, videotapes and slides which are made available for use at workshops, seminars and conferences at convenient locations throughout the Province.

Sixty percent of Simon Fraser's Distance Education students are female, 40% male. The median age for the group is 29. Thirty-four percent of these students reside in the Interior of British Columbia and on Vancouver Island. The remaining 66% live in the Lower Mainland.

Simon Fraser has always been characterised for its innovative and flexible approach to education. Its involvement with new technologies include use of Knowledge Network, audio-conferencing and computer networks.

Simon Fraser University

Sample of Programmes Offered Using Satellite Technology, 1983-84.

- Apiculture, An Introduction to Beekeeping
- History 338-3 The World at War
- Cultural Conferences in Education

The University of Victoria

Formerly a two-year college affiliated With the University of British Columbia, the University of Victoria came into being in 1963. Like the other two universities, the University of Victoria has strong research programmes and offers undergraduate and graduate degrees to the doctoral level. 11,288 full and part-time students were enrolled in 1983-84 and approximately 1,073 more students

were registered in Distance Education courses. The distance learners are generally in their early thirties and 60% are female.

The University Extension Division of the University of Victoria is responsible for co-ordinating Distance courses, in consultation with each Faculty and School of the University. Since 1976 the University Extension Division has offered part-time degrees, professional development and community education courses through a variety of Distance Education methods including television, telephone, video and audio-cassettes, and print. Computer-based delivery methods are likely to be used increasingly in the future.

During the period under study, Nursing, Social Work and Public Administration were the principal discipline areas for distance delivery. Periodically courses were offered in Child Care, Education and Arts and Sciences. A course in Computer Based Information Systems was offered for the first time in the autumn 1983. Most of these courses were taken for credit. A comprehensive support service was available to students, including telephone links with instructors and a Project Manager, some tutors

in the field and, for degree students, a free information line to library services.

There is a television studio for live telecasts which are micro-waved to the Knowledge Network for distribution. An audio-conferencing bridge is available for courses and course administration and meetings.

University of Victoria

Sample of Programmes Offered Using Satellite Technology, 1983-84

- Nursing 303 - Theories and Concepts in Nursing
- Computer Based Information Systems - The Foundation Course
- Canadian Politics and Government

The Open Learning Institute

The Open Learning Institute (O.L.I.) was established in June 1978, designed to provide for the 'unmet needs' of education in the Province (detailed in Section 2.1). It offers programmes in three areas: Adult Basic Education,

Career-Technical-Vocational subjects; and Bachelor of Science and Bachelor of Arts degrees. All of the activities of the Open Learning Institute are developed for learning at a distance. The organisational arrangements include six advising centres at Kelowna, Prince George, Victoria, Terrace, Nelson and Kamloops, as well as the administrative headquarters in Richmond in the Lower Mainland.

During the year 1983-84 there were 9,281 enrolments in three semesters. In terms of student characteristics, the median age of OLI students is 34. Approximately two-thirds of the student body are women. Sixty-six percent of this group resides in a non-metropolitan area. OLI students the are those who cannot take advantage of the existing system of public education owing to reasons of distance, work, physical handicaps and so on.

Most of the curriculum materials are in the form of print packages, so that OLI courses are similar in kind to traditional correspondence courses. The Open Learning Institute has offered, in conjunction with other institutions, telecourses via the Knowledge Network. In some courses, audio-cassettes are used as a supplement to print materials.

Two approaches are taken to course development at the Open Learning Institute. Existing course material may be purchased from other institutions involved in Distance Education and 'prefaced' for use by OLI students. Otherwise, contracts are made with individual course writers, and the copyright retained by OLI. More than one hundred original courses have been developed at OLI and these programme packages may then be sold to other institutions. Subject areas are in Adult Basic Education, Career-Technical and Vocational as well as University courses.

There are inter-institutional arrangements for the joint development of new Distance Education courses between the Open Learning Institute and Athabasca University in Alberta, Simon Fraser University and North Island College in B. C.

