Impact of educational television on young children

Edited by
Wayne H. Holtzman,
University of Texas
and
Isabel Reyes-Lagunes,
Universidad Nacional Autónoma de México

in collaboration with
Mira Aghi,
Indian Space Research Organization, Bombay, India
Takashiro Akiyama,
NHK Radio and Television Culture Research Institute, Japan
Arrigo Leonardo Angelini,
Universidade de São Paulo, Brazil
Margot Berghaus,
Universität Hamburg, Federal Republic of Germany
Angela Biaggio,
Pontificia Universidade Catolica, Rio de Janeiro, Brazil
Janpeter Kob,
Universität Hamburg, Federal Republic of Germany
Alicia Martín del Campo,
Universidad Iberoamericana, Mexico
Kurt Pawlik,
Universität Hamburg, Federal Republic of Germany
Samuel Pfromm Netto,
Faculdades Metropolitanas Unidas, São Paulo, Brazil
Takashi Sakamoto,
Tokyo Institute of Technology, Japan
Gavriel Salomon,
Hebrew University, Jerusalem, Israel
During the last two decades, the possibility of harnessing the power of television to modern instructional techniques and dramatic programming for the education of young children has increasingly captured the imagination of planners, educators and large segments of the general public throughout the world. The variety of experiments undertaken in this field, geared to widely different educational systems and levels of communication development, seems to indicate an irreversible trend. They also point to the need for measuring the impact of television on young children, notably with respect to the development of cognitive skills, and for developing a cross-cultural or 'culture-free' approach to this end. This publication represents one of Unesco's efforts to respond to these needs.

This study, undertaken by the International Union of Psychological Science with financial support from Unesco, is an outgrowth of two international conferences on educational television for children and a survey of evaluations from different nations. The first conference, held in Mexico City in May 1976, brought together seventeen research specialists in the behavioural sciences, first, to examine a number of empirical studies dealing with the impact of educational television on cognitive, perceptual and personality development in young children, and, second, to begin developing alternative models for evaluating such efforts in different countries. The conference also drew up a plan for completing a series of scholarly reviews and scientific papers. These materials, in turn, constituted the agenda for the second conference, which took place in Tokyo, in September 1977, under the auspices of the Japanese Psychological Association and the Nippon Hoso Kyokai (NHK, Japan Broadcasting Corporation) Institute for Broadcasting Culture. It was highlighted by a symposium entitled 'Television and the Child', held at the Matsushita Audio-Visual Center.

The conclusions of the Tokyo conference and symposium are reflected in Part I which deals with the linkages between communication and education, the principles and methodology of evaluation and a review of recent findings in the field of child development as they pertain to television and its impact on young children.

Part II contains six case studies carried out in varying socio-economic and cultural contexts in both industrialized and developing countries. The major focus of these studies is Sesame Street* and its adaptations, as well as other programmes which derive in large measure from its format. Given the fact that this model has influenced children's television so widely and that so many systematic evaluations to date have been carried out within the context of this programme, it was a logical point of departure for further work. Future studies based on different models are not only desirable, but necessary.

Part III comprises a summary of the major points of the preceding chapters, along with a series of recommendations for evaluation.

It is hoped that this publication will provide new insights for researchers, educators and decision-makers and stimulate further research into educational television and its impact on the child.

Unesco wishes to express its appreciation to the two editors, Wayne H. Holtzman and Isabel Reyes-Lagunes, as well as to the many contributors without whom this study would not have been possible. The opinions expressed in this publication are, of course, the sole responsibility of these editors and contributors and do not necessarily reflect the views of Unesco.

* Launched by the Children's Television Workshop of New York, N.Y., United States of America, in the late sixties.
Table of contents

Part I. THEORIES AND METHODS OF EDUCATIONAL TELEVISION AND ITS EVALUATION .................................................................. 5
  Chapter 1. Evaluating Educational Television. ......................... 6
          (Gavriel Salomori, Alicia Martín del Campo)
          (Wayne H. Holtzman, Mira Aghi, Takashi Sakamoto)
  Chapter 3. Child Development ............................................. 19
          (Angela Biaggio)

Part II. CASE STUDIES OF ETV EVALUATION .......................... 27
  Chapter 4. A Sampling of Children's Television in the United States. 28
            (Wayne Holtzman)
  Chapter 5. Plaza Sesamo .................................................. 31
            (Isabel Reyes-Lagunes)
            (Kurt Pawlik, Janpeter Kob, Margot Berghaus)
            (Takashi Sakamoto, Takashiro Akiyama)
  Chapter 8. Impact of Brazilian TV on Children and Education .... 43
            (Samuel Pfommm Netto, Arrigo Leonardo Angelini)
  Chapter 9. Project SITE in India ......................................... 49
            (Mira Aghi)

CONCLUSION ............................................................................. 54
REFERENCES ............................................................................. 57
Part I
Theories and methods of educational television and its evaluation
CHAPTER I
EVALUATING EDUCATIONAL TELEVISION
by
Gavriel Salomon
Alicia Martin del Campo

Television in general and educational television (ETV) in particular are systems which are composed of a number of components, each of which exerts its effect in different ways upon individuals and society. Evaluation of an educational project mediated by television involves identifying and measuring the impact of the total system, as well as its various components, upon the viewers of the programme. Simplistic attempts to evaluate the total system may obscure much valuable information unless the specific functions of the various components are recognized and analysed in appropriate ways. Let us examine in more detail the components of ETV and the specific functions that each can accomplish.

EDUCATIONAL TELEVISION COMPONENTS AND THEIR SPECIFIC FUNCTIONS

The different aspects of educational television that are of special interest in understanding the total system and its impact upon individual viewers can be grouped into six components as follows—the technology of transmission, the content as transmitted in television programmes, the specific situations of viewing television, the symbol system of the television medium, educational-didactic factors, and the organizational factors of the system.

The technology of the television medium exerts its own effects upon viewers regardless of the other components. It is the technology of the satellite in Project SITE which delivered educational television to the many villages in India. It is the technology of the medium which made the dissemination of a new curriculum possible in El Salvador. The major function of the medium's technology is dissemination, and any evaluation of television should be undertaken in light of this particular function. How many people or different audiences of individuals gain access to the programme? If there are only 200 receivers in a country, the impact of television is very different than if there are 2 million receivers. When only one person is viewing each receiver in a small room, the impact is quite different from when the technology provides a larger screen for viewing by many individuals. New advances in technology can alter the medium, rendering it more effective in reaching large numbers of individuals.

The primary purpose of technology in educational television is to disseminate particular contents in the form of educational packages. The contents of these packages are rarely, if ever, unique to the medium of television. Such topics as family planning, mathematics, health, art history, and preparation for reading are all educational programmes which have little to do with television per se. To the extent that it takes place, learning is thus attributable to the transmitted contents rather than to the system or technology of transmission. The major function of the transmitted contents is to inform, teach, change attitudes or develop skills. Any evaluation aimed at determining whether this educational function has been satisfactorily accomplished must separate the effects of dissemination from the effects of content. A programme may be widely disseminated in the sense that a large number of people have access to it, but only if the contents of the programme are actually learned by a significant number of viewers can the major function of educational television be realized.

The viewing of television takes place in a wide variety of social settings which may or may not influence the outcome of any educational programme. While family viewing at home is most common among industrialized societies, educational television is also viewed in classrooms, nursery schools, special tele-clubs, and even in outdoor plazas, as in the community viewing characteristic of the Indian villages in Project SITE. Such social situations in themselves are both important causes for change, as well as outcomes of exposure to educational television. The more significant learning by pre-schoolers when encouraged by their parents in the social situation of viewing [Salomon, 1977] is an example of a causal factor influencing the impact of ETV. The breakdown of the caste system among dozens of viewers in the villages of India who intermingled while watching television is an example of an unforeseen outcome quite aside from the specific learning of the transmitted contents.

Television uses a 'language', or symbol system which differs in many important ways from that of books, spoken language, or even film. As such, it addresses itself to the more concrete levels of an individual's cognitive structures. It conveys more experiential meanings and possibly requires mental skills that are not tapped by the symbol systems of many other educational media [Salomon, 1979]. Many educational improvements that can be observed by ETV evaluators do not result from the contents of the educational packages, but from the 'language' by means of which these contents are conveyed. Similarly, a failure of an ETV programme to bring about a desired change may result from the novelty or from the 'concreteness' of the medium's 'language', a feature that may explain the frequent lack of success of ETV in high schools. The appeal of many ETV programmes such as Sesame Street could be a result of a combination of a well-functioning technology of transmission and a symbol system which represents otherwise mundane contents in a highly appealing manner.

In addition to the above-mentioned four components, there are more general educational and didactic considerations which pertain to the structuring and instructional nature of ETV programmes. Like the contents, these factors are not really an integral part of the medium. Yet they may have profound effects on learning outcomes quite aside from any other effects. A programme may be easily accessible as a

1. See references beginning on page 57.
result of good technology and may have well-chosen contents which make good use of the 'language' of television. Nevertheless, it may still fail to achieve educational objectives because of poor structuring; it may allow no rehearsal or feedback, or it may aim too high for the intended audience. Such considerations are didactic and of great relevance to ETV, facilitating or impeding educational success quite aside from all other components.

ETV involves what goes on behind the screen as well as the programme that finally reaches an audience. The curriculum developers, the producers, the technicians, the teachers, the material writers and the actors all play an important role in the final product. How well these efforts are organized can be a crucial factor in the success of the product. An ETV programme may have great potential and all five of the above-mentioned components may be well thought-out; and yet, the entire undertaking may fail because of difficulties in orchestrating and co-ordinating the whole system. As Schramm [1977] has pointed out, these organizational factors may be of greatest importance as a source of influence upon the outcome of the educational effort, regardless of other components in the system.

These six components or factors function together within one system. In short, they define the medium of educational television. A comprehensive evaluation must address all six components, even though it may focus in more detail upon one or two of them rather than all six. The technology affects how the programme is disseminated; the transmitted contents affect the acquisition and development of knowledge, attitudes, habits and skills; the context or situation of viewing affects social forms and context; the symbol systems employed in the language of television affect the ease or difficulty with which learning takes place; the educational and didactic considerations deal with the detailed process of learning and the relationship between curriculum structure and outcome; and the social organization of the entire system determines how well the system functions in delivering the educational programme.

ETV differs from general television in some respects, but not others. The analysis of the medium of television into six components helps us to identify in what ways the two systems differ. Technologically there is no major difference between general television and educational television, although there are a few exceptions. Closed-circuit television, when used for teacher training is one such exception; the possible use of ETV in combination with computer-based instruction is another. But by and large the technologies of both systems are identical. The future, however, promises to introduce more differences between the two kinds of medium. Whereas general television is a non-differential medium carrying messages to large audiences, educational television is moving in the direction of more precise specifications of the target audience. Although it may not be well-suited for truly individual instruction, it may ultimately become the medium of preference for group instruction.

The two systems of general and educational television differ very clearly in terms of their content, in terms of the social institutions associated with their viewing, and in terms of the educational-didactic nature of the programmes. The contents of ETV are specifically selected to obtain socially desired and approved educational goals. While commercial television has specific goals in mind, they are not necessarily socially desirable ones. The educational contents are conveyed in situations that are seen as promoting individual learning. General television makes no attempt to structure the social situation in this manner. Thus, special viewing conditions may be engineered as part of the ETV system — e.g. special classroom settings, special clubs, encouraged parental active participation — to facilitate the attainment of the educational goals. And finally, the educational-didactic considerations, which are highly ever-present in general television, are very much the heart of every educational package, whether conveyed by ETV or not. These three components of the system — the contents, the social situations of viewing and the educational-didactic factors — characterize the unique roles and functions of educational television as contrasted with general television.

**LINKING COMMUNICATION AND EDUCATION: A PARADIGM FOR ETV EVALUATION**

The evaluation of educational television simultaneously touches upon the discipline of both education and communication. Although education, at least in its formal aspects, is a communication process and much of the process of communication entails acts of education, there are few concepts common to both fields. Similarly, theoretical considerations formulated in one field seldom find their way into the other [Mielke, 1972].

It is our purpose here to suggest a conceptual framework for evaluation of ETV in which communication and education are considered together, thus drawing upon concepts common to both. Underlying the suggested framework are the following five assumptions which are based upon accumulated knowledge and theory in both education and communication.

*Any educational act, ETV included, involves all the commonly known components of a communication process.*

A moment's reflection shows how easily one can translate educational acts (teaching, cultivating skills, imparting knowledge, creating an atmosphere) into communication terms. There is always a sender — teacher, writer or ETV producer — who is part of a wider social system that uses one or more media of communication to carry intended coded messages (accompanied by noise) to particular receivers — students and other persons who constitute the target groups in education. The receivers are part of a particular sub-culture, characterized by specific aptitudes, needs, desires and interests. All this takes place under social and physical conditions which affect the meaning, reception and effects of the coded messages. In addition, there are feedback messages between nearly all elements of the process, making it a continuous network rather than a linear chain. Some of these are immediate feedback messages while others are delayed.

Two features of the educational act as expressed in ETV are somewhat unique among communication acts. First, an ETV programme will usually be more intentional, or goal-directed, than other television messages, since it is aimed at specific audiences with definite purposes in mind. Second, ETV is aimed at the personal growth and development of the receiving audience, while other television messages are more often designed to create an immediate effect. In spite of such differences, the acts of education and communication appear to share many things in common.

*The process of communication (teaching) starts out at different points for different participants in the process.* For the receiver (learner) the process may start only when the book is open, the television set is turned on, or the teacher begins the lesson. But it will have started much earlier for the book writer, programme designer or teacher. For the parents who may follow up with their children on the information that has been transmitted, the whole process may start much later.

It follows, therefore, that the evaluation of an educational act, especially when it concerns ETV, can have more than one starting-point. The choice of where to begin depends very much on the goals, roles and scope of the evaluation. For instance, one researcher may be interested in studying how the previewing of a programme by teachers may affect children's learning. Another may want to examine the learning effects that are produced by parental reinforcement of the material presented in a programme. The former investigator will focus on pre-broadcasting influences upon learning, while the latter will concentrate upon post-broadcasting effects.
Factors mediating between input and output may be of as much importance as the input factors, since the learning outcomes depend not only on the input but on the mediating processes as well. This assumption is one of the major lessons learned over the years in both communication and education. For many years, direct effects of input (e.g., persuasive messages, commercials, political appeals, educational programmes and the like) on output were studied, resulting in few, if any, strong positive outcomes. In nearly all cases, so-called moderator variables were found to modify, amplify, or even nullify the effects of input. The conception of direct effects of television gave place to the famous two-step flow hypothesis. According to this hypothesis, interpersonal relations, in the form of information-relaying and social reinforcement, intervene between input and output. ‘Talking to others’ turns out to be a major mediating component of the process. Recently, it has become clear that, at least in Western countries, the reinforcement function of interpersonal communication is of more importance than the relay function [Katz, 1975], thus giving even more weight to the mediating relative to the input.

Among the most important moderator or process variables which have been found to mediate between input and output are the differences between teaching methods, classroom atmospheres, teachers’ attitudes, previous learner knowledge and achievement, and initial attitudes of learners. The important point to note with regard to such moderating variables is that input factors affect them differentially. Thus, students with different levels of mental skill mastery are differentially affected by a given ETV programme, and classrooms with different atmospheres react differently to the same educational programme. Input factors and moderator variables interact to produce diversified outcomes. In other words, we can hardly speak of the direct effects of input on outputs, since outcomes depend so heavily on the interactions between input and moderator variables.

When seen from a communication point of view, we can distinguish between the effects of an ETV programme and its effectiveness [Salomon, 1974]. The ultimate purpose of evaluation is to study the effectiveness of an educational input as measured by attainment of a specific educational objective or outputs. But this ultimate effectiveness is mediated by more immediate effects. The immediate reactions produced by a message, programme, curriculum, situation, or environment, on students, teachers, school systems, or education planners are effects. Receivers may become attentive, interested, excited, or involved by, say, a message structured and designed in a particular way. These are all mediating effects of a psychological, sociological, or even organizational nature. The kind and strength of the effects depend upon the nature of the input, how the message interacts with the nature of the receiver and his environment. However, having an effect is no assurance of being effective. Whether an effect is or is not effective depends upon the intent, the purpose, and the desirability of particular outcomes. Thus, there must be external criteria by means of which the effectiveness of specific effects is evaluated. Both the intended and unintended objectives of a programme are such criteria.

Imagine an ETV programme carefully designed to teach basic behavioural principles of personal hygiene. The programme is found to draw attention, arouse interest, and capture the target audience. However, later examination of the audience’s personal hygiene behaviour reveals that the behaviour has not changed in any observable way. In light of its own objectives, this ETV programme, though having desirable effects, is not very effective. This distinction does not mean that effects are usually unrelated to effectiveness. In fact there are strong connections between the two. Quite clearly, the stronger the agreement between the intentions of the message sender and the psychological effects that the message produces, the higher the chance for the message also to be effective. Such connections are never simple ones. The specific effects, whether psychological, sociological or organizational, are mediators with respect to criteria of effectiveness, and it is quite difficult to evaluate the effects of actualised before examining them. Likewise, it is undesirable to measure only the effect without evaluating their effectiveness in the light of external criteria.

The implications of this distinction for ETV evaluation are that mediating processes (the effects of inputs on moderator variables) need to be taken into account and that both programme effects and effectiveness should be examined independently. Much of a programme’s effectiveness simply cannot be understood without knowledge of the mediating effects.

Different ETV systems may serve different purposes, depending upon the general developmental level of the educational system; more specifically, any given role attributed to an ETV system and its various components may serve different functions for different receivers at different points in time. ETV is but one component of general educational systems. The role ascribed to ETV depends upon the general state of the overall educational system, as well as upon the purposes attributed to the educational system. ETV may serve as the major carrier for educational reform, as in El Salvador [Mayo, Hornik and McAnany, 1976], or it may be no more than an adjunct to an already well-developed educational system of the Federal Republic of Germany or Israel. Consequently, teaching and to provide general enrichment, as in Japan, the Federal Republic of Germany, or Israel. Consequently, evaluation of ETV cannot be packaged in standardized form for all the societal roles and educational objectives extant in various countries. The evaluation of ETVs effectiveness in a country where it is perceived as no more than a technology for distribution (as is the Telesecundaria in Mexico) would differ markedly from the evaluation of ETV in a country where it is expected to provide unique educational experiences by drawing heavily upon the specific ‘informational potential’ of the television medium.

ETV programmes also serve different functions and satisfy different needs within any specified role. Take, for instance, the various functions that ETV can accomplish for schoolteachers. It may serve as a source of novel information for one teacher, as a relief from teaching for another, and as a model of good teaching for a third. Moreover, the purposes that a given programme may serve for different teachers may have little to do with those it serves for different audiences of learners. There is a complex mixture of functions that an act of communication in education can potentially serve which may lead to a corresponding combination of criteria which can be addressed in the evaluation.

The functional assumption which is adopted here, based on recent theoretical and empirical developments in communication [e.g., Katz, Blumer and Gurevich, 1974], attributes an active role to the receiver (or, in fact, to any other relevant element in the process). It is the receiver who does something with the message to satisfy personal needs and to serve specific functions for the receiver. This concept is fully compatible with recent views in education which approach the learner as an active, self-directed person.

The implication for ETV evaluation is that, aside from the stated purposes of an ETV programme, there may be many other, often hidden, purposes and outcomes. These other objectives which a programme serves at different times for different people must be examined and evaluated as seriously as the stated objectives. Indeed, it may turn out to be the case that, while a programme fails to attain its stated goals, it serves many other, no less important goals which are determined by teachers or students rather than by programme developers and directors.

Evaluation of ETV serves the function of feedback to all participants in the input and mediation phases of the process, providing primarily ‘diagnostic’ rather than ‘judgemental’ feedback. That feedback is needed by designers, producers,
teachers, and other educational authorities is self-evident. One can hardly imagine any educational system designed to accomplish specific functions which does not utilize some kind of feedback to correct its own activities. ETV is no exception. However, due to its very nature, it is usually impractical to obtain immediate feedback from schools and homes for correcting an ETV programme. Even if the transmission of such feedback could be arranged, it would be nearly impossible to make immediate use of it. No wonder, therefore, that even poorly-designed ETV packages continue to be used for relatively long periods of time before any corrective feedback is obtained.

Providing feedback to planners, designers and producers is where ETV evaluation can serve a unique function, provided it is 'diagnostic' rather than 'judgemental'. Judgemental evaluation tells us whether an ETV system (or single programme) is or is not effective, given specific criteria for judging effectiveness. Diagnostic evaluation, on the other hand, tells us what in the system (or programme) is more or less effective, for whom it is effective, and under what specific conditions planners and producers can expect that specific changes will increase the effectiveness of their ETV packages. For instance, Salomon [1977], in his evaluation of Sesame Street in Israel, found that lower-class 5-year-olds who observe the programme with their mothers learn far more than those who view the programme alone — nearly as much as middle-class children. A judgemental evaluation would usually not involve such specific interactions between input (the programme) and mediating factors (such as mothers' co-observation with their children), since these interactions do not tell us whether the programme is generally 'effective'. Only such diagnostic feedback based on the elements of the system can tell us what specific changes in a programme would make it more effective.

Obviously, not all kinds of ETV evaluation are designed to provide 'diagnostic' information; hence not all kinds serve direct feedback functions.

Evaluation models

With these five assumptions in mind, we may now turn to examine a number of models for ETV evaluation. Three major components can be identified in the process of communication or education: The input, the output and the process or mediating activity which links the two (Figure 1).

![Figure 1. Three major components in communication or education.](image)

The input circle includes all the elements which are brought into the situation, usually with specific intentions and reasons in mind. Input can be a whole curriculum, a programme, a show, or only a unit of content. Input is not only the observable curriculum or message which is brought into the situation, but also the intent behind it, the stated purpose as well as the hidden agenda, of the message. The output of ETV can involve numerous factors such as the change of attitudes, the memorization of a lesson, the acquisition of skills, or the learning of new behaviours. The mediating process may also be of a varied nature. The very fact of being a mediator or moderator transforms the input to produce an output. In the context of ETV, one would consider the teacher to be such a mediator for instance. Without such mediators, hardly any input-output relations are even conceivable.

We thus have a rather complex model. Inputs affect audiences which in turn exhibit specific outputs. The latter are evaluated in light of the original objectives and criteria. The intermediate process between input and output plays a major role as it interacts with both input and output and hence serves as mediator between the two. The entire process of communication, adapted specifically to ETV, is presented in Figure 2.

The left side of Figure 2 represents the cluster of input variables; the right side, the output variables; and the centre, the mediating process variables. All three clusters entail focal and peripheral factors. Usually the message is the primary factor of the input. But note that the message is strongly influenced by its social context, the overall educational system, and the medium as well as its concomitants. Thus, the focal element of the input can (and often should) be evaluated in light of the other input components. Similarly, the target audience, the learner, and the effects on him, are the main factors in the mediating process while the learning outcomes are the focal points of the output cluster. However, since each focal point is affected by peripheral factors (e.g. the learner is affected by the learning situation), one can also evaluate the structure and content of the message in light of its wider social desirability. Similarly, it is possible to evaluate the effects of the learning situation on the learner, or to examine the wider social implications of the learning outcomes.

The model yields at least seven types of evaluation schemes as outlined below.

Evaluation of input components. The nature, structure, content, etc. of the message can be examined in the context of its own surrounding factors, its social adequacy, or the relationships between original intentions and actual programme. One very common method used for this kind of evaluation is content analysis [e.g. Gerbner, 1969; Holsti, 1969] by means of which the overt as well as covert meanings of an ETV programme are revealed. Often such analyses reveal why a single programme of an entire curriculum could not possibly be effective since particular elements which were supposed to lead to change are actually hidden, blurred, or even missing. Content analysis may be of central importance to an ETV evaluation, since quite often intentions are not materialized in a programme as expected, nor are the educational packages that are given to the schools consistent with the original objectives the planners had in mind.

Evaluation of mediating processes. Evaluation of process involves a look at those mediating factors which are affected by the input and which, in turn, produce the output. These include situations, students and teacher characteristics. Within this framework, evaluation is done on the mediating factors themselves. For example, are early educational aspirations (a background mediating factor) related to ETV viewing (a situation variable)? Similarly, one may ask how enjoyment and comprehension (two mediators of learning) are related to each other, or, as Chaiken and Eagly [1976] have asked, how is liking of the programme's presenter related to the comprehension of his messages?

Many factors, such as attention to or interest in a programme, early attitude towards the subject-matter area, or comprehension of a show, are not to be considered as outcome variables since they are not the criteria by means of which the effectiveness of a programme is to be evaluated. They are, however, possible facilitators of learning and should therefore be considered as mediators between input and output. Their interrelations are the focus of interest for this kind of evaluation.
Figure 2. Process of communication adapted to educational television
Evaluation of output factors. Output factors can be studied as they are interrelated among themselves. For example, improved knowledge in botany for some students may be accompanied by an increasingly negative attitude towards this area of study rather than a positive attitude. Frequently there are outcomes which were neither planned nor expected. The relationships of unanticipated outcomes and expected ones should be studied. Finally, outcomes are not restricted to the learners. Teachers' classroom behaviours, organizational patterns, and sometimes even whole educational systems are affected by ETV. All these need to be examined in their own right. For instance, where ETV is centralized, one would expect to find that improved mastery of knowledge by students is accompanied by feelings of less instructional autonomy by teachers.

Evaluation of input-output relations. This is the most common type of ETV evaluation. It has often been criticized for omitting the process (mediating) factors. Programme designers and politicians are often interested only in this kind of evaluation since they wish to get a 'simple' answer to a seemingly 'simple' question: Does the ETV programme produce its desirable outcomes? As already pointed out, this question, naive as it may sound, is not a simple one at all. Nor can the answer be a simple one.

First, as we have seen, effectiveness depends to a large extent upon the mediating (process) variables and effects. Omission of process variables yields an 'average' result which is both distorted and meaningless. Imagine an evaluation project in which it is found that, on the average, learners experience a gain of, say, 15 per cent in their knowledge of science. This finding is rather misleading as it fails to inform us who gains more, and under what conditions; who gains less; and whose learning may even be debilitated.

Second, input-output evaluation is judgemental in its role but fails to serve a diagnostic function. It does not tell us where, why and under what conditions an ETV project is successful or not; it fails to serve a diagnostic function. It does not tell us who gains more, and under what conditions; who gains less; and whose learning may even be debilitated.

Process-output evaluation. This type of evaluation complements the preceding one, leaving out the input cluster. In some respects, it is more akin to scholarly empirical research than to evaluation since it attempts to relate psychological, sociological or organizational factors (assumed to be produced by the input) to output. Questions addressed by this plan deal, for instance, with the relationship between enjoyment (a mediating factor) and achievement (output), between teachers' attitudes towards an ETV package (mediator) and learners' interest in the subject matter (output), or between classroom scheduling (mediator) and teachers' feelings of instructional autonomy (outcome). The independent variables in this research design are actually the mediating process variables when viewed in a wider context, but are dealt with here as if they are the causal factors. Such a design for evaluation is more meaningful when carried out side by side with other designs.

ETV in the villages of India, as described by Agh in Chapter 9, provides us with an example of how mediating factors may influence output, attesting to the importance of this kind of evaluation. In a given village, as many as 500 members of a community might watch a programme on a single receiving set. Certain local rules were developed, such as the one determining that young children would occupy the front rows in the audience. Anthropological observations suggested that variations in viewing situations from village to village had a profound impact upon the programme's effectiveness.

The evaluation of El Salvador's ETV provides another example of process-output evaluation. Hornik [Mayo, Hornik and McAnany, 1976] carried out a separate study, accompanying other studies, in which the relationships between educational aspirations of rural youngsters and television ownership and use were investigated in El Salvador. This study gained additional meaning in light of the other evaluations which were carried out at the same time.

Input-process-output evaluation. This design for evaluation is an all-encompassing one that deals with the whole education-communication system. It relates input to mediating factors, and the latter to the output; hence it entails a study of the specific effects of the ETV package as well as its effectiveness. In other words, this plan incorporates the three latter segmental designs into one comprehensive design. Such a scheme is potentially the most powerful, providing answers to important questions often overlooked initially by designers and government officials. Not only is programme effectiveness determined, but also light is shed upon the specific effects of different programme components upon the audience under different conditions. In addition, it can tell us how much and in what way the mediating effects influence the outcomes and where to find factors which facilitate or impede the whole communication-educational process. In other words, this evaluation scheme is judgemental as well as diagnostic. In a sense, it is an interactive plan for evaluation since it deals with the interactions between input, mediating processes and output.

The plan for the evaluation of ETV in Israel [Salomon, 1976b] may serve as an illustration of this scheme of evaluation. The first stage of the plan consisted of a large-scale but low-cost study in which amount and consistency of classroom use of ETV were to be related to students' achievements and capabilities. The second stage consisted of a comparison between the achievements (as well as other, originally unintended outcomes) of the top third and bottom third of the classrooms, ranked by amount of ETV used. These two stages followed the input-output paradigm of evaluation. The second stage also enabled the evaluators to study the effects of attitudinal, organizational and situational factors responsible for one group of classrooms becoming heavy ETV users, are numerous mediating variables of potential importance which need to be considered in any comprehensive evaluation of ETV.
and for the other group becoming low users of ETV. The interactions between process and input variables could therefore be examined.

The third stage of the study focused only on the top third of the classrooms, the heavy users of ETV. Although all classes in this group used ETV extensively, rather large differences among them could be expected in terms of such outcomes as achievements and attitudes. The third stage was therefore designed to examine what differences in teachers' behaviours, social atmospheres, classroom compositions and technical settings could account for the differences in, say, achievement when the amount of ETV use is held constant. Thus, the effects of mediating process variables on outcomes were evaluated in the third stage.

The last stage consisted of in-depth content and format analysis of ETV programmes. First, the match between original intention and actual programme was examined. Second, each programme was rated on scales such as amount of humour, proportion of instructional material versus entertainment, difficulty, continuity, and the degree to which the special features of television as a medium have been fully exploited. Each programme's profile of ratings was compared to the amount of achievement the programme produced, as determined in the first two stages, revealing those components of ETV which facilitate or even debilitate learning in different groups of learners. Reviewing information in all four stages of the study provided a basis for judging the overall quality and worthwhileness of ETV for different kinds and ages of students, as well as for pointing out diagnostically where, how and for whom ETV can be improved.

CONCLUDING REMARKS

Let us imagine a large nation-wide ETV project, involving a new curriculum, newly written materials, and a series of ETV broadcasts. One's desire to examine the effectiveness of the project, as judged in light of its own objectives, is quite clear. But effectiveness for whom? And of what? Many different 'audiences' take part in the project; they can be influenced in many different ways, under different kinds of conditions, and by different components of the input. If we are to follow seriously our five assumptions stated earlier, we cannot but reach the following conclusions.

First, the input, i.e. the whole 'package', needs to be evaluated internally. That is, the books, the preparation courses for teachers, the transmission system, the content of the broadcasts, and the like, have to be studied for what they aim at explicitly and what they convey implicitly; how they are integrated (if at all); and how well they agree with each other.

Next, the different effects of the 'package' on different audiences have to be studied as well, since they also affect the output. Hence, what teachers, students and parents perceive, how they relate to the project, how much use they make of its components, and how well they use them, all need examination.

Finally, an interactive scheme of evaluation (the seventh scheme) should be adopted in order to determine what factors facilitate the project's effectiveness and which debilitate it under specified conditions. Otherwise no corrective feedback to designers and producers could be given.

Incorporating all these evaluation schemes in a single study usually turns out to be practically impossible. A good alternative is to design a series of smaller evaluation studies using different samples and research methods appropriate to the specific goals of each study. Central in such a series of related studies is the notion, adopted from communication, that many facets of the input produce important but complex effects due to the interaction of both input and mediating factors, thus leading to different kinds of outcomes.

The really important question to be answered by ETV evaluation is not whether a television series is generally effective, but rather what components of the programme, interacting with whom and under what educational, sociological, and organisational conditions, are more or are less effective. Such an interactive-diagnostic view is far removed from a simplistic overall evaluation of a project's 'worthwhileness'.
Evaluation in its most fundamental sense is as old as the history of man. Once a programme is launched with a stated objective, the question immediately arises as to whether or not the objective has been achieved. The more effort put into the programme, the more likely the outcome will be defended by its proponents and challenged by its sceptics. Whenever we ask such questions as, What did the programme achieve? or, Are the obtained benefits worth the cost of the programme?, we must undertake some kind of evaluation, even if only impressionistic, in order to obtain any kind of answer. All too frequently such evaluation rests upon informal observation or testimony, consensus of expressed opinion, or pronouncement by authorities.

In the recent years the rapid growth of social and educational programmes sponsored by the government, private foundations, and others has stimulated the development of a modern science of evaluation involving systematic empirical methods for assessing the impact of a programme and evaluating various outcomes by comparing them with the originally stated objectives and the cost of the programme. The number and scope of new social programmes or expanded ones under government auspices in education, health, international development, recreation and other areas of human endeavour, have been staggering. Except for programmes which were outstanding successes or colossal failures, all too little is known about their impact. As a result, a strong demand has arisen for governmental accountability in general and, more specifically, for the evaluation of programme outcomes.

Rather belatedly have social and behavioural scientists, those who have the tools and knowledge best suited for programme evaluation, become deeply involved in evaluation research. Traditionally, such scientists have been trained and rewarded to keep values out of their research rather than to deal directly with evaluation or policy studies. Description, explanation and prediction have been their traditional goals. Rapid changes are occurring in the behavioural sciences, however, and the past ten years have seen a flourishing of new handbooks, journals and advanced training programmes dealing with the applied science of evaluation and policy study.

The principles and concepts of evaluation as well as the specific methodologies for conducting an evaluation study have grown largely out of education, sociology, psychology and economics. Within education and psychology, the emphasis has been largely upon the impact of a given programme upon individuals participating in it. Within the social sciences, investigators have focused mainly upon larger units in society, ranging from small groups to communities and even to nations as a whole. Studying the impact of television upon young children contains elements of both points of view. A comprehensive evaluation of an educational television programme calls for an interdisciplinary approach if it is to yield findings of real significance in the formulation of policy.

A comprehensive evaluation study of educational television can be divided into seven major steps: (1) establishing goals and concepts, (2) developing programme content, (3) defining and surveying the audience, (4) measurement, (5) implementing the research design, (6) data analysis, and (7) interpretations. Let us examine each of these in some detail.

Establishing goals and concepts. The objectives of the programme must be explicitly stated in the form of practical goals that are socially significant to achieve. A major goal of the American Sesame Street, for example, was to improve the abilities of pre-school children in four areas of school readiness. The goals for Project SITE in India were more modest in nature, namely, to impart elementary information on the village life, science, hygiene and family living to children and adults in remote villages.