Support services to students are provided through telephone contact with tutors and advisors, library services and laboratory arrangements with various community colleges throughout the Province.

The Knowledge Network

The Knowledge Network of the West Communications Authority was established in 1980. Its three primary mandates are:

1. To establish, maintain and operate a telecommunications network for the educational institutions.
2. To co-operate and collaborate with the educational institutions in the delivery of educational opportunities.
3. To foster, stimulate and participate in the development of high quality learning systems.

The Knowledge Network uses the ANIK C 14/12 Ghz satellite, community cable television, microwave and broadband cable in its sophisticated networks. It currently provides 98 hours a week on its public television service to 150 communities throughout British Columbia. This represents carriage of schools programming, telecourses and live interactive educational broadcasts on behalf of the educational institutions. It assists the Colleges, Institutes and Universities to work together through its Learning Systems Working Groups and provides the framework for the problem-solving necessary for a co-operative Provicial learning system.

Its subsidiary corporation, the Knowledge-West Communications Corporation, operates a broadband closed-circuit service that links five teaching hospitals and the two universities in Vancouver with two-way video, audio and data units. The Knowledge-West also acts as a Development Directorate for new ventures in closed-circuit satellite video-conferencing, data networks and electronic publishing.

During 1983-84 12,159 students enrolled in the colleges, institutes and universities for courses offered through the Knowledge Network. The knowledge Network is a non-profit society with its own Board of Directors. It is funded by grants from the Ministry of Education and the Minsitry of Universities, Science and Communication. It was the first full direct broadcast service (DBS) user of ANIK-C, Canada's powerful new generation satellite, launched by the space shuttle "Columbia" in December 1982. This ended a three year period of experimental use of the ANIK-B satellite.

Institutional Involvement in Distance Education

In addition to the three Universities, the post-secondary system has fifteen two-year regional community colleges and seven specialised Provincial institutes. At least two use Distance-Education Systems exclusively (North Island College and the Open Learning Institute), and all of the others are involved in some fashion with Distance Education activities either through provision of Learning Centres or through course support for telecourses offered through the telecommunications network.

The Province established the Knowledge Network (in 1981) to help initiate and co-ordinate activities using new information technologies. Through the co-ordination provided by the Knowledge Network, all 15 colleges, 3 universities and 4 institutes are involved in Distance Education using satellite delivery that can currently be received by 85% of the Province's population.

Adult Distance Learners

As detailed previously, the needs of adult learners in British Columbia are provided for by a number of different post-secondary establishments using a continuum of delivery technologies.

In terms of student characteristics, those learners who are at a distance differ from full-time, on-campus students, in certain respects. Distance Education students are approximately 10 years older, generally in their early 30's and predominantly female. They are usually fully-employed, have families, and may be involved in community activities. Frequently they have been out of the educational system for some years, and therefore, approach the learning task with great anxiety and feelings of unfamiliarity. Often they are isolated in small towns and in need of human contact for support and the sharing of ideas and problems. Generally, courses are taken to gain credit for professional development, or for personal enrichment, stimulation and growth. Distance Education students tend to be well-motivated and determined to overcome the obstacles to learning. It has been pointed out that Distance Education students <u>have</u> to be well motivated in order to succeed, for, unlike the face-to-face classroom setting, there is no-one there to force or cajole them into doing the work. Instructors and tutors do their best to encourage and help their students to learn, but this is not an easy task to do through a television screen or at the end of a telephone.

Support services are provided to Distance Education students by all the institutes involved in the form of telephone conversations with instructors, special library services, learning centres and other services.

Currently, the Provinces' fifteen colleges are providing learning centres both for their own students as well as for students participating through the telecommunications network. It should be noted that the Universities and the Open Learning Institute do not use only the satellite system in Distance Education, but also audio-conferencing. Also, they are contemplating computer-conferencing, in addition to print-based courses and audio-cassette. No one form or model of Distance Education dominates in British Columbia and examples may be found of a variety of approaches.