Stating the programme goals in general form is a first step that is usually necessary before a sponsor will support development and implementation of the programme. Translating general goals into specific measurable objectives is a more difficult undertaking. The general goal of a programme, for example, may be to teach basic cognitive skills to young children so that they are better prepared for entering kindergarten or the first grade. Innumerable questions immediately arise that must be answered before a pre-school programme can be developed and implemented on television. Is there a demonstrated need for the programme? Which children are most likely to benefit from it without special facilities or encouragement? What particular basic skills are most important to enhance readiness for school learning in the first grade? Should any social values be deliberately included as objectives? What is the estimated cost of such television programming, relative to alternative strategies for pre-school education? What side effects are likely to occur, both positive and negative? Such questions are only a few of the many that must be addressed in one way or another by those concerned with the programme. When properly stated, these questions lend themselves to empirical investigation by studies of needs assessment, potential audience survey, or small pilot projects in which experiments are undertaken. Quite frequently the experience of other experts who have participated in earlier evaluations can be of great value in the initial stages of establishing goals and concepts in sufficiently concrete form to be amenable to evaluation.

Calling upon an appropriate evaluation specialist in the early stages of programme formulation can make a real difference in the eventual success or failure of the project. All too frequently, evaluation is an afterthought, too late to influence the development of the programme. Conducting a needs assessment, audience survey, or pilot study requires special skill and knowledge if it is to be worthwhile. The initially stated goals and programme formulation predetermine the kind of criteria that can later be employed in the evaluation in order to determine whether or not the goals...
have been reached. Establishing such criteria for measuring programme outcomes is a major technical task that requires greater attention to the interaction between programme developer and evaluation specialist.

Developing programme content. Once special goals, target populations, programme conception, operational feasibility, and estimated costs have been established, the production of the programme can get underway. Writers, actors, producers and educators must work closely together in the creative process of developing programme content. The behavioural scientist trained in evaluation can be particularly helpful in these early stages of curriculum development. Continuous interaction of the programming staff and its special advisers is necessary to deal with such questions as the relevance of content to programme objectives, the coverage of objectives, the technical accuracy of content, the relevance of the content to the target population, and the likely acceptance of the programme content by the audience for whom it is intended. While expert judgement may suffice for answering some of these questions, brief audience surveys with prototypes or segments of the programme may be necessary during the formative stages in programme development.

Formative evaluation can range from content analysis, such as that undertaken by Kob and Berghaus in their analysis of sex-role stereotypes in *Sesamstrasse*, to small studies in which segments of the programme are viewed by children similar to those in the intended audience for their completed programme series. Rapid feedback is critical to success since production delays are costly and cannot be tolerated. Formative evaluation is aimed at improving materials and products during the developmental stages of the programme. A major objective is to make the programme responsive, in keeping with the needs, problems and requirements of the target population as well as making the programme appealing and attractive to them. Prototype segments of any new programme must be pre-tested in preliminary form to identify which ideas and elements offer the greatest promise. The formative evaluator may have to design short experiments with programme viewers drawn from the target population in order to evaluate both the content and the mode in which the content is presented. The effectiveness of various dramatic or instructional techniques, the pacing and length of a particular programme segment, the extent to which audience participation or adult encouragement may be needed, and the level of both acceptance and understanding by individual viewers can best be determined in formative evaluation conducted concurrently with programme development.

It is not only how important the content of a programme may be, the manner of presentation will enhance or detract from it. A viewer who is bored or fails to pay attention is not likely to benefit appreciably from the educational content. At the same time, it is essential that the message not be lost in one's eagerness to entertain the viewer.

Most well-designed educational television programmes are developed through a series of successive approximations. The formative evaluator acts as a middle-man between the producer and content specialist on the one hand and the audience or target population on the other. Various units of the overall programme series are examined empirically for both audience appeal and educational impact, leading to specific refinements as the programme is revised.

Developing programme content for educational television aimed at young children is particularly difficult because less is known generally about cognitive and personality development in the pre-school child than is the case for school-age children and adults. The older person has a number of basic cognitive abilities that can provide articulate verbal feedback both as a way of improving the programme and responding to tests aimed at evaluating programme impact. For this reason alone it is especially important to include a child psychologist or other developmental specialist as part of the production team. If such a specialist is expert in conducting formative evaluation studies and rapid corrective feedback for programme improvement, so much the better.

The first large-scale use of child psychologists and formative evaluation in an educational programme for young children is *Sesame Street*, produced by Children's Television Workshop of New York about a decade ago. These early efforts are described by Lesser [1974] and summarized by Palmer, Chen and Lesser [1976]. A similar programme of formative evaluation for *Plaza Sesamo*, the Spanish version of *Sesame Street*, has been documented by Diaz-Guerrero, Bianchi Aguilla and Ahumada de Diaz [1975].

The formative evaluator works closely with the script writer, educator and producer in reviewing the detailed script for each unit of the programme. Generally speaking, the only reliable way to determine whether or not the language is appropriate, the concepts can be understood, and the content is the right mixture of entertainment and educational message, is to pre-test the script with viewers from the target population. Small numbers of participants are studied in brief try-outs in which the viewers are encouraged to give general reactions as well as specific suggestions. In the case of relatively non-verbal, immature young children, actual observation of viewing behaviour and assessment of comprehension may be necessary. Several cycles of script revision, testing and modification may be necessary before the final version of the programme unit can be produced. The primary function of such formative research is to provide a high level of quality control by obtaining quick, useful answers to many questions about content and style of presentation early enough in the production process to influence the final product.

Defining and surveying the audience. The target audience is partially defined by an explicit statement of the programme's goals. In addition, however, it is important to test the limits of the audience since in many cases a programme may be viewed by a different audience than originally intended. Viewers of *Sesame Street* in America are primarily young children. Viewers of the Spanish version in Mexico may include older children, maids and adults. Viewers of *Sesame Street* in Japan and Israel are adults and older children who wish to improve their English. Any evaluative research must define the intended population and construct an adequate sample for a research design in order to study the effectiveness of the programme as it relates to the stated goal.

Educational television designed for a mass audience assumes that a large segment of the population, if not the majority, will find the programme interesting and relevant to their needs. If information is not already at hand concerning the demographic characteristics of the intended audience, special surveys will have to be conducted. In the case of educational television for young children, it is essential to know the extent to which television is accessible to the child through the home or through a community centre. One must also take into account the traditional values in the family, such as religious, political and social customs; the extent of cultural variation and ethnic differences; the motivation of parents with respect to their young children; alternative educational resources available to the family; and a host of other characteristics that make a difference in how the programme is developed and the extent to which it can reach effectively a large audience as intended.

Measurement. Empirical measurement may range from content analysis of programme segments to delayed outcome measures of impact upon viewers. It can vary from the simple counting of events or categories of behaviour to extensive individual psychological testing of viewers before, during, and after exposure to the programme. The kind and intensity of measurement depend upon the purposes of the evaluation, the technical resources available, and the amount of financial support budgeted for evaluation. The number and variety of measures that might conceivably be employed in an evaluation of educational television are limited only by one's imagination. From a practical point of view, however, the most likely measures are relatively limited. The most obvious are outcome
variables that appear related to the original programme objectives. In order to interpret such measures, however, one must also take into account two other broad kinds of variables: organismic variables, the background or identifying characteristics of viewers such as age or sex; and treatment variables, characteristics of the television programme content and mode as well as the viewing conditions and associated activities. Let us examine in more detail various measures of organismic, treatment, and outcome variables.

Organismic variables. It is important to know the most salient background characteristics of the viewers in order to describe the viewing audience and compare it with the original target population. Such identifying personal characteristics as the age and sex of the child, as well as the child’s educational level, are invariably of interest. In most educational programmes it is also important to have some measure of the child’s family characteristics, since such variables often influence how a particular educational programme will be interpreted by the child. For example, the lifestyle, the socio-economic status, or the ethnic identification of the family may be important information that will help shed light upon the meaning of the measured impact discovered after the child views the programme. One might well expect a different outcome for a particular educational television programme when viewed by children of educated, affluent white parents than when viewed by black children from uneducated parents in a ghetto setting. The kinds of stimulation in the home environment that the child receives and the value orientations and lifestyles of these two contrasting families are important factors that cannot be ignored. Less striking family differences may also be of importance. In any event, such organismic variables are relatively easy to measure in any assessment of impact upon individual viewers and should be considered in the design of the evaluation project.

Treatment variables. Measures of the treatment or process variables are also necessary if one is to interpret the meaning of any outcome measures. Both the content of the programme and its mode of presentation are important. Most analyses of content involve several steps. First, the television programme is broken down into a number of discrete units in sequence from beginning to end. These logical units may be thought of as episodes or events that can be distinguished. Second, each unit is judged as to presence or absence of the particular characteristics of interest. In some cases the characteristics of the content may be rated for intensity, as well as simply presence or absence. And third, the categories of rated units are grouped together and compared.

The analysis of role typing by Kob and Berghaus described on page 36 et seq. is an example of this type of unitizing and rating typical of content analysis. The particular characteristic or quality being rated depends upon the purpose of the evaluation, which in turn are closely related to the objectives of the educational television programme.

The mode of presentation for the content in the television programme is also often of importance in evaluation. An adequate description of the mode of presentation in the ETV programme deals with such characteristics as the format, the main characters, the use of music, rhythm and speed, the use of narration and the characteristics of the narrator, the form of presentation, the length of the programme, and whether or not the programme is part of a longer series.

The conditions of viewing are often as important in the study of treatment variables as the television programme itself. It is important to describe the kinds and varieties of viewing characteristic of the target audience. Are the viewers in the evaluation study watching the programme in their homes, in small groups in nursery schools, or in large groups in a community setting, as in the SITE project in India? Activities associated with the viewing should also be noted. Do the nursery school teachers watch the television with the children? Do the parents talk to the child about the programme content and even act out certain aspects of the programme in order to heighten the child’s interest and give the programme added meaning? Or is the child merely watching the programme in a fashion unrelated to any surrounding activities? As indicated by Cook et al. [1975] in their re-analysis of Sesame Street evaluations, the answers to such questions can be crucial in the interpretation of the outcome.

Outcome variables. The measures that deal specifically with the impact of the television programme upon its target population are, of course, the most obvious ones to consider. These range from degree of attention exhibited by the child while viewing a programme to improved school performance several years later. As outcome variables, these measures are conceived of as dependent upon (or caused by) a particular combination of organismic and treatment variables. Considerable attention is given in the research design to the development and selection of adequate outcome measures with respect to the objectives of the television programme and its evaluation. To be satisfactory, such outcome measures must provide answers to such questions as the following: To what extent does a child learn the material presented in the ETV programme? How long is the new knowledge or skill retained once acquired? Are there any changes in personal attitudes, emotional behaviour, or other personality attributes as a result of viewing the programme? A variety of techniques is available for assessing cognitive, affective, attitudinal, and personality traits as outcome variables in evaluation studies.

Among the more common methods of measurement employed for obtaining criterion data pertinent to outcome variables are the following: (1) test scores in paper-and-pencil, situational and performance tasks designed to measure individual characteristics; (2) questionnaire or interview schedules for obtaining information from teachers, parents, or the children themselves; (3) detailed logs or diaries of impressions kept by participants during the course of programme viewing; (4) direct observation of the child’s behaviour, both in the viewing situation and later in other settings; (5) ratings of the child’s performance or personality by informed others, e.g. parents, teachers, or older siblings; (6) later records such as school grades; (7) social indicators of change throughout the community or school that reflect improved behaviour or social change; and (8) expert opinion. The first two methods, scores on psychological or educational tests and measures derived from questionnaires or interview schedules, are the most common methods of measurement for evaluating an ETV programme. When working with young children, direct observation of the child’s behaviour is probably the most reliable approach for measuring the immediate effects of the programme. Where a delayed follow-up study is undertaken to provide criterion data, the use of school records is especially appropriate where one is stating as an objective for the programme improved school performance in later years. The use of social indicators is only rarely appropriate and calls for a large-scale experiment in which some communities receive the educational television programme while others do not. Expert opinion, although used fairly frequently, is likely to be the most unreliable and misleading unless carefully checked by independent methods.

Given the bewildering array of diverse measures that might conceivably be used at various stages in the evaluation, how does one select the appropriate measures for a particular study? This question is paramount in any research design and must be answered prior to the launching of the evaluation study. While there is no substitute for the expert advice of a competent specialist in the field of evaluation and measurement, there are some general considerations that may help in answering this important question. Some of these considerations may be subsumed under six headings: (1) reliability of measurement, (2) validity and relevance of measurement with respect to stated objectives, (3) ease of collecting the measure, (4) cost per unit of measurement, (5) ethical issues involved in the use of the measurement, (6) contemplated methods of analysis and interpretation.
Reliability. A reliable measure is one that provides consistent and stable indications of the characteristics being investigated. The issue is complicated by the fact that a given measure may be quite reliable when obtained under specific circumstances but unreliable under other conditions. Personality traits, for example, are often so dependent upon the specific situation in which the person is behaving that they are not consistent when measured in other very different situations. Considerable variation from one measurement situation to another yields an unreliable measure for which any generalizations about outcome must necessarily be severely limited. For this reason, various indices of reliability have been developed to aid in decisions about the usefulness of a particular measure. Technical methods for obtaining reliability coefficients generally involve giving the test more than once to the same individuals (test-retest method), administering alternate or parallel forms of the measure to the same people and comparing the results (alternate forms method), or estimating reliability from an internal analysis of item interrelationships (split-half method or internal consistency methods). The concept of reliability is applicable to all kinds of measurement, although it is most highly developed in the use of tests or ratings.

Validity. A valid measure is one for which there is clear and strong evidence that it really does measure what it purports to measure. In many cases the validity or lack of it is self-evident. Such content validity is easiest to establish when dealing with a specific performance domain of interest such as doing simple arithmetic, naming familiar objects, or reciting the letters of the alphabet, as in the case of measures used for the evaluation of Sesame Street. When dealing with personal characteristics other than knowledge of skills, however, validity of the measure is much more difficult to establish. For example, a child may be more aggressive in play immediately after viewing aggressive scenes on television, but does this measure have any validity with respect to aggression in other circumstances, such as interpersonal play in the neighborhood at a later date? The relevance or validity of measurement with respect to the stated objectives of the study is an important issue on which both logical and empirical evidence is required before reaching a decision.

ease of collection. Some measures are far more difficult to collect than others. Too often an evaluator will succumb to the easiest kinds of measurement, even though they may be less valid and less costly. Other things being equal, objective short tests, questionnaires or ratings can be more easily applied, particularly by the relatively untrained person, than is the case for more complicated instruments or clinical procedures which require special skills. In those situations where technical resources are simply unavailable, one is forced to consider measures that can be collected very easily by relatively untrained individuals, even though such measures may not be ideal with respect to other considerations.

Cost of measurement. The cost per unit of measurement and the ease of collection are related. Measures which are more difficult to collect tend to be more costly, although there are exceptions. The use of highly trained psychologists as clinicians to observe behaviour or to administer and interpret certain tests can be very costly. In general, a good rule of thumb is to employ the least costly method of data collection consistent with adequate reliability and validity. 

Ethical issues. Some measures violate the privacy of an individual much more than others. For this reason it is especially important to review the proposed measures to assure that there is a minimum of invasion of personal privacy and that there is no humiliation, or other undesirable after-effect, that may result from the measurement process itself. The welfare of the individuals involved must always be considered.

Methods of analysis. Some kinds of measures are more difficult to analyze than others. Generally speaking, a quantitative measure that varies in intensity and that has adequate reliability and validity will be a more powerful measure that can be analyzed more effectively than is the case for a measure which has questionable reliability or that indicates only presence or absence of a specific quality. For a given level of confidence in interpretation of the outcome, more cases are needed in the evaluation design when the measurement is qualitative rather than quantitative in nature. Of course, in many instances qualitative measurement is the only kind that can be obtained. The methods of analysis to be employed once the data are collected depend largely upon the kind of research design employed in the first place, as well as the kind and quality of measurement called for in the design.

Research design and its implementation. The primary difference between casual observation and a systematic evaluation can be largely implied by the term itself. Given the stated objectives, the programme content, the definition of a target audience, and the kinds of measurement that are feasible to consider, a systematic investigation must be launched to obtain the information needed for any conclusions. As in any scientifically based research, the design for evaluation requires a high degree of technical skill in research on human behaviour and the statistical analysis of complex data. It is useful to think of research strategies as falling primarily into one of three broad categories—exploratory research, descriptive analysis, and the conducting of an experiment.

Explanatory research involves the pre-testing of ideas in small pilot studies. Preliminary concepts are sketched out in tentative form; various measures are tried out on a small scale which permits considerable revision; and a flexible stance is maintained in order to incorporate new ideas, unexpected findings and insights. This strategy is particularly appropriate in the early stages of an evaluation project.

The most common research design for evaluation of television is descriptive and analytical in nature. Groups of viewers are assessed before and after exposure to television and compared with other groups who may have a different treatment experience. The description can be more powerful when a number of organismic, treatment and outcome variables are measured and studied by statistical methods. Most field studies in naturalistic settings are basically descriptive in nature, even though they may purport to isolate cause and effect relationships between exposure to television and outcome variables. The biggest difficulty with such descriptive analysis is the logical-inferential dilemma arising when one tries to draw a strong conclusion concerning the cause/effect relationships between viewing the television programme and outcome. Without experimental controls and other safeguards characteristic of a true experiment, one is always left with a more or less difficult interpretation that can frequently be challenged on logical grounds.