APPENDIX C

Salomon's (1979) Research on the Symbol Systems of Media

It can be argued that there are three significant elements of programme ingredients in any communication: content or knowledge; modes of representation and symbol systems. The content is the facts and concepts and the beliefs and opinions about them that forms the 'core' of the material to be presented. Modes of representation refers to the way this content or knowledge is 'packaged' and 'represented' and includes such features as structure, style, pace, complexity and redundancy (Salomon, 1979). Each of these elements affects the kind of mental processes used by students, and the kind of meanings attached to the learning material.

What is a symbol system?

A symbol system is a set of elements, such as words, numbers, shapes or musical scores, that are interrelated within each system by syntactic rules or conventions and which are used in specific ways in relation to fields of reference. Some systems are more 'notational' (e.g. musical scores) because they entail discrete and unambiguous

elements which can be organised in lawful ways. Other systems are non-notational, such as pictures, and are both syntactically and semantically 'dense', in that they are much more open to interpretation, since there is no unambiguous relationship between the symbol (picture) and what it refers to (Goodman, 1976). The symbolic code may be digital, analogic or iconic. The greater the variability for a symbol system, the more levels of meaning it can potentially carry (Salomon, 1979). This observation has clear implications for media such as television, which can present a very wide range of symbol systems, including highly 'dense' symbol systems, which allow for multiple interpretation.

Salomon makes the important distinction that, of the three programme elements, content, mode of representation and symbol systems, it is symbol systems which are the most generic to media. It has already been shown that content or knowledge are not media dependent for transfer of meaning (Olson & Bruner, 1974). According to Salomon, specific modes of representation - jokes, stories, metaphors, redundancy, structure - can also be presented equally well through most, if not all, media. Symbol sys-

tems, though, are correlated with particular media. Each medium develops its own blend of symbol systems.

Symbol Systems of Instructional Media

Salomon argues that in instruction, one should try to choose the most appropriate medium in terms of the extent to which it can symbolically represent or 'model' the nature of the learning task. If, for instance, one has to learn to deal with a situation where analysis must be made of a set of simultaneously occurring events, then a symbol system representing both iconic and analogic codes (e.g. television) would be more suitable. If, however, the task was to learn an abstract principle, then this learning could best be obtained from digital coding (e.g. print).

Another important variable to consider is the nature of the predominant symbol system in any given programme, since television can vary in the extent to which it uses various symbolic systems, and as there seems to be a relation between different symbol systems and different types of learning. That is, the effectiveness of a programme is likely to depend considerably on the extent to which the symbol systems it uses are appropriate to the kinds of

thinking which the programme designers would like to stimulate in the learners.

APPENDIX D

List of Interview Questions

To Group I: Senior Administrators at the Institutions.
and Group II: Distance Education personnel.

1. Involvement in Distance Education
   - What is the nature and extent of your institutions' involvement in Distance Education programming?
   - For how long has this institution been involved?
   - What delivery technologies are used?

2. Programmes and Support Services
   - What kinds of programmes have been offered in the past and are currently available? What future programmes are planned?
   - Are these on or off-campus, or both?
   - To what extent is a model of 'open learning' in operation?

3. Instructors
   - Is participation in Distance Education courses voluntary or compulsory?
   - What is the incentive/reward for participation?

- How does this affect the faculty's own research work?
- What qualities are needed in the Distance Education instructor?
- What training/guidance are they given?

4. Learners
   - How many students are enrolled in your Distance Education courses?
   - What are the characteristics of the 'typical' Distance learner? In what ways are Distance learners different from on-campus learners?

5. Individualisation of Instruction
   - To what extent is Distance learning more individualised than on-campus learning?
   - What are the advantages and disadvantages of an increase in individualised instruction and learning?

6. Finance
   - How much money is allocated to Distance Education programming (percentage of total university operating grant, and dollar amount)?
   - What is the source of this finance?

- How assured is the continued financing of Distance programmes in the future?

7. Internal Organisation
   - What is the impact of involvement in Distance Education programming within this institution?
   - What evidence is there of change in internal organisation and administration?