The most rigorous research strategy involves the conducting of a true experiment in which individuals are randomly assigned to experimental and control groups with both pre- and post-treatment measures to isolate the treatment effects. A true experiment is characterized by three features: genuine randomization of cases to different treatment groups in order to avoid bias; replication of the basic unit of study (usually an individual viewer) in each group in order to provide an estimate of error-variance for statistical inference; and rigorous control of all potentially confounding variables in order to yield a clear, unequivocal interpretation of the outcome. In actual practice it is exceedingly difficult to implement the ideal experimental design on a large enough scale and in a realistic enough context to ensure highly significant unequivocal results. Even the best of designs when implemented may prove impossible to preserve, partly because human beings as subjects may drop out of one group more frequently than they do in another. A good example of a true experimental design that was actually implemented is presented briefly in the later discussion of Plaza Sesamo. It is important to note, as reported by Diaz-Guerrero and Holtzman [1974],
that the first experiment in Mexico on Plaza Sesamo involved a rigorous experimental design implemented under carefully controlled conditions in three closely monitored day-care centres. The later, much larger field experiment involving Plaza Sesamo was conducted in fifteen day-care centres and rural communities under less well-controlled conditions. Although the larger field study started out as a true experimental design, differential attrition across experimental and control groups, as well as a number of other unanticipated events, changed the nature of the research design so that it had to be reclassified as a quasi-experimental design.

Quasi-experimental studies have many features similar to a true experiment. Both experimental and control groups are present, although there may not be genuine randomization of cases, especially when looking at post-treatment or outcome scores. Statistical methods are available for analysing quasi-experimental designs to adjust for such effects. Considerable attention has been given in recent years to alternative analyses in such cases [Campbell and Stanley, 1966].

Data analysis. The coding and analysis of data in an evaluation study should be thought through carefully in advance of implementing the research design itself. All too frequently the inexperienced evaluator ends up with a bewildering and incomplete array of data that cannot be properly analysed or interpreted. Since most kinds of analysis involve statistical methods for description and scientific inference, it is essential that the evaluation specialist be thoroughly familiar with methods of statistical analysis, as well as research design.

The availability of a modern computer greatly increases the efficiency of analysis while making possible more powerful methods, both descriptive and inferential, than would be the case with an ordinary hand calculator. The proper coding of measures and qualitative information for computer analysis is an essential step that requires careful advance planning.

Interpretations. The final step in a comprehensive evaluation study concerns the interpretation of results. If all of the other six steps have been competently performed, the interpretation of the outcome is relatively simple. All too frequently, however, neglect of an important earlier step vastly complicates the interpretation.

A distinction should be made between the specific and direct interpretation of the outcome of the analysis for the population of viewers and the sets of measures employed in the investigation, and the more general interpretations as to the meaning of the results for slightly different populations or for decision-makers who must set policy at a local or national level. The controversy between Cook and his colleagues and the original evaluators of Sesame Street at the Educational Testing Service and Children's Television Workshop dramatically illustrates the above distinction between specific interpretations of a given experiment and general interpretations of broader significance [Cook et al, 1975].

In recent years, much more attention has been given to cost considerations and economic analysis as an integral part of interpreting the meaning of an evaluation. A major policy decision may hinge upon the weighing of costs against benefits received for a particular programme. In Sesame Street, for example, the costs of producing the programmes and transmitting them on large scale to television receivers in homes or classrooms where millions of pre-school children may view them can be estimated fairly accurately, though with some difficulty. The benefits to be achieved by such a programme, however, are more controversial. It is much more difficult to translate gains in cognitive development as a result of viewing Sesame Street into monetary equivalents that can be balanced against costs in a cost-benefit analysis. In education, there are usually no clear monetary values that can be assigned to outputs. A more realistic approach involves cost-effectiveness analysis which compares different programme alternatives, such as televised Sesame Street versus the use of tutors in day-care centres. Probably the most important feature of this approach is the creative task of generating alternative strategies which might be more cost effective for attaining the same specific goal.

In this brief review of the seven major steps involved in a comprehensive evaluation procedure, only the highlights of evaluation principles and their applications could be outlined. It should be apparent that a high degree of technical competence on the part of an evaluation specialist is essential. The above discussion can only introduce the reader to the more salient issues in this rapidly growing new field. Table 1 contains a list of questions to consider in designing an evaluation of an educational television programme.

Table 1

<table>
<thead>
<tr>
<th>Checklist of questions to consider in designing an evaluation of an educational television programme</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROBLEM</strong></td>
</tr>
<tr>
<td><strong>TARGET</strong></td>
</tr>
<tr>
<td><strong>CRITERION</strong></td>
</tr>
<tr>
<td><strong>CONTENT</strong></td>
</tr>
<tr>
<td><strong>PURPOSE</strong></td>
</tr>
<tr>
<td><strong>CONTEXT</strong></td>
</tr>
<tr>
<td><strong>DELIVERY</strong></td>
</tr>
<tr>
<td><strong>LITERATURE</strong></td>
</tr>
<tr>
<td><strong>RESOURCES</strong></td>
</tr>
<tr>
<td><strong>IMPACT</strong></td>
</tr>
<tr>
<td><strong>CO-OPTION</strong></td>
</tr>
<tr>
<td><strong>COLLECTION</strong></td>
</tr>
<tr>
<td><strong>COST</strong></td>
</tr>
<tr>
<td><strong>BENEFITS</strong></td>
</tr>
<tr>
<td><strong>ANALYSIS</strong></td>
</tr>
<tr>
<td><strong>INTERPRETATION</strong></td>
</tr>
<tr>
<td><strong>DISSEMINATION</strong></td>
</tr>
<tr>
<td><strong>RELATIONS</strong></td>
</tr>
<tr>
<td><strong>ETHICS</strong></td>
</tr>
<tr>
<td><strong>QUALITY</strong></td>
</tr>
<tr>
<td><strong>BIAS</strong></td>
</tr>
</tbody>
</table>
Anyone interested in pursuing these matters further should turn to more detailed presentation, such as the *Encyclopaedia of Educational Evaluation* [Anderson et al., 1975]. Still another useful introduction to the field which has been written for the general reader is *The Profession and Practice of Program Evaluation* [Anderson and Ball, 1978]. The case studies of educational television evaluation presented in Part II of this book illustrate many of the principles outlined above. These studies were deliberately chosen to illustrate the wide range of possibilities for evaluation in this field.
CHAPTER 3
CHILD DEVELOPMENT AND TELEVISION
by
Angela Biaggio

INTRODUCTION
What has developmental psychology to tell us about the impact of television upon child development? A great deal of research effort has been directed to this topic. The majority of early studies can be grouped into three categories: descriptive studies of audience variables; field and laboratory studies on the impact of televised aggression upon aggressive behaviour in children; and learning from television. More recently there has been a great interest in research on the effects of socially positive televised models upon children's behaviour. Television advertising directed at children, credibility of television programmes, cognitive variables and several other topics are also burgeoning as new fields of interest.

In this section is presented an overview of the theoretical background and research findings in the area. Further directions that research on effects of television upon child development can take are also briefly examined. The overview is not intended to be comprehensive, since there is extensive specialized work published elsewhere. Instead, a very general survey is combined with deeper treatment of a few studies or specific topics of interest that might be useful when brought to the attention of individuals who are involved with educational television and who have an international perspective.

THE THEORETICAL VIEWPOINTS
Most developmental psychologists would say that the major theories in the field are Piaget's theory of cognitive development; psychoanalytic and neo-psychoanalytic theory; and social learning theory. We do not intend here a complete presentation of these theories, but rather a brief mention of the points which may be relevant for the study of the impact of television upon children.

Piaget's theory of cognitive development. Jean Piaget, born in Switzerland in 1886, is considered one of the most influential theorists in current developmental psychology. His theory of cognitive development is permeated by biological concepts such as those of organization and adaptation with its two complementary phases of accommodation and assimilation leading to a state of equilibrium [Piaget, 1923, 1947; and Flavell, 1963]. These functions are called invariants, because they are present throughout changes, progressing through stages. An interplay of maturation and environmental stimulation is responsible for this progression through the various stages. Let us explain some of these basic concepts, which are fundamental to an understanding of Piaget's view of cognitive development.

Basically, the child is born with some very simple structures (schemata), with which he can apprehend the stimuli, such as the reflexes. When the child is faced with a new object or a new stimulus, he will utilize the structures that are available to him in order to adapt to the world. When he can apprehend this new stimulus by means of an existing structure, he is merely assimilating the object or stimulus. Piaget calls accommodation a change in the organism, the development of a new structure in order to adapt to a new stimulus or situation. The process of accommodation is obviously painful in its first stages. This process is followed by a period of exercising in which the new structure has been developed and the child experiences pleasure in assimilating various objects with this new structure. Then comes a period of satiation. Soon a new stimulus will initiate a new process of accommodation. The point of equilibrium lies halfway between accommodation and assimilation, that is, the early stages of accommodation are hard and unpleasant, but over-assimilation leads to boredom, and a new cycle is started.

What can we learn here that would be important for educational television? Basically, that programme content must be such that the child can accommodate it without too much strain. If the content is way beyond the child's comprehension and interest, the process of accommodation won't even start. When the content is too easy, it may be quickly assimilated and then dismissed by boredom. Many factors other than programme content should be considered here also, especially in connection with cultural differences since we are talking here about educational television from an international perspective.

THE TARGET AUDIENCE: TELEVISION VIEWING PATTERNS OF CHILDREN
Stein and Friedrich (1975) have summarized findings on television viewing patterns, emphasizing the following five points. First, consistent general trends have been found about mean group differences in the amount of viewing according to age, sex, social class, ethnic group and intelligence. Exact estimates of the number of hours per week that the child watches television are difficult because of the unreliability of different methods of assessment, as pointed out by Bechtel, Achelpohl and Akers [1972]. Second, the amount of viewing increases from age 3 to early adolescence. Third, there are no sex differences in amount of television watching in childhood, but adolescent girls watch slightly more than adolescent boys [Lyle, 1972]. Fourth, children from lower social status homes watch more television and more violence than those from higher status homes; blacks also watch more television and more violence than whites, even when social class is controlled [Lyle, 1972]. Fifth, most recent studies found no relationship between amount of the television watching and intelligence or school achievement. Early studies such as Schramm, Lyle and Parker [1961] suggested that very intelligent children were heavy television watchers in childhood but not in adolescence. The few recent studies that show a relationship indicate the reverse; namely, that heavy television watching is related to low intelligence or poor achievement [Friedrich and Stein, 1973; Lyle and Hoffman, 1972a; Stein and Friedrich, 1972].
Television viewing habits, or even familiarity with a television set, may be factors to consider since the child may have to adapt to the medium of television before adapting to the programme content. In some cultures in which a television set is a complete novelty, this factor may be of extreme importance. While this case may be obvious, there are other less obvious cultural differences between equally developed cultures, such as climate, for instance. One cannot assume that a television programme will catch a child's attention in a tropical city where the child can play outside most of the time, as it does in the wintertime in a northern city when the child is confined to closed spaces.

The optimum point of equilibrium for accommodation is that point that captures the child's interest. As is well known from studies of attention and difficulty level, material that is too hard or too easy will not attract the child's attention. The optimum level of stimulation (or in our specific case, of what ETV will present so that it will hit the ideal points that lead to adaptation) has much to do with the developmental stage of the child.

Piaget proposes that every child goes through four major stages which are qualitatively different, and that each stage supercedes but does not eliminate preceding stages. The notion of egogenesis means that higher stages depend on earlier stages, that the child who did not acquire structures typical of the earlier stages will have trouble acquiring the more mature structures of the later stages. The four major stages are sensory-motor (0-2 years), pre-operational (2-6 years), concrete operations (7-13 years), and formal operations (14 years on). It is important to keep in mind that the age bands are not rigid and individual differences in reaching the various stages are very large.

Sensory-motor stage. During the first stage, the nature of intellectual functioning is basically sensorial and motor. This means that the intellectual achievements of this period consist of things like discovering that information coming through different sensory channels all come from one object (for example: the rattle that the baby sees with a given shape and colour is the same object that is producing a sound and that is felt on his hand); discovering that there are alternative paths to reach an object; learning that a hidden object is still there; and learning intentionality and the beginnings of cause and effect relationships (such as learning that kicking the crib's rail can make a mobile move or make a sound).

Piaget considers intelligence to be internalized action emphasizing the importance of manipulation of objects. He also emphasizes the importance of the baby's having plenty of visual, auditory and tactile stimulation in order to make the most out of this sensory-motor stage upon which the higher stages rest.

One may give some thought at this point to the role that an ETV programme with appropriate visual and auditory stimulation might have in homes, day-care centres, or orphanages where there is little opportunity for the baby to have such sensory stimulation provided by the caretakers. Kagan [1975], also a cognitive psychologist, believes that the motor (manipulation) aspects emphasized by Piaget are not as crucial to cognitive development as Piaget implies. If Kagan is correct, visual and auditory stimulation of infants by means of ETV would be worth looking into, especially with the kind of children described above.

Pre-operational stage. During this second stage, the development of symbolism is crucial to language. Recognizing the distinction between signifier and signified is central to symbolic processes. Children at this stage are characterized by certain structures, such as egocentrism — the inability to place oneself in someone else's viewpoint; animism — the attribution of life to inanimate things; and anthropomorphism — the attribution of human qualities to non-human beings.

These structures should guide ETV producers in the elaboration of films for children at this stage. Cartoons in which animals or even inanimate objects are endowed with human behaviours capture the child's attention. Other important characteristics of this stage are centring, the inability to take into account more than one aspect of the stimulus at the same time, and irreversibility, the idea that operations do not have an inverse.

The pre-operational child does not yet have the elementary logical structures required for logical thinking. This stage is characterized by disequilibrium where accommodation prevails over assimilation. Thus, ETV pre-school programmes should be careful not to push the child beyond his or her capacity. Such programmes should also be aimed at accelerating the appearance of the next stage in cognitive development.

Concrete operations stage. At this stage, the child overcomes the difficulties he had at the previous stage. He becomes able to think in logical terms even if at a concrete level. He can now understand that the amount of water does not change when we pour water from one glass to a differently shaped one, because he is able to 'decentre' and to understand that operations are reversible. The concrete-operational child is able to classify objects into categories, taking into account more than one object at a time. He understands relationships between classes and subclasses but is still unable to solve these problems at an abstract level. That is why visual aids, concrete demonstrations, are crucial at this stage.

Formal operations stage. Adolescents are capable of purely abstract thinking. They can test hypotheses systematically, hence their preoccupation with ideologies, religion and the future. The key characteristics of these four different stages in cognitive development should give us leads to the type of ETV programming most appropriate to various ages of children. The reader who is interested in going into more details is referred to works such as Flavell's [1963] classical overview of Piaget's theory, Ginsberg and Oppen [1969], or Piaget's original publications.

Psychoanalytic and neo-psychoanalytic theory. Freudian psychoanalytic theory traditionally has had much more to say about instinct, affect and emotions rather than about cognitive development. The direction that psychoanalysis has taken in recent years, usually referred to as ego psychology, originated with Anna Freud [1937] and was elaborated by her followers, Loewenstein [1953], Kris [1951], and Hartman [1958]. More recently, with the work of White [1960], Loevinger [1966] and others, cognition has moved into a central role in psychoanalytic theory.

Ego psychology emphasizes ego processes, which are rational, reality-oriented, and obviously involve cognition. Thus, they come closer to Piaget's cognitive theory than orthodox psychoanalytic theory ever came. To White [1960] for instance, the child has a basic motivation for competence, for mastering the environment, which is much more important than psychosexual conflicts in the development of personality.

It is in the work of Loevinger [1966] that this cognitive trend is most visible. The stages of ego development she proposes are: Pre-social and Symbiotic; Impulse Ridden; Opportunistic; Conformist; Conscientious; Autonomous; and Integrated. Cognition permeates Loevinger's view, which has a great deal in common with Piaget's theory and with Kohlberg's [1965] developmental-cognitive theory of moral judgment.

Research on the effects of different kinds of television advertising with children and their relative effectiveness, depending upon the child's stage of ego development, will be reviewed later. Although we are not specifically interested in advertising, these studies give us a lead for future research efforts, which could investigate relationships between stages of ego development and educational television programming.

Social learning theory. Most research on the effects of television has been based on social learning principles. By social learning theory, in the broad sense, we mean the theory of child development which is based on pure learning theory. This view holds that all behaviours are learned and that
personality and social development follow the same learning principles that have been observed in well-controlled laboratory experiments.

Two central concepts of learning theory are contiguity and reinforcement. The principle of contiguity states that a stimulus acquires the same properties as another stimulus by mere contiguity, i.e. by being presented together as in the case of the famous Pavlov conditioning experiments with dogs in which the sound of a buzzer produces salivation, by being presented several times concomitantly with meat. The principle of reinforcement states that behaviour is learned as its consequences are rewarding or positive, as proposed with different nuances by Thorndike, Hull and Skinner.

Another characteristic of modern learning theory is the increased emphasis placed on the role of imitation in personality and social development. The role of imitation in learning has been widely acknowledged although some theorists, such as Miller and Dollard [1941], considered it to be a special case of reinforcement. People imitate because they are vicariously reinforced when they watch a model receiving reinforcement for some behaviour performed, or because they have been reinforced for matching a model’s behaviour.

Bandura and Walters [1963] gave new impetus to social learning theory by emphasizing the role of observational learning, i.e. the notion that behaviour can be learned by mere observation of a model, even in the absence of any reinforcement, even if vacarious. This idea elevated imitation to the same level as contiguity and reinforcement, as explanatory principles of personality and social learning. More recently, Bandura has recognized the importance of cognition in the process of development. Mischel [1971], another important representative of the modern social learning viewpoint, explains this shift in emphasis clearly in discussing a cognitive social learning reconceptualization of personality development. Variables such as expectancies, values of the reinforcer to the subjects, and anticipation of consequences are now taken into consideration.

Bandura and Walters [1963] also make a distinction between learning and performance, pointing out that observational learning may lead to the learning of a behaviour which may or may not be actually performed, depending upon reinforcement. Thus, while imitation is very important in the acquisition of a behavioural response, reinforcement is important for the outward performance of the behaviour. A great deal of Bandura’s work on the role of imitation has dealt with the acquisition of aggressive behaviour [Bandura, 1973].

Contrary to many psychologists who believe that human aggression is innate and must be expressed, even if in disguised ways (Freud, Lorenz and drive theorists), Bandura believes that aggression is learned through reinforcement of aggressive behaviour, observation of models being positively reinforced for aggressive behaviour, and mere exposure to aggressive models.

In several experiments, Bandura demonstrated the powerful role of exposure to filmed models in the acquisition of novel aggressive responses [Bandura et al., 1963]. These experiments typically consist of assigning children to experimental and control groups. The experimental subjects are exposed to aggressive models and direct or vicarious reinforcement of the aggressive behaviours while the control subjects are not. Both control and experimental children are then placed in standard situations to see what kinds of aggressive behaviour occur. These experiments as well as field studies indicate that exposure to aggressive models increases aggressive behaviour in later life-like situations. The role of imitation through exposure to models has also been studied in the acquisition of positive social behaviour.

The implications of this kind of experiment for television are obvious. While educational television may be designed primarily for imparting knowledge, attention should also be given to positive social or antisocial values and behaviour that may result from social learning. Social learning theory seems to be particularly important for those who wish to understand and control the impact of television upon children.

BASIC RESEARCH AREAS

Perception. The study of perception has constituted one of the most important areas of experimental psychology. While most studies of perception have involved adult subjects, the development of perception in children has been of great interest in recent years. One reason for this traditional emphasis on adults lies in the lack of appropriate methodological refinements for detecting whether or not a child perceives a stimulus. When confronted with a stimulus (visual, auditory, etc.), the adult can respond verbally as to whether or not the stimulus is perceived and what its characteristics are. The very young child is unable to give such verbal responses.

Another problem involved is that of attention. The adult subject in an experiment can force himself to pay attention, even if he finds the situation uninteresting or boring. With children, however, the situation must be so interesting that it will capture the child’s attention spontaneously. In this respect, Lesser [1977] calls attention to the fact that ETV must be interesting and must hold the child’s attention to be effective. Otherwise the child will turn off the set, change the channel, or walk out to another activity.

Regarding the pre-school child, many interesting points have been studied, such as that of whole versus part perception. Heinz Werner’s [1940] theory of differentiation and many research studies with the Rorschach and Holtzman inkblot techniques have led to the conclusion that younger children perceive the undifferentiated whole better than the details. Later they begin to perceive details and at a third stage (integration) they begin to integrate the details into coherent wholes [Hemmendinger, 1953; Holtzman et al., 1961]. Other studies have questioned this notion. Reese and Lipsitt [1970] argue that the Rorschach stimuli do not correspond to any known object, since they are mere inkblots. They cite the work of Dworetzki [1939] who, recognizing this problem, constructed stimulus figures made up of meaningful parts that were also meaningful when perceived as a whole. With these stimuli, children perceived details better than the whole.

Studies on perception in children are worth pursuing further in searching for applications to educational television.

Language. Another important area of interest in developmental psychology is the acquisition of language. Two competing theories offer alternative explanations. Behaviouristic learning theory states that language is learned behaviour like any other kind of learned behaviour (i.e. through conditioning and imitation). Psycholinguistic theory asserts that there are innate capabilities which pre-dispose the human brain to acquire the language of the culture where one grows up, by a process of relating underlying innate structures to superficial structures (a particular language). The details of this theoretical controversy need not concern us here. Both theories recognize the role of environmental stimulation in the development of language.

The studies on culturally disadvantaged children reviewed by Hunt [1961] indicate that the lower-class child is exposed to less adequate verbal stimulation in terms of the language spoken by adults around him, which leads to poor language development. Riepngold et al. [1959] and Weisberg [1963] demonstrated that even the rate of vocalization in newborn infants is dependent upon social reinforcement (attention, caressing by adults).

In the field of language, many factors have been included. One of the leading authors in this field, argues that the central effect of cultural deprivation is a lack of cognitive meaning in the mother-child communication system. Hess and Shipman [1965] argue that the structure of the family shapes communication and language, and that
language shapes thought and cognitive styles of problem-solving. Bernstein [1961] states that language structures can condition what the child learns and how he learns. He identifies two forms of communication codes or styles of verbal behaviour: restricted and elaborated. In restricted codes, sentences are short, simple and often unfinished. Elaborated codes are more differentiated, more precise. Studies by Bernstein and others confirm that lower-class language patterns are of the restricted type and are not conducive to the ideal development of language and cognition in the child.

Can exposure to television compensate for this disadvantage? There is very little known research on the effects of exposure to television upon language development of children. On the basis of existing theory and research, we may infer that carefully planned programmes designed to improve language development should have a positive effect. But there is no certainty about this effect. Some authors argue that television involves a passive role on the part of the viewer. Would listening to elaborated language codes without responding to the stimulus or without verbally interacting with other people be effective? Recent studies indicate that the family may be a mediator, facilitating learning from what is exposed on television to the child [Brown and Linné, 1976]. These are questions worthy of further scientific investigation.

**STUDIES ON THE IMPACT OF TELEVISION**

On aggression. The emphasis of social learning theory on modelling effects, especially Bandura's [1973] studies on the acquisition of aggressive behaviour through mere exposure to aggressive models, including film-mediated models [Bandura et al., 1963], has led to a great deal of pre-occupation with the effects of televised aggression. In a technological society, the children's models are not only the parents, teachers, and close members of the family, but also those conveyed by the mass media (primarily television, but also newspapers, magazines and movies).

Many research studies [Bandura et al., 1963; Bandura and Mischel, 1966; Prentice, 1972; Grusec, 1972] have demonstrated that both children and adults may acquire attitudes, emotional behaviours, and complex behaviour patterns through filmed models. These studies have awakened the concern of several national governments, especially that in the United States, with the potentially adverse effects of aggressive films and cartoons to which children are exposed. Many American programmes are exported to other countries which broadcast them freely.

Pre-occupation with this problem gradually increased in the United States to the point that, in 1969, Senator John O. Pastore asked the Secretary of Health, Education and Welfare to direct the Surgeon General to initiate a study on the impact of televised violence upon behaviour. The Scientific Advisory Committee for Television and Behaviour was appointed, comprised of twelve behavioural scientists, in July 1969. At the same time, $1 million were assigned to research on this problem, and a group from the National Institute of Mental Health was appointed to co-ordinate the research programme. During the following two years, twenty-three research projects were conducted in several universities and research centres. The sixty reports from these studies were analysed by the advisory committee in 1971 and a final report, entitled 'Television and Growing Up: The Impact of Televised Violence' was presented to the Surgeon General.

This report plus five volumes containing research reports were published in 1972. These research studies focused upon three major topics: the characteristics of the contents of television programmes; the characteristics of the audience (who watches what and for how long); and the potential impact of televised violence upon the attitudes, values and behaviours of the viewers.

Some of the most striking results regarding the first question were published by Gerbner [1972]. Out of ninety-four children's cartoons analysed, all but two in 1967, one in 1968 and one in 1969 contained at least three times as many violent episodes as did comparable adult programmes. In 1969, a typical hour of cartoons contained six times as many violent episodes as one hour of adult programmes. Barcus [1971] reported similar results: 71 per cent of the cartoon segments analysed contained at least one episode of human violence.

Regarding the second question, the results indicated that young children are among those who watch television most. Several studies [Lyle and Hoffman, 1972a, b; Murray, 1972] demonstrated that young children spend two to three hours a day watching television and that they watch even more on weekends than during the week. On the average, pre-school children spend at least twenty hours in front of a television set each week.

The third question is the most important one for our purposes. We can take for granted that there is a great deal of violence presented on television and that children spend many hours watching television. Now, what do the studies which investigated the effects of this exposure reveal?

Stein and Friedrich [1972] evaluated the effects of exposing children to antisocial, socially positive, and neutral programmes. The subjects were pre-schoolers who were observed for a period of nine weeks. During the first four weeks, the children were exposed to different programmes in a planned order. Later there were three weeks of follow-up observations of the children performing normal activities in their preschool class. Observers registered several kinds of behaviours at various times in the experiment. These could be described as socially positive (helping, sharing, co-operative play, tolerance of delay) or antisocial (quarrelling, pushing, breaking toys). Children were judged as more aggressive as a result of watching antisocial programmes such as Batman. On the other hand, children who saw twelve episodes of socially positive programmes became significantly more co-operative, willing to lend toys and to help other children.

In another study, Liebert and Baron [1972] evaluated the child's willingness to hurt or help another child after watching aggressive or neutral television programmes. The experimental condition consisted of a situation in which the child would purposely 'hurt' or 'help' another child who was supposedly in the room next door. The children who had watched the aggressive programmes pressed the 'hurt' button earlier and for longer periods than did the children who had watched the neutral programmes. When the same children were observed later during free play, those who had watched the aggressive programmes demonstrated higher preference for playing with guns and aggressive toys than those who watched the neutral programmes.

Other studies have attempted to investigate the cumulative long-range effects of exposure to aggressive models on television. Several researchers found a consistent relationship between preference for aggressive television programmes and involvement in aggressive and delinquent acts. One of the most important studies along these lines is that of Lefkowitz, Eron, Walder and Huessmann [1972]. This study investigated the development of aggressive behaviours of the same group of boys and girls, for a period of ten years. For boys, the results indicated that a preference for violent programmes at age 8 was significantly related to delinquent behaviour at age 18. For girls, the relationship was less marked.

In summary, we can say that there is enough evidence from rigorous, well-designed experimental studies to conclude that short-range exposure to aggressive models on television leads to aggressive behaviour in children, confirming Bandura's theory of modelling. Evidence about long-range, cumulative effects is less clear, although there is a trend suggesting that exposure to aggressive television programmes leads to aggressive behaviour years later. Studies on positive social behaviour demonstrate that 'good' behaviour can also be increased by
exposure to models on television. These are ideas and facts that can be used in educational television programming if the goal is to increase co-operation and other good behaviours while decreasing aggressive behaviour.

On positive social behaviour. Earlier it was pointed out that social learning theory places great emphasis upon imitation as a major principle of learning. Children's programmes like Sesame Street have always had, as a primary goal, teaching cognitive skills to inner-city disadvantaged children. Yet the staff have also wanted to encourage socially valued behaviours by appropriate programming. This objective raises an important philosophical question. What is socially good behaviour, and who determines what is good? Leifer [1975 p. 2] considers socially good behaviour 'actions which are supporting of others within the existing social system. They include such behaviours as sharing, taking turns, expressing affection, spending time in social interaction, co-operative play, and verbal rather than physical attempts to control others'.

Many research studies have been conducted recently on the acquisition of positive social behaviours. Stein and Friedrich [1975] summarized some of the most important laboratory studies on this topic. Their general comments are that imitation of adult or peer models has been demonstrated for affective behaviour; helping another child, altruism and sharing, setting high standards for self-reward, giving up rewards after peer performance, delay of gratification, mature levels of moral judgment, and overcoming fears. As in the case of aggression, however, one must be cautious in generalizing from these laboratory studies to real-life situations. Most investigators who have used 'real programmes' for the study of the positive social effects of television have chosen Mr. Rogers' Neighbourhood. Stein and Friedrich [1975] identified the following themes in the script of this children's programme: co-operation, sympathy, sharing, affection, friendship, understanding the feelings of others, verbalizing one's own feelings, delay of gratification, persistence and competence at tasks, learning to accept rules, control of aggression, adaptive coping with frustration, fear reduction, self-esteem, and valuing the unique qualities of each individual.

In their review, Stein and Friedrich found that kindergarten children who saw four episodes of Mr. Rogers' Neighbourhood learned and generalized several themes — helping a friend, trying to understand another's feelings, knowing that wishing does not make things happen, and valuing a person for inner qualities rather than appearance. Children who saw a brief episode stressing sharing showed greater generosity to a friend immediately afterward [Shirley, 1974]. Aggression of children who saw Mr. Rogers' Neighbourhood in Shirley's study declined steadily, an outcome consistent with social learning theory principles, which state that in order to extinguish a response, incompatible responses should be strengthened.

In recent seasons, there have been Sesame Street segments emphasizing such socially positive behaviour as maintaining safety, reducing fear, and understanding another's point of view. Paulson, McDonald and Whitmore [1979] studied exposure to six vignettes illustrating co-operation that were shown nine times during one season of Sesame Street. Children who had the programme available in their day-care centres could identify and label co-operation in situations similar to those in the show, although little of this ability generalized to new situations. These children were also more co-operative than non-viewers, but only in test situations similar to those shown on the programme.

How to create positive racial attitudes through television was addressed by Leifer [1975]. The value-added independent variables of race of subject, number of minority participants included in a programme, and type of characterization of the minority participants. For this study, videotapes of commercially produced cartoons were used. As an example of a negative characterization of blacks, Graves cited a tape called The Harlem Globetrotters.

The children in Graves' study were between 6 and 8 years of age; half were black and half white, with half of each group being male, and the other half female. The children were given a general racial attitude scale in individual interviews before and after exposure to the cartoons.

Four groups were studied experimentally: black subjects with positive portrayals of blacks in a cartoon, black with negative portrayals, white subjects with positive portrayals, and white with negative portrayals. For three of the groups, there was some attitude change toward more positive attitudes toward blacks. However, the fourth group, white subjects with negative portrayals of blacks on the cartoons, changed the most, toward more negative attitudes toward blacks.

Her results also indicated that black children changed more strongly toward a more favourable attitude toward blacks than did white children. Simply seeing blacks in a programme resulted in a more favourable attitude toward blacks for the black children, regardless of portrayal. However, positive characterizations did show stronger effects than did negative portrayals.

Graves' research indicates that children's television programmes which are designed to entertain can influence the child's racial attitude either positively or negatively. This finding could be used by educational television programmers for the purpose of improving racial attitudes.

On credibility. One of the most important contributors to research on television impact is Aimée Leifer of Harvard University. Among other topics, Leifer [1975] has focused a great deal of attention on research concerning the 'credibility' of television programmes, i.e. do people think that television programmes are 'true to life'? Findings from interviews with different people formed the basis for a preliminary curriculum for parents to use in teaching children how to evaluate the reality and applicability of television to their own lives. According to Leifer [1975, p. 3],

'Television presents children with much antisocial behaviour stereotyped portrayals of women and minorities, and exhortations to purchase products. This content can affect the behaviour, attitudes, and expectations of children. We believe that children may be able to modify the effects of the content by becoming more critical consumers of it and parents can help them to do this.'

The objectives of this programme by Leifer, Graves and Gordon [n.d. p. 3] are threefold:

1. To discover the processes children use, or could be taught to use, to discriminate the applicability to their own lives of varieties of television content.

2. To develop techniques which allow parents to teach their young children to use the processes identified in the first objective.

3. To demonstrate that children who have been taught these processes will use them to discriminate which television content is applicable to their lives, resulting in changes in the extent to which television content influences them.'

Initially, fifty-eight interviews were conducted with 13-year-olds, 16-year-olds, and their parents. These subjects were white, black and Puerto Rican residents of communities in the Boston area. Topics covered in the interview included their knowledge of the programmes in question, television personalities, and other information considered reliable by the investigator. The authors analysed the differential use of knowledge made by the various groups studied and plan to use these findings in future studies where they will examine how 4, 8 and 12-year-olds judge the credibility of television programmes.

To our knowledge, no research has been conducted yet on how credibility affects the impact of educational television, an area worthy of study. Obviously, cartoons and puppets are not as true-to-life as real people depicted on television,
but do children perceive them as less credible? As we know from Piaget's discussion of the pre-operational child, animism, and anthropomorphism, cartoons and puppets may be highly credible for very young children. Are such caricatures more or less effective in transmitting educational messages for young children? More research is needed to answer such questions.

In a symposium at the 1976 convention of the American Psychological Association, Leifer and her collaborators reported further findings on 'credibility'. Five critical evaluation skills were tentatively identified as central for the individual: (1) explicit and spontaneous reasoning about the reality of television content; (2) readiness to compare television content to outside sources of information; (3) readiness to refer to knowledge of the industry in reasoning about television reality; (4) tendency to find television content more fabricated or inaccurate; and (5) general evaluation people have of television, with those who are more critical showing less credibility.

Leifer's group is now engaged in a programme which aims at teaching children and parents to be more critical consumers of television, by capitalizing on these five abilities which were identified. As Leifer [1976, p. 2] put it, 'While it may not be possible to change the content of television, it may be possible to modify the effects on children by making them more critical consumers of television'.

Although Leifer's research refers to commercial entertainment, television, there are many lessons that educators using television can profit from by making sure that the content they wish to teach will be presented in ways that will enhance its credibility.

On advertising. The most significant research about effects of television advertising on children and adolescents has been conducted by Scott Ward and his co-workers at the Harvard Graduate School of Business Administration and the Marketing Science Institute in Cambridge. Ward [1976] points out that most research on effects of television upon children focuses on the effects of television programming. On the other hand, research on advertising uses adults as subjects. Ward emphasizes that programmes are different from advertisements and that research findings on adults cannot be generalized to children. His project had as its overall purpose to provide explanatory baseline data on the effects of television advertising on children and teenagers.