8. External Organisation
   - What is the impact of involvement in Distance Education programming in the way this institution operates in relation to the other universities?
   - To what extent is there more co-operation?

9. Curriculum
   - What is the impact upon curriculum and evaluation of teaching in the Distance Education mode?
   - What specific changes, if any, are apparent?

10. Future of Distance Education
    - What do you predict will be the future development of Distance Education programming?

- Do you notice any changes that have already taken place, e.g., in people's attitudes to Distance Education. What kinds of changes do you predict for the future?

To Group III: Policy Makers, Directors of Educational Programmes at the Ministries.

What are the significant factors that have affected the historical development of the higher education system in British Columbia? (See Appendix A for this information)

To Group IV: Distance Education Instructors

1. - What is the nature of the programme you taught for the Knowledge Network?
   - What was the duration of the course? (e.g. 10 weeks)
   - When was the programme shown and repeated (e.g., Thursday 7-10 p.m., Saturday 9-12 a.m.).

2. - Who were the intended viewers?
   - What background did they have in this subject area?

3. - What were the sources of information for the course? (e.g. was it newly prepared, or adapted from an existing course such as Britain's Open University?)

- What was your experience of teaching for television, in such areas as preparation of material, delivery of material?

4. How important was the interactive component of your programme? How much time was allocated, how was this period structured and how successful was the interaction?

5. How important were the visual materials to your programme? What kinds of visuals were shown?

6. What was the impact of the technology on course content and presentation of materials?

7. If the course was evaluated by students, what was the learner response to the programme?

Group V: Students

1. What was the course you studied?
2. What was your previous experience of Distance learning?
3. What is your preferred mode of study, and why? (e.g. on/off campus, correspondence, television)

4. What are your views about the course taken, in terms of such factors as workload, quality, standards expected of students, support services?

APPENDIX E

List of Interviewees

A personal interview was conducted with Dr. Antony Bates, Leader of The Audio-Visual Media Research Group, Open University, Milton Keynes, England.

GROUP I

Face-to-face interviews were conducted with the following five senior administrators, concerned with the Distance Education programmes within their respective institutions.

Dr. Glen Farrell, Director, University Extension, University of Victoria.

Dr. Robert Smith, Vice President, Academic University of British Columbia.

Dr. Jack Blaney, Vice President, University Development and Extension, Simon Fraser University.

Dr. Ian Mugridge, Dean of Academic Affairs, Open Learning Institute

Mr. Brian Gillespie, Dean of Health, British Columbia Institute of Technology.

GROUP II

Distance Education Personnel were interviewed:

June Landsberg, Knowledge Network Co-ordinator, Simon Fraser University.

Alexandra McGregor, Manager, Learning Design Services, Knowledge Network.

Michael Reddington, Manager, Utilization Services, Knowledge Network.

Dr. Margaret Haughey, Distance Education Programme Co-ordinator, University Extension, University of Victoria.

Arlene Zuckernick, University Extension, University of Victoria.

GROUP III

For the historical context of the study, the following people were also interviewed.

Dr. Walter Hardwick, Chairman and President, Knowledge Network, former Deputy Minister of Education, Science and Technology.

Dr. Ron Faris, Executive Director, Continuing Education Division, Ministry of Education.

Mr. Dean Goard, Director, University Programmes, Ministry of Universities, Science and Communications.

GROUP IV

The following University of Victoria instructors were interviewed:

Dr. Geoff Potter, Educational Technology

Dr. Jane Garland, Nursing

Carolyn Attridge, Nursing

Lucille Rudiak, Public Administration

Dr. Peter Hitchcock, Computer Systems

Dr. John Cossom, Social Work

Dr. David Turner, Social Work

Dr. John Langford, Public Administration

Jeanette Muzio, Computer Systems

Dr. Lloyd Ollila, Language Arts

Dr. Terry Johnson, Language Arts

Dr. Yvonne Martin, Public Administration

GROUP V

Telephone interviews were conducted with five Distance Education students in the Nursing programme of the University of Victoria.