Seven separate studies were conducted by Ward and his collaborators, four with children and three with adolescents. Three areas are of primary concern since they dealt with children aged 5 to 12: commercial watching behaviour, effects of cognitive development, and interpersonal behaviour (attempting to influence parents to buy advertising products). In the three studies of adolescents, the major concerns were with attitudes toward advertising, materialistic attitudes, knowledge of commercials, and buying behaviour. The researchers were also interested in what motivated adolescents to watch commercials and in the relationship of television advertising to intrafamily communication. The adolescent data were also analysed by race to determine whether television advertising differentially affects black and white adolescents. In both the studies with young children and those with adolescents there was also a primary concern with discovering what children learn from commercials. Some of the main findings of this project are summarized below.

Regarding children's commercial watching behaviour, Ward et al. found that all children show a drop in attention during commercials, regardless of product category, time of viewing, or number of companions watching television. The drop in attention from programme to commercial is least for the youngest children (5- to 7-year-olds). Talking to others occurs during about 25 per cent of the commercials. This talk can be either a result of, or an alternative to, commercial watching.

Regarding reactions to television advertising and stages of cognitive development, an exploratory study by Blatt, Spencer and Ward [Ward, 1976] used eight categories of responses to commercials and related them to stages of cognitive development. Cognitive development theorists assume that all children go through specific stages of cognitive development. The lower stages of reasoning are more concrete, literal, and undifferentiated, while the higher stages are more complex, involving a high degree of 'abstract thinking', symbol recognition and analysis, and more differentiation and integration of perception and cognition. Reasoning from this point of view, Blatt et al. expected that young children would respond more to 'concrete', 'basic need', 'hedonistic', and 'authoritarian' themes (e.g. 'buy this toy because it's fun for you', or an 'authoritarian' announcer ordering a child to 'tell your mother to buy this'). Older children would more likely respond to symbolism, competence, mastery, sex-role identification, and conformist themes (e.g. 'don't be left out — get this toy — all the boys are getting them', or 'this cosmetic will make you beautiful and popular'). More mature individuals would be expected to respond to more rational, 'conscientious' themes (e.g. those dealing with the factual characteristics of the products or with their social utility).

The eight categories of responses to commercials were:

1. **reality** (what a commercial is, in relation to cartoon, documentary, news programmes);
2. **purpose** (perceived intent of commercials);
3. **discrimination** between advertisement and product (ability to differentiate the product being advertised from the message itself);
4. **class** of products recalled (food, household products, and others);
5. **complexity** of recall; (6) significant others (humans spontaneously recalled or cited by child viewers);
6. **credible** and credibility of advertisements; and (8) affective responses to commercials.

Relating these categories to stages of ego development, Blatt et al. arrived at a stage conception based on a synthesis of Erickson, Loevinger and Kohlberg, which is reproduced below:

**Level 1: Impulsive, self-protection and submissive.** At this level, viewers respond principally to basic needs and fears, and tend to be most receptive to commercials which demand, threaten, or use 'hard sell' commands to stimulate impulsive reactions or beliefs and behaviours adopted in deference to a 'superior authority'. Advertisements aimed at this level tend to be blunt, direct and concrete.

**Level 2: Intentional self-interest.** Viewers at this level are most susceptible to appeals to 'hedonistic' personal desires, 'mastery' and 'power' themes which appeal to self-image, ideal role models, and sexual identity. Level 2 is differentiated from and higher than Level 1 in terms of cognitive growth because appeals assume individual autonomy and intentionality, as well as an active, preference-seeking sense of self. At Level 1, individual reactions are pursued on a 'stimulus-response' or 'knee-jerk' reflex basis. Advertisements at Level 2 tend to be rich in 'selfish' fantasy and symbolism.

**Level 3: Conformity.** Viewers at this level are most susceptible to 'other directed' appeals — comparisons with others, themes based on individual needs for social approval, popularity, and status ('not being left out'). Level 3 is differentiated from and more developmentally advanced than Level 2 because thinking at this level recognizes the existence and influence of others in addition to the self. Level 3 advertisements employ symbol and are more realistic and 'social' in format and theme than those targeted to Level 2 thinking, but they still depend upon emotional reactions rather than rational evaluation for their effects.

**Level 4: Conscientiousness.** At this level, viewers preferentially respond to appeals to duty, functional utility, and rational role requirements. Level 4 advertisements tend to be objective and factual (e.g. straight-forward industrial marketing). 'Our company's new microwave transmitter delivers higher power at lower cost because it is designed to the following technical specifications'. This stage is 'higher' in a cognitive-developmental sense than those which precede it.
because it requires greater differentiation of facts as well as a rational evaluation of the claims.

Level 5: Social utilitarian, integrative, and self-actualizing. Viewers at this level respond preferentially to aesthetic, altruistic, moral and social concern appeals and self-actualization: 'Buy Brand X and you will improve society while attaining your own highest potential', (e.g. advertisements based on ecological themes). Advertisements targeted at this level attempt to edify the viewer and often appear as 'art'.

It is the hypothesis of Blatt et al. that viewers are differentially sensitive and receptive to advertising appeals, and that this differential susceptibility parallels recognized stages in the maturation of cognitive, affective, moral and ego-reasoning abilities. Small children are most likely to be susceptible to manipulation by 'low-level' appeals.

Regarding television advertising and intrafamilial behaviour, the main findings were that mothers perceived that television advertising influences their children. The mothers estimate the commercials' effects by the frequency with which their children attempt to influence purchases.

Regarding attitudes, adolescents hold negative attitudes toward television advertising. There are only slight differences between black and white adolescents in such negative attitudes.

Finally, Blatt et al. reported that adolescents acquire a number of measurable consumer attitudes and skills from television advertising.

Although educational television may not involve advertising, there is much that can be learned from this research, especially from the study of relationships between categories of responses to commercials and level of ego development. Educational television programmers should investigate the adequacy of their messages with respect to level of ego development of the target audience.

On learning content. The earliest and still dominant use of educational television has been for the purpose of teaching cognitive content as in school learning. Evaluations of instructional programmes viewed in class have repeatedly indicated that children, adolescents, and adults generally learn the cognitive content that is presented about as well as they do in other instructional situations [Leifer, 1976]. Evaluations of the first and second year of Sesame Street and Electric Company indicate that the programmes teach preschoolers a variety of content, both when viewed in class and at home [Ball and Bogatz, 1970]. Some critics of these studies conducted by Educational Testing Service claim that Sesame Street may widen rather than narrow the gap between educationally advanced and disadvantaged children [Cook et al., 1975]. However, there is overwhelming evidence that people do learn cognitive content from television [Chu and Schramm, 1967; Leifer, 1976].

Research on learning content has been conducted in different countries throughout the world. As an example, we cite Diaz-Guerrero and Holtzman's [1974] study on learning by televised Plaza Sesamo in Mexico City. These investigators studied 221 children from three different lowest-class day-care centres, ages 3, 4 and 5, half of whom were boys and half were girls. These children were randomly assigned to experimental and control groups. A battery of tests was given before, during and after the six-month viewing season. Significant differences were found for specific achievement tests dealing with general knowledge, numbers, letters and words taught in the programme as well as for cognitive tests indirectly related to Plaza Sesamo. An oral comprehension test completely independent from the programme also showed significant differences. The largest differences occurred in 4-year-olds and the smallest in 3-year-olds. The rate of learning was consistently faster for the experimental group than for the control group. Other studies like this, from around the world, are reviewed in Part IV.

Since learning cognitive content is the focus of other chapters in this book, it will not be discussed further in this section. Our major purpose here has been only to introduce areas of investigation and practice based upon developmental psychology theories and research findings.

SUGGESTIONS FOR FURTHER RESEARCH

Suggestions for further research have been hinted at in each of the earlier surveys. It is our feeling that research on the impact of television has been too narrow in scope, focusing almost entirely on the effects of aggression and the learning of content. More recently, there has been some interest in research on the effects of socially positive programme. However, there is much more that developmental psychology can tell us about other important aspects of educational television. Some of these ideas would be useful in teaching us how to make learning by ETV more effective, such as recent findings on perception, attention, curiosity, credibility, relationships between stages of ego development and efficacy of types of messages (as suggested by Ward's studies on advertising).

Other areas reviewed suggest specific areas of child development upon which television can have an impact, such as language and cognitive development, maturity of moral judgement, and improvement of racial attitudes.

Graves [1975], Leifer and Gordon suggest interesting points regarding research strategies, such as using naturalistic content, situations and measures, employing different methodologies, and providing extended exposure. As far as substantive matters are concerned, their recommendations are more specific to problems in the United States than elsewhere. They suggest a diversity of portrayals, communication of socially valued behaviour, and modification of the impact of current programming. By such modification, they mean that the context in which the child views a programme, such as with family or in school, may influence the intended impact of the programme. By diversity of portrayals, they mean that programmes should present a wide range of characters of various ethnic groups, social classes, and so on.

Part II of this book contains specific case examples of evaluation studies in which personality, cognitive, and social factors growing out of developmental psychology have been examined for the impact of ETV. Chapter 10 in Part III deals with further research possibilities and recommendations, including some that grow out of this brief review of developmental psychology and its application to educational television for young children.
Part II
Case studies of ETV evaluation
The first generation of children to view television in the United States grew up on a diet of cartoons, variety shows, and entertainment, with a sprinkling of educational television, live studio productions, and other shows designed for children. By the mid-sixties, it was apparent to educators, politicians, foundation executives, and even the general public, that the full potentials of television as a mass medium for child development had not been realized. Why not combine the best of creative talent in the entertainment world of television with specialists in child development in a new, admittedly costly effort to accelerate the cognitive, personality, and social development of millions of children? The idea was carried forward by government leaders and private foundations, leading to the creation of a new non-profit organization, Children's Television Workshop, in March 1968. Preliminary productions under the skilful direction of CTWs president, Joan Ganz Cooney, sold potential sponsors on the original idea of Sesame Street, a widely acclaimed television series aimed at entertaining and teaching children aged 3 to 5.

While Sesame Street and its counterpart for older children, Electric Company, are the best known American productions, other impressive children's series have also proven highly successful in audience acceptance and staying power. In the brief space of this presentation, only a sampling of children's programmes can be made. In addition to Sesame Street, special attention has been given to Mr. Rogers' Neighbourhood, a programme designed specifically to teach positive social behaviour in an entertaining way. Mr. Rogers' Neighbourhood has been evaluated and analysed in a number of different research studies, and has been adapted for use in other countries as well.

Sesame Street and the new era of children's television. The public acceptance of Sesame Street for pre-school education by television in 1970 marked the beginning of a new era in educational television. For the first time, the proven techniques of commercial television, the entertainment field, and professionals in education and the behavioural sciences were combined to produce an educational series designed to stimulate the cognitive development of young children. Initial evaluations of Sesame Street by Ball and Bogatz [1970] and Bogatz and Ball [1971] demonstrated significant gains for children viewing the programme, although the meaning of these gains, particularly for disadvantaged children, has been questioned by subsequent reviewers [Cook et al., 1975].

Within only six years, Sesame Street has been translated, adapted, and imitated throughout the world. The original English-language version has been broadcast in over forty countries, and eight foreign-language adaptations have been presented in nineteen countries [Palmer et al., 1976]. The productions in foreign languages usually follow one of two different patterns: the co-production format in which half the material (usually expensive graphics) is taken from the American original while the remainder is produced locally; and the 'Open Sesame' format consisting of segments from the American original with language dubbing and with a locally produced film opening. The 'Open Sesame' format is more common since the co-production format calls for new script, characters, actors, production and formative evaluation similar to the original.

Sesame Street and its foreign adaptations have the primary objective of preparing young children for school learning. The specific goals concern four areas of school readiness: symbolic processes, such as recognition and use of letters, numbers and geometric forms; cognitive organization, including sorting, classification, and perceptual discrimination; reasoning and problem solving; and elementary understanding of the social and physical world. Less explicit are the goals of socialization, increased self-esteem, and interpersonal competence. The detailed statements of goals guided the production of programme segments and provided targets for specially constructed achievement tests used in the national evaluation studies carried out by Educational Testing Service of Princeton, New Jersey.

The original, English-language version of Sesame Street proved to be unexpectedly popular in several foreign countries where older children and adults valued the series as a way of improving their ability to speak and understand English. Sesame Street is still broadcast for this purpose in Israel [Salomon, 1976] and Japan [Yamamoto, 1976]. In most instances, however, the local language (if not dialect) was employed.

The primary intended audience for Sesame Street was urban, low-income, pre-school children viewing television in their homes or in day-care centres. As might be expected, middle and upper class parents quickly seized the opportunity to educate their own children, rapidly expanding the audience to many millions of children beyond the initial target group. Using data from a number of nation-wide audience surveys, Cook et al., [1975] estimated that about one-third of all the nation's children between 2 and 5 years of age were regular viewers (four or more times a week) during the first two seasons of Sesame Street broadcasts. When one takes into account the fact that only 63 per cent of the households in the nation could receive public television, these impressive figures indicate that the majority of pre-schoolers in the United States with access to public television were regular viewers of Sesame Street.

In most other countries the programme also has been well received. For example, a 1971 survey by the Australian Broadcasting Corporation revealed that 84 per cent of all children aged 3 to 6 in the broadcasting catchment area viewed Sesame Street frequently, [Palmer et al., 1976]. Within a year of its introduction to Mexico City, Plaza Sesamo
had been viewed by over 90 per cent of pre-school children, regardless of social class [Diaz-Guerrero et al., 1976]. The overwhelming majority of parents think their children learn from watching Sesame Street.

Several major evaluations and a score of minor ones have been undertaken to assess objectively the impact of Sesame Street upon young children. The most extensive American evaluation is the series of national studies of the original Sesame Street undertaken by Ball and Bogatz at the Educational Testing Service. Because this series and a secondary analysis by Cook and his associates constitute one of the most thorough evaluations ever done on the impact of educational television upon pre-school children, the results are worth examining in some detail. Only selected highlights can be presented here.

The national evaluations of Sesame Street were carried out during the first two seasons of broadcast. Since the series consists of daily presentations for six months—a total of 130 programmes each one hour in length—efforts were made by the evaluators to encourage regular viewing by experimental children, using a variety of incentives. The control groups were not so encouraged and few of them happened to see the public broadcast.

In the first year’s evaluation, the pre-schoolers were also divided into those who watched Sesame Street at home and those who watched it in a kindergarten or day-care centre. Five research sites across the nation were chosen, yielding large numbers of both black and white children, including a small number of Mexican Americans in Arizona. Most were from economically disadvantaged families, although a sufficient number of middle-class whites were included to permit studies of socio-economic status as well as ethnic background. Complete pre-test and post-test data on the specially devised test battery were obtained for a total of 945 preschoolers who were 3, 4 or 5 years old at the start of the experiment. Logs of time spent viewing were also kept and many children were actually observed periodically.

When considered as a whole at the end of the six months, the experimental children learned more on the average than did the control groups. Encouraged children learned more than did the children who were not systematically encouraged to watch Sesame Street, and heavy viewers showed larger gain scores on the tests than light viewers. These initial results, though promising, left considerable doubt concerning the magnitude of the impact on specific kinds of children under different viewing conditions. A partial confounding of site, socio-economic status of birth, and uncontrolled viewing behaviour made a detailed interpretation difficult.

The second year’s evaluation was limited to two cities, Winston-Salem and Los Angeles, where Sesame Street was available only on a restricted cable or UHF channel, making experimental control much easier. Poor neighbourhoods were chosen where viewing could be more rigorously controlled by providing children in the experimental groups with cable or UHF adaptors and withholding them from the control groups. Periodic encouragement of the experimental groups of children was given with a number of incentives, leading to more regular viewers. The eight learning tests given before and after Sesame Street were also improved, resulting in a more carefully controlled study of 285 children, largely disadvantaged blacks, in the second year. A separate study of 66 Spanish-speaking children in Los Angeles was also undertaken but was largely inconclusive due to initial pre-test differences in the experimental and control groups and the small number of cases.

One of the second-year results replicated those of the first year, leading the evaluators to conclude that regular viewing of Sesame Street by 3-, 4- and 5-year-olds produced significant cognitive gains beyond those that would have been reached by normal maturation without Sesame Street. These positive findings were widely acclaimed in support of Sesame Street and its foreign adaptations throughout the world.

Among the incidental findings from home observations and parental interviews in the Sesame Street evaluations, it was discovered that encouragement to view the programmes regularly did not cause any change in general television viewing; nor did it affect parental aspirations for the child or the amount of intellectual stimulation in the home. However, the mothers of children who were encouraged to view Sesame Street did report that they were reading less to their children. Encouragement to view and the actual amount of viewing are two different factors. They both proved to be important influences upon the learning gains.

A critical reanalysis of the initial evaluation data was carried out by Cook et al. [1975] as a kind of secondary evaluation. Cook started from different premises, looked at the data from a fresh point of view, and concluded that encouragement to view was the most critical factor in the Sesame Street outcomes. Frequent visits to the home and incentives for the family played up the importance of paying attention to Sesame Street, a factor missing in most American homes, particularly the disadvantaged ones. He also noted that Sesame Street widened the gap between middle-class achievers and the disadvantaged lower classes, raising a policy dilemma for those committed to narrowing this gap. An interesting rebuttal by Ball and Bogatz is given in the last chapter of Cook’s book, sharpening the debate between the two groups of evaluators.

An admitted weakness of the Sesame Street studies was the lack of complete experimental control over the viewing conditions which resulted in a number of debatable interpretations. In an open, democratic society such rigid control of viewers and non-viewers under field conditions in the child’s home is almost impossible to achieve. Once Sesame Street has been widely broadcast and publicized, the conduct of such experiments is immeasurably more difficult. But one such experiment (summarized in Chapter 5 by Reyes-Lagunes) was carried out under carefully controlled conditions with a Spanish version, Plaza Sesamo, in Mexico [Diaz-Guerrero and Holtzman, 1974].

Both the Sesame Street and Plaza Sesamo studies strongly suggest that viewing conditions are highly important if one is interested in having a major positive impact upon the child’s cognitive and perceptual development. Some adult encouragement and the use of other incentives which communicate to the child that the programme is important and that they should view it regularly may be essential, especially for lower-class children. A ‘tertiary’ evaluation by Liebert [1976] of Cook’s book as well as the earlier Sesame Street and Plaza Sesamo evaluations reached essentially the same conclusions as Cook et al. concerning the limited gains and the extent to which these are caused by factors other than high viewing.

These critical studies have had little or no impact upon the spread of Sesame Street around the world in the past several years. It is easy to understand why when one considers the alternative of not showing Sesame Street or programmes like it. The appealing entertainment format, the programme’s educational content, and the high quality of production are an irresistible combination for anyone in search of a low-cost method for reaching millions of pre-school children.

Influence of children’s educational television upon social behaviour and personality. Most programmes developed especially for children are aimed at cognitive stimulation and the learning of new information rather than the development of pro-social behaviour and other desirable personality characteristics. Sometimes a programme such as Sesame Street, designed primarily for cognitive learning, also takes into account other desirable social traits and deliberately programmes for them. Only rarely is a programme developed that is aimed specifically at teaching pro-social behaviour for improved intergroup attitudes. One such programme is Mr. Rogers’ Neighbourhood, a popular television programme that has been broadcast in Europe as well as the United States.
A recent study comparing Mr. Rogers' Neighbourhood and Sesame Street demonstrates convincingly the way in which programme content relates to actual interpersonal behaviour of children who view television [Coates, et al., 1976]. First, a content analysis was made of sample programmes totalling ten hours that were drawn from Sesame Street. Two observers rated each programme on the frequency of characters giving positive reinforcement and punishment to other characters for social or cognitive behaviour. It was discovered that Sesame Street programmes consisted mainly of characters who gave both positive reinforcement (740 instances) and negative reinforcement or punishment (213 instances) to other characters on the show. By contrast, content analysis of ten different selections of Mr. Rogers' Neighbourhood revealed a total of 1,224 positive reinforcements and only 67 punishment episodes involving interpersonal behaviour. The punishment category that was employed by Coates et al., was very similar to the category of aggression as used by Friedrich and Stein [1973]. The positive reinforcement category included verbal praise and affection or some kind of affectionate physical contact.

Next, an experiment was carried out by Coates et al., involving thirty-two pre-school children in a nursery school who observed either Sesame Street for 15 minutes on each of four treatment days or Mr. Rogers' Neighbourhood for 15 minutes on each of the four treatment days. The particular selections of Sesame Street segments emphasized more punishment than positive reinforcement, while all of the selections from Mr. Rogers' Neighbourhood emphasized positive reinforcement. Observations were made of each child before, during and after the one week of exposure to each of the programmes. The children's social contacts with other children and with adults were also measured. Comparison of the children who watched Sesame Street with those who watched Mr. Rogers' Neighbourhood revealed that the quality of interpersonal behaviour viewed on the screen influenced the quality of interaction among the children during the later free play period. For the children who were generally low during the baseline measure in their giving of positive reinforcement and punishment, Sesame Street significantly increased both of these kinds of social behaviour. For the children who were already fairly high in the giving of positive reinforcement and punishment to others, Sesame Street had no measurable effect. In the case of Mr. Rogers' Neighbourhood, the giving of positive reinforcement to other children significantly increased after exposure to the programme. In addition, social contacts with other children and with adults in the pre-school increased in frequency. These results are consistent with the earlier findings by Friedrich and Stein [1975] that 5-year-old children not only learn the socially positive content of programmes such as Mr. Rogers' Neighbourhood, but they also reveal positive social behaviour in fantasy and real-life situations.

The results of these studies clearly indicate that positive social behaviour increases as a result of watching socially positive interactions on television. In a similar manner, punishment or aggression increases after watching television in which such interpersonal activity dominates the scene.

Interpersonal attitudes, including racial attitudes, can also be influenced by the content of children's television. The Canadian Broadcasting Corporation developed a special series of Sesame Street programmes in which children of different races and cultures were inserted in place of the original characters. A study by Gorn et al., [1976] demonstrated that pre-school white children show a strong preference for playing with non-whites, as opposed to whites, after being exposed to the Canadian-produced Sesame Street inserts containing non-white children. This positive transfer of attitude contrasted sharply with the preferences of a control group who were not exposed to the inserts. The sets of inserts were particularly effective because they were produced in an attractive manner and were presented to children within the popular format of Sesame Street.

Attitudes toward French-Canadians on the part of English-Canadian pre-school children were also investigated by Gorn et al. It was found that children reacted favourably to the French-Canadian boy even though he spoke an unfamiliar language. It is interesting to note that it did not matter whether Richard spoke French, since the children tended to pay more attention to what they saw than to what they heard. These short-term changes in attitudes are quite clear cut, at least in pre-school children. Whether or not they generalize to other situations is unknown and requires further research for clarification.

Closing comment. While considerable attention has been given to educational television for pre-school children in recent years, research of an experimental or evaluative nature is still relatively uncommon. Most studies of children's television in countries other than the United States deal primarily with audience surveys and reactions to television, rather than measurement of the impact of television upon actual behaviour in young children. The international success of Sesame Street, and to a lesser extent of Mr. Rogers' Neighbourhood, has focused attention upon the importance of television as a powerful medium of education and socialization for pre-school children. The extensive evaluative research on Sesame Street as part of its original development in the United States set a pace that is difficult for most other countries to achieve. Sesame Street provides a comprehensive model of evaluation that serves as a standard for others to strive for in attempts to determine the value of deliberate programming for pre-school children.
When in 1971, Plaza Sesamo was developed in Mexico, it represented a unique opportunity for evaluation. This programme is a completely new production of Sesame Street, specially adapted to Latin American culture. In developing the programme, educators, psychologists, psychiatrists and linguists collaborated in planning and conducting formative studies to assist the producers of Plaza Sesamo. This series of formative investigations [Diaz-Guerrero, et al., 1975] laid the groundwork for embarking upon more extensive experiments to determine the impact of Plaza Sesamo upon learning in young children.

An experiment under carefully controlled conditions. The first of these experiments was with pre-school children in day-care centres in Mexico City [Diaz-Guerrero and Holtzman, 1974]. A total of 221 children, aged 3, 4 and 5, from three different lower-class day-care centres were equally divided by age and sex and were randomly assigned to experimental and control groups. Children in the experimental groups watched Plaza Sesamo programmes for fifty-minute periods, five days a week, from 3 to 4 p.m. until the entire series of 130 programmes had been broadcast, a total of six months of continuous viewing. At the same time, children in the control group were viewing cartoons and other non-educational television programmes on a different broadcast channel in a separate room. The television sets were placed on a pedestal so that every child could see and hear with no difficulty.

Since Plaza Sesamo was a new programme in 1975, none of the control children had ever seen it before. Strenuous efforts were made to prevent the control children from viewing Plaza Sesamo on another channel when it was broadcast each evening from 6 to 7 p.m. At the end of the experiment it was found that very few of the controls had been exposed to the programme so that the experimental design was not compromised in any way. The number of times a child was discernible bias due to drop-outs.

The design to evaluate the impact of the programme upon the children required a series of individually administered tests given to all the subjects in the sample at three points in time: pre-test, immediately prior to exposure to Plaza Sesamo or the control films; during-treatment test, seven weeks after beginning the experiment; and post-test, at the end of the experiment. An interval of seven weeks between pre-test and during-treatment testing sessions was chosen because the earlier evaluations of Sesame Street by Ball and Bogatz [1970; Bogatz and Ball, 1971], in the United States, used this size interval.

Daily ratings were also made by trained observers to measure the degree of attention exhibited by the children in the experimental group. These ratings were made only in two of the three day-care centres and were based on ratings of six children randomly selected each day. Over the period of 130 programmes, every child in these two centres was rated a number of times.

Nine individual tests were employed to measure the amount of learning for each child over the six-month period. Three of these tests, general knowledge, numbers, and letters and words, are criterion measures of skills specifically taught in the Plaza Sesamo programmes. Five other tests, relations, parts of the whole, ability to sort, classification skills and embedded figures, are indirectly related to Plaza Sesamo but are not specifically criterion measures. The ninth test, oral comprehension, has no relation to the stated goals of Plaza Sesamo although it measures an important cognitive ability related to school readiness among pre-school children.

Analyses of variance and covariance were carried out to see whether or not the Plaza Sesamo viewers did significantly better than children who watched only cartoons. In general, children in the experimental group showed greater gains in test performance over the six-month period than did those in the control group.

The main results can be summarized as follows:

1. Regardless of age-group, the children who watched Plaza Sesamo for six months did significantly better on general knowledge, numbers, letters and words, and classification skills than did the control children who watched only cartoons during this period.

2. The greatest increases for Plaza Sesamo viewers occurred on the three tests most closely related to the stated goals of Plaza Sesamo -- general knowledge, numbers, and letters and words.

3. Oral comprehension, the test unrelated to Plaza Sesamo, also revealed significantly greater gains for the Plaza Sesamo viewers than for the control children in all three age-groups.

4. The 4- and 5-year-olds showed the greatest gains for experimental children who watched Plaza Sesamo, as compared to controls. The 3-year-old experimental children failed to show a significant difference from the control children in general knowledge, relations, parts of the whole, and embedded figures.

5. Although the most rapid gains of the experimental children over the control groups occurred in the first seven weeks of viewing Plaza Sesamo, the gap between the experimental and control groups continued to grow throughout the six months.

6. Within the combined experimental group, the degree of attention to Plaza Sesamo correlated positively (as high as .49) in six of the nine post-test measures, indicating that children who attend regularly the Plaza Sesamo programme gain more than children whose attention wanders.

7. Experimental children with a large number of absences did less well on the post-treatment test battery than did children who attended regularly.

The outcome of this first experiment indicates that significant gains are made in a number of cognitive and perceptual
areas by pre-school children who watch Plaza Sesamo for the entire six months of the programme. This new information was obtained from survey information indicating that only one out of every twenty youngsters could get pre-school education in Mexico, encouraged the Institute (INCCAPAC) research staff to undertake a large-scale summative evaluation under field conditions to see how well the positive findings hold up when the viewing conditions cannot be so rigorously controlled.

A summative evaluation under field conditions. The main factors studied in this extended experimental design consisted of two age levels, 4- and 5-year-olds; both sexes equally divided; two socio-economic levels: low- and blue-collar classes; and two habitats, urban and rural. Since only lower class families were present in the rural areas, social class differences were examined only for the urban samples.

From fifty day-care centres surveyed within the Health Department of Mexico City, twelve were selected as having large numbers of pre-school children, a good representation of lower class and blue-collar families, and adequate facilities for television viewing. Fifteen rural communities near Mexico City were visited, and three villages were selected for study. Complete surveys were made of all families in these villages in order to obtain the necessary information for the research and the consent of parents for their children to participate in the experiment. In a similar manner, home visits and interviews were conducted with all parents in the urban day-care centres.

After 500 interviews with parents of day-care children, a startling fact was revealed: only two per cent of the urban children had never seen Plaza Sesamo. While the investigators were aware that it might be difficult to find good control cases who had never seen Plaza Sesamo, since the programme had been broadcast for two years prior to the beginning of this second experiment, the extent to which Plaza Sesamo had reached into every household in Mexico City had not been realized prior to this survey. No alternative was available other than to design an experiment for these urban children which would use as control cases children contaminated by uncertain amounts of prior viewing of Plaza Sesamo.

Fortunately, Plaza Sesamo I, the initial version of the programme, had been discontinued in January of 1974, providing a six-month period just prior to the experiment in which no Plaza Sesamo programmes would appear. In any event, random assignment of children to experimental and control groups within each day-care centre would equalize prior exposure.

During May and June of 1974, pre-test data were obtained on 1,119 cases of 4- and 5-year-old children in the fifteen rural and urban settings. The basic research design can be divided into two major phases according to the kind of treatment administered. In Phase I, one-half of the children viewed Plaza Sesamo while the other half watched cartoons.

In Phase II immediately thereafter, about one half of the original experimental group (EE) watched a new version of Plaza Sesamo while the other part of the experimental group (EC) looked at cartoons. The original control group was divided in a similar manner so that one-half of them were viewed for the pre-test, and the other half viewed for the post-test. These results indicate that exposure to Plaza Sesamo for four and a half months in Phase I was ineffective at the rural sites. Furthermore, it appears that urban children in the blue-collar class tend to benefit more from Plaza Sesamo than children in the lower class.

Results using the purified sample were not appreciably different. Plaza Sesamo viewing for the first four and a half months had no measurable effect upon the rural children of either age. Nor was six months of viewing beneficial for the cognitive development of the 4-year-old, lower-class children. Significant, though not large, beneficial effects were found for the urban, blue-collar children from both ages and for the lower-class 5-year-olds in Mexico City.

With Phase II data, two major kinds of analyses were undertaken. First, analyses of covariance were made for the two groups that did not change from Phase I to Phase II in the course of the study; that is, the children in the experimental group who watched Plaza Sesamo through the entire experiment (EE), and their control counterparts who watched only cartoons (CC). The results of these analyses can be summarized as follows:

Among the very poor children in the rural villages, no differences were found between the experimental group children who viewed both versions of Plaza Sesamo and the control group children who watched only cartoons. Somewhat better results were obtained for the urban children. Among
the 4-year-olds in particular, the children who viewed Plaza Sesamo for 10 and a half months showed significant gains over the control group viewers on several of the criterion tests. General knowledge and classification skills proved significant for both the urban lower-class and the blue-collar children among the 4-year-olds. Embedded figures and numbers showed significant differences only in the urban lower class and oral comprehension in the blue-collar children. Words was the only significant test among the urban 5-year-old children.

A second group of analyses was made only for the urban 4-year-olds since the 5-year-olds and the rural children appeared to receive little, if any, benefit from viewing Plaza Sesamo when only groups EE and CC were analysed. Post-test scores were compared for children who watched Plaza Sesamo during Phase I and then viewed cartoons during Phase II (the EC group), as well as the children who watched cartoons for the first six months followed by exposure to Plaza Sesamo in the last six months (the CE group). When compared with the children who remained in the control group for the entire six months (the CC group), the CE group did significantly better on post-test only for general knowledge and numbers.

The strategy of using individual tests related to the content of Plaza Sesamo is well suited for measuring the effectiveness of the treatment on specific objectives. When the tests are considered independently, however, the results are not as strong and consistent as one would like to have for general conclusions about the degree of success of Plaza Sesamo in stimulating cognitive development. Since many of the criterion tests were positively intercorrelated, a new measure, the content learning score, was developed by combining individual scores on general knowledge, numbers, letters, words, ability to sort, and classification skills. The estimated reliability of this score was .83 for the 4-year-olds and .91 for the 5-year-olds.

This overall content learning score was examined by analyses of covariance similar to the ones performed on the individual tests. In only one of the six analyses was there a statistically significant difference between the children who viewed Plaza Sesamo and the children who viewed only cartoons throughout the experiment. The urban, lower-class 4-year-olds showed significantly higher learning scores after viewing the programme than did their control group counterparts. The absolute mean difference between the EE and CC groups for these 4-year-olds, however, was quite small.

Three of the remaining five categories of children, the rural 4-year-olds, the rural 5-year-olds, and the blue-collar 5-year-olds, failed to show even a slight difference between the viewers and non-viewers in the amount of gain in content learning score over the period of the experiment.

Why were the outcomes of the first experiments and this larger field experiment so markedly different? Several questions have been raised and at least partially answered by the experimenters in a more detailed presentation elsewhere [Díaz-Guerrero et al., 1976]. Only a brief summary of the main points can be presented here. First, the uncontrolled viewing of Plaza Sesamo in the large-scale field study occurred to a small degree in both experimental and control groups. This fact might have narrowed slightly the differences but could hardly have eliminated them. Such contamination did not occur in the more rigorously controlled first experiment. Second, the severe attrition in Phase I of the second experiment was due largely to ambitious mothers who pushed their children into the first grade. The more achievement-oriented 5-year-olds may have been the ones who dropped out for this reason. Although both experimental and control groups were equally affected by attrition, the greater homogeneity of the remaining children may have been a minor factor in the negative results for the second experiment as compared to the first. Three, absenteeism, especially among rural children, was sufficiently great to cast some doubt upon the generality of the negative results obtained in the field study. Analyses performed in both studies indicated that those children who attended regularly in either experimental or control group did better on the achievement tests than children who were frequently absent.

None of the above is sufficient to explain the marked differences in outcome for the two experiments. Still, there is one important difference not yet mentioned in the two studies. As indicated earlier, in the first experiment the attention of six randomly selected children was rated daily in two of the day-care centres. This observation was done in a special room where the six children sat with two assistants. Although the analyses did not show any significant differences when the three day-care centres were compared, one can never be sure. It is fairly obvious in the first study that more adults were around when children were watching the programmes, possibly creating a positive reinforcement effect on actual attention and therefore achievement. This hypothesis is reinforced by Salomon's [1977] finding that Israeli children learned more from educational television programmes when their mothers were present. There may well be a need to incorporate some kind of adult reinforcement or guidance to make educational television more effective for very young children. In any event, further research must be undertaken before this question of adult modelling and reinforcement encouragement can be answered.
A RECENT SURVEY

In the Federal Republic of Germany, television has been used for educational purposes in at least two different ways. First, as an augmentation of a special didactic device for ordinary school instruction in standard subjects of primary and secondary school curricula (physics, biology, mathematics, etc.). Second, as educational enrichment and general developmental psychological support (social learning, cognitive development, compensatory education), especially for pre-schoolers. In preparing this brief review of recent research on educational television in the Federal Republic of Germany, a twofold inquiry was made with special attention to evaluative studies.

First, all television stations were contacted and information was requested on current educational programmes and, if available, evaluative research. These were the eight television stations responsible for programme channels 1 (a nationwide programme with limited times for regional programmes) and 3 (a regional programme, often with appeal to the more sophisticated viewer) and the television station producing the nationwide channel 2 programme. Second, colleagues involved in television research were invited through a 'call for reply' (published in professional journals) to contribute to this inquiry from their individual research experiences and institutes.

The results of these two inquiries can be summed up as follows. In general, no systematic evaluative research is available on the effectiveness of television programmes designed to implement or augment school instruction. A noteworthy exception is the research on political science programmes conducted by W. Wieczerkowski and his co-workers at the University of Hamburg; as to educational television in the more general sense, four sources of research information could be ascertained:

1. The follow-up research project to the series Sesamstrasse (the German version of Sesame Street) of the Norddeutscher Rundfunk (North-German Radio), conducted by Kurt Pawlik and his co-workers at the Hans-Bredow-Institute for Radio and Television at the University of Hamburg;
2. Research on the effects of television on emotional responses, conducted by Hertha Sturm and her co-workers at the Munich International Central Institute for Educational Television;
3. A follow-up inquiry conducted by the Second Television Programme to evaluate the enrichment programme Rappelkiste, with E. M. Lorey being project co-ordinator, and
4. A number of individual research projects on psychological effects of television in general.

Studies on the German Sesame Street series are reviewed in the following section by Kurt Pawlik and Berghaus.

The programme of research by Sturm and her colleagues has dealt primarily with the emotional and cognitive impact of radio and television programmes upon adult and teenage listeners. In one study, for example, 464 children, all 15 years old, were invited to the Munich Broadcasting House where they viewed a new twenty-minute feature film on the problems teenagers have getting along with each other. The children rated the leading characters and overall story, using the Impression Differential, a set of scales similar to Osgood's Semantic Differential. One group of children was questioned immediately, a second group was questioned one week after the viewing, and the remaining two groups were questioned two or three weeks later. The cluster of items in the Impression Differential concerning 'power' and 'excitement' yielded the same ratings, regardless of time interval between viewing and questioning. The cluster dealing with 'valence' changed over time, the programme being judged pleasant at first and then more neutral two or three weeks later. A deeper analysis revealed that most of this change in 'valence' could be attributed to only one character in the film. Such studies are continuing at the Munich Institute with particular attention being paid to the emotional confusion created in the minds of children when characters are thoughtlessly presented in various roles and when a long-running series abruptly ends without careful explanation over television to the viewing audience.

The final report on the third study, evaluating the series Rappelkiste (a production comparable to Sesame Street in mode of presentation and educational aims), was not available at the time of this review. In the Rappelkiste study, interview data were obtained by Lorey and his colleagues for a total of 312 households. Purpose of the study was to investigate parental evaluation of the programme and parental observation of children while viewing the series. Preliminary results available at the time of this writing indicate a degree of viewing interest and emotional responsiveness on the part of the children comparable to that found for Sesame Street. Criterion-oriented testing of series effects (educational achievement and behaviour modification with respect to educational goals of the series) was not part of the study. A more detailed review of Rappelkiste and earlier plans for analysis have been reported by Nemetschek and van Lessen [1975] and by Lorey [1973].

Individual research projects falling into category 4 have been reported, for example, from the universities of Aachen (by Dagmar Krebs and J. P. Groebel), Freiburg (by M. Charlton), Hamburg (by I. Langer, Anne-Marie Tausch, and W. Wieczerkowski), Mannheim (by Elfriede Iohn), and Munster (sponsored by Lilly Kemmler) in recent volumes of two journals, Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie and Zeitschrift für Sozialpsychologie.

1. By Kurt Pawlik.
SESAME STREET IN THE FEDERAL REPUBLIC OF GERMANY

This brief report describes an extensive research project conducted from 1972 to 1975 by the Hans-Bredow-Institut für Rundfunk und Fernsehen an der Universität Hamburg (Institute for Radio and Television Research at Hamburg University). Basic information is presented on the nature of the inquiry, some essential general results, and a few interesting, single findings. More details are given in the final report of the research (Berghaus et al. 1978).

Adaptation of Sesame Street and construction of the inquiry. For about ten years, politicians in the Federal Republic of Germany, as in other industrial countries, found it increasingly necessary that children should be educated by professionals even before entering school. Television was thought to be an appropriate instrument for managing such pre-school efforts without requiring excessive employment of teachers and high financial costs. As a consequence, Sesame Street was initiated in the country by a television company, Norddeutscher Rundfunk Hamburg. The acquisition of Sesame Street from the Children's Television Workshop in New York was promoted by the Ministry for Education and Science, which also financed the research. From this point of view, as in the United States, Sesamstrasse was more than an experiment of mass medium television. It was an attempt by the government to provide an intentional pre-school education within a short time and to control its success.

A second important aspect of Sesamstrasse in the Federal Republic of Germany was the intensive modification of the programme prior to German screening. Although the general view of the series was basically positive, some critical points were noted. Referring to the main educational concepts in the country today, the editorial staff of Sesamstrasse recognized two negative traits in the original Sesame Street programme and tried to change them in the German version: (1) the predominance of cognitive educational goals (new spots with subjects in 'social learning' were produced) and (2) the extreme 'magazine form' of Sesame Street — the very short spots seemed to resemble television commercials and were thought to irritate and deflect the children. So the newly procured spots were longer, and the producers tried to concentrate on a single theme or topic in each programme. In comparison with the American spots, realistic filming was preferred over animation and puppets.

At the beginning, one-third of Sesamstrasse consisted of newly produced spots. This share is steadily increasing. A future goal is to replace the American parts entirely. These factors generated special interest among the researchers in the investigation of social learning effects and in a comparison of American and German spots.

A third interesting attribute of Sesamstrasse was the broad, intense, and successful publicity for the series. It was publicized favourably by television, radio and newspapers even before its start. For some weeks, the culturally fastidious third television channels transmitted the original Sesame Street in English and thus introduced the programme to their well-educated, rather exclusive audiences. The main characters of the show were popularized, also. Consequently, Sesamstrasse quickly became the best-known programme among pre-school television series in the Federal Republic of Germany. Likewise, the parents became acquainted with the didactic meaning of the programme and purposefully integrated it into their children’s education.

The Sesamstrasse research first had to answer two general questions: Can television be used at all as a pre-school instrument? Can it compensate for an actual lack of direct pre-school education felt in kindergartens and schools? The next question concerned Sesamstrasse in particular: Can the concrete realization of the programme serve as a model for other efforts?

There was only a very short period of time to prepare the investigation; the instruments had to be developed within half a year. That was especially difficult in those areas in which no proved or tested methods were available measuring the extended social learning effects. Developing a content analysis of the programme and observing the children during their television watching. Indeed, we had negative experiences with some of our methods, but in general the research produced definitive and relatively important findings.

The following is a short outline of the methods used. More information is presented in the final report and also in two interim studies published by the Hans-Bredow-Institut in 1973 and 1975. The research consists of six thematically and methodically different projects, the results of which were integrated at the end.

1. Content analysis. A systematic content analysis was made in order to code the themes, actors, and forms of presentation in mediating the educational aims to the audience. Content analysis enabled us to describe the 'reality' of Sesamstrasse more objectively and to compare it with the producers' intentions as well as the audience's reactions.

2. Children's reactions. The reactions of children as they watched Sesamstrasse were recorded in a controlled observation. The children and accompanying adults were observed at home and in kindergartens.

3. Social and cognitive impact. The social and cognitive capacities of children were tested before and after viewing and compared with similar data for non-viewers. By differentiating between 'viewers' (children who regularly watched the series during more than one year) and 'control groups' (children who scarcely knew the programme), we were able to gauge the probable effects of Sesamstrasse.

4. Home and family factors. By interviewing the children's parents, information was obtained about the social surroundings and the educational situation of the children. These family factors were regarded as intervening variables for interpreting the effects of Sesamstrasse.

5. Teacher attitudes. Pre-school and elementary school teachers were interviewed to determine their attitudes toward Sesamstrasse. As important reference persons to children, these people were presumed to influence the perception of others toward the programme.

6. Audience characteristics and attitudes. By surveys of families with 3- to 10-year-old children, we ascertained the degree to which Sesamstrasse was watched and how it was evaluated and used.

Highlights of results. From its beginning, Sesamstrasse was unusually popular among the target group. The favourable publicity remained steady during the year and a half of investigation. More than two-thirds of all children aged 3-10 regularly watched the programme. It is remarkable that grown-ups, too, liked to watch children's show. Obviously, families with pre-school children gained a sort of 'pedagogical sensitivity' through Sesamstrasse. This outcome was probably produced by two factors. First, the intense and regular transmission of the series: new programmes were put on the air four days per week, always at the same hour; moreover, there were daily repetitions. Through this high frequency and regularity — like a school schedule — parents were able to integrate the programme into the children's daily rhythm and into their own educational activities. Second, the ingredients apparently interested and amused adults: since Sesamstrasse is more than a merely didactic instrument, parents became familiar with the contents and the actors of the series and thus received suggestions for discussion and interaction with their children. Given the parents' active interest, Sesamstrasse is a good vehicle for pre-school learning.

Parental interest was important, not only for this special investigation; the instruments had to be developed within half a year. That was especially difficult in those areas in which no proved or tested methods were available measuring the extended social learning effects. Developing a content analysis of the programme and observing the children during their television watching. Indeed, we had negative experiences with some of our methods, but in general the research produced definitive and relatively important findings.

The following is a short outline of the methods used. More information is presented in the final report and also in two interim studies published by the Hans-Bredow-Institut in 1973 and 1975. The research consists of six thematically and methodically different projects, the results of which were integrated at the end.

1. Content analysis. A systematic content analysis was made in order to code the themes, actors, and forms of presentation in mediating the educational aims to the audience. Content analysis enabled us to describe the 'reality' of Sesamstrasse more objectively and to compare it with the producers' intentions as well as the audience's reactions.

2. Children's reactions. The reactions of children as they watched Sesamstrasse were recorded in a controlled observation. The children and accompanying adults were observed at home and in kindergartens.

3. Social and cognitive impact. The social and cognitive capacities of children were tested before and after viewing and compared with similar data for non-viewers. By differentiating between 'viewers' (children who regularly watched the series during more than one year) and 'control groups' (children who scarcely knew the programme), we were able to gauge the probable effects of Sesamstrasse.

4. Home and family factors. By interviewing the children's parents, information was obtained about the social surroundings and the educational situation of the children. These family factors were regarded as intervening variables for interpreting the effects of Sesamstrasse.

5. Teacher attitudes. Pre-school and elementary school teachers were interviewed to determine their attitudes toward Sesamstrasse. As important reference persons to children, these people were presumed to influence the perception of others toward the programme.

6. Audience characteristics and attitudes. By surveys of families with 3- to 10-year-old children, we ascertained the degree to which Sesamstrasse was watched and how it was evaluated and used.

Highlights of results. From its beginning, Sesamstrasse was unusually popular among the target group. The favourable publicity remained steady during the year and a half of investigation. More than two-thirds of all children aged 3-10 regularly watched the programme. It is remarkable that grown-ups, too, liked to watch children's show. Obviously, families with pre-school children gained a sort of 'pedagogical sensitivity' through Sesamstrasse. This outcome was probably produced by two factors. First, the intense and regular transmission of the series: new programmes were put on the air four days per week, always at the same hour; moreover, there were daily repetitions. Through this high frequency and regularity — like a school schedule — parents were able to integrate the programme into the children's daily rhythm and into their own educational activities. Second, the ingredients apparently interested and amused adults: since Sesamstrasse is more than a merely didactic instrument, parents became familiar with the contents and the actors of the series and thus received suggestions for discussion and interaction with their children. Given the parents' active interest, Sesamstrasse is a good vehicle for pre-school learning.

Parental interest was important, not only for this special

1. By Janpeter Kob and Margot Berghaus.
2. For further information please contact: Hans-Bredow-Institut, Heimhuder Str. 21, D 2000 Hamburg 15.
programme. The publicity of *Sesamstrasse* popularized at the same time the idea of pre-school education in general, and also of special educational goals and methods.

Two characteristics were found that provided especially positive effects: *amusing elements* concerning substance, the comical, funny elements of the series, deriving mainly from the American parts, caused a high and continuous acceptance of the programme; through these elements, the direct teaching is concealed, and the usual unattractiveness of didactic intentions is reduced and the *magazine structure* which offered enough variety to hold the children's attention during a half-hour programme. By observation, we discovered, as the participation in the programme. In the west and particularly in the south of the Federal Republic of Germany, the interest was less than in the north. Two reasons for this variation are likely: regional peculiarities in language — actors in *Sesamstrasse* mainly speak in the north German idiom; and emotional identification with the television station — the audience in the northern region has a closer affinity to 'its' station. One can conclude from this finding that pre-school television programmes should not be planned and screened for an overly broad area. Rather, they should be locally limited. Thus it would be possible to fulfil the concrete and actual requirements of the audience and to get a high feedback.

The findings are rather different with regard to the educational goals.

**Cognitive goals.** As expected, the cognitive aims produced the least difficulties and the most reliable results. What the American *Sesame Street* research discovered was confirmed in our investigation. A television series so intentionally planned and regularly offered achieves, with high probability, its goal of raising the intellectual skills of children. There is no doubt that television has generally positive effects in this area. But there are some differences in detail. The more complex the aim, the more necessary it was that adult reference persons lend support.

The importance of adult encouragement means that the child's social surrounding is a very important factor in realizing the full potential of the programme for young children. For example, middle-class children succeed more in learning from *Sesamstrasse* than did those from lower social classes. The children of the lower social classes showed a cognitive gain but not as much as children with more highly educated parents. The fundamental gap in intellectual capability between the social classes was not reduced by *Sesamstrasse*.

**Social goals.** It was not surprising that the accomplishment of the social aims, in comparison with the cognitive goals, was very uncertain and dependent upon many uncontrollable factors. On the one hand, several effects were discovered that tended to bear out the producers' intentions; for example, 'Understanding the actions of grown-ups' and 'Autonomy toward grown-ups' increased. On the other hand, children sometimes learned nearly the opposite of what they were expected to learn; for example, the attitudes of *Sesamstrasse* viewers toward minority groups were more negative after watching the series than were the attitudes of the non-viewers. The educational aim 'Reduction of sex-role fixations' also did not succeed as hoped. This outcome is discussed later in more detail. Such inconsistencies in the realm of social learning lead to certain conclusions.

**High consensus of adults needed.** To advance educational goals of a social nature successfully by means of television requires a high consensus of the children's direct reference persons. It is impossible to realize by television, educational maxims adverse to those in the families and in the schools. That does not mean that the teaching of social aims in television would be senseless because only those principles could succeed which played their part in the children's everyday lives anyway. The findings prove that even in these cases, the supporting help of television can promote an educational goal which would have been more difficult without this aid.

**Limited goals best.** In pre-school television programmes, only a limited number of social goals should be pursued. Even if a series like *Sesamstrasse* is aired for a long period of time, it seems more realistic to concentrate on some strategically important didactic principles and aims instead of attacking the multitude of all possible pre-school aims. Otherwise, the children could be overtaxed by the complex and contradictory demands and possibly misinterpret them in a way totally different from the producer's intentions.

**Single spot broadcasts not enough.** Important educational goals must not be restricted to single spots. If a goal is to be realized in the programme only while it is the explicit subject of a spot and is ignored in other parts of the broadcast, there is no chance of success.

**Home viewing better than institutional.** Is it better for the children to watch such a programme at home with the family or in a professional pre-school institution such as a kindergarten, pre-school, or day-care centre? All results show that the strongest positive effects are obtained at home where the adult reference-persons are 'didactic amateurs'. A possible reason for greater success in family-centred viewing is the following: in the family situation, the reception of the programme is more individualized and intense, while in pre-school institutions the appreciation of the pedagogical substance is diminished because it is only one educational effort among many more direct attempts by the teacher. In the family where educational activities normally are an exception, an educational television programme can initiate such activities and thus assume central importance when encouraged by the child's parents.

A pre-school television series should clearly be accompanied by supporting activity aimed at the parents. The goal-oriented success of the programme depends mainly on assistance from other reference persons who are typically 'educational amateurs'. Consequently, materials aimed at the parents have to be planned and realized as thoroughly and intensely as those directed at the children, certainly to a higher degree than has been true heretofore in the German experiment.

**Sex-role presentation on Sesamstrasse.** The role presentation on *Sesamstrasse* — and its effects on children. Consisting of about two-thirds American, one-third newly produced spots, the German version of *Sesamstrasse* placed a major emphasis on 'social learning'. Consequently, the extended influence of *Sesamstrasse* on the viewers' social perception and social learning was of concern in the evaluative research. The test series focused on two features of differentiation during the pre-adult period of children — generation and sex. The investigation concerned the children's interaction with other children and with grown-ups, as well as their sex-role understanding. The study of sex role is presented here for two reasons. First, it is less complex than the study of interaction with the peer group or with adults, and it can more easily be reported in brief. Second, critical results were obtained for sex-role presentation on *Sesamstrasse* which may be of special interest