Ivory Warner
Joel Ross
Ruth Davis
Marg Shore
Nancy Burke

These students were selected because they had extensive experience of Distance Education Study in a variety of modes over a period of several years. Names were drawn from class lists held by Dr. Faith Collins of University Extension, and participation was voluntary.

APPENDIX F
Knowledge Network Programme Titles

List of Knowledge Network Programmes Reviewed

#	Title	Instructor
Philosophy 331	Issues in Bio-Medical Ethics	Dr. Eike
	Genetic Engineering and Deliberate Death	Henner Kluge
Language Arts Education ED-B 480	Contemporary Issues in Education	Dr. Terry Johnson
		Dr. Lloyd Ollila
Public Administration 406	Ethics and Accountability	Dr. Margaret Haughey
	Issues in Public Administration	
Social Work 301	Crisis Intervention	Dr. John Cossom Susan Mitchell
Social Work	Basic Counselling	Dr. David Turner Katherine Leonard
Nursing 303	Health Sciences	Dr. Jane Garland
Public Admin. 404	Canadian Government	Dr. John Langford
Nursing 301	Theories and Concepts in Nursing	Dr. Jessie Mantle

APPENDIX G

Matrix of evaluation criteria and research findings

Area A Curriculum

EVALUATION CRITERIA	SUMMARY OF FINDINGS
LEARNING THEORY	
1 To what extent and in what ways are general learning principles followed?	Lack of personal interaction Fundamental principles followed but presentation often weak
2 How far is the apparent approach to learning consistent with programme goals?	Technological constraints made cognitive approach difficult Variation amongst individual instructors/ programmes
3 How much and in what ways is attention given to individual differences in learning style?	Difficult in O.E. context Increasing use of techniques to assist learner in taking individual approach found in some recent print packages
4 How far and in what ways are attempts made to attract and sustain audience attention?	Insufficient awareness of need to attract and sustain audience attention
5 To what extent and how is generative learning encouraged?	Communication of content emphasised of expense of promoting discovery in learning
COMMUNICATION THEORY	
1 To what extent are general communication principles followed?	Technological constraints can lead to instructor-dominated communication, danger of 'over-load' and formal or rigid productions
2 How are and in what ways is the approach to communication consistent with programme goals?	'Process' not semiotic model dominates Consistent where goal is communication of content, inconsistent where goal is to produce cognitive change
3 How much and in what ways is opportunity provided for inter-personal communication?	0-33% Average 20% inter-action Instructor-dominated communication with insufficient learner feed-back Instructors more concerned than learners
4 How much and in what ways is emphasis given to the develop-ment of mental skills?	Tendency to stress content rather than development of mental skills
ADULT LEARNING FROM EDUCATIONAL TELEVISION	
1 To what extent is the medium used for appropriate purposes as defined by Bates (1981)	Disparity amongst programmes Frequent 'inappropriate' use of t.v. medium
2 How much and in what ways is attention given to individual differences in learning from media?	Knowledge Network programmes use t.v., telephone and print Planned use of computers will make wider range of technologies available
3 To what extent and in what ways is visual information provided to facilitate learning?	Often lacking in visual stimulation
4 To what extent and in what ways is an active or deep-level approach to learning encouraged?	Disparity amongst individual instructors in awareness of need for active/deep-level learning reflected in O.E. products

VITA

Surname: Collins Given Names: Valerie Anne Cecilia

Place of Birth: Redhill, Surrey, England

Date of Birth: July 26,1953

Educational Institutions Attended, with Dates of Entering and Leavi

Middlesex Polytechnical 1972 to 1975
at Hendon, London, England

Garnett College of Education, London, England 1975 to 1976

University of Victoria, British Columbia, Canada 1981 to 1984

Degrees, Diplomas, Etc., Awarded, with Dates
and Names of Institutions:

B.A.(Honours) 1975 C.N.A.A. degree, Middlesex Polytechnic

Publications:

O.E.C.D. Case Study: British Columbia-Higher Education
and the Integration of a New Technology

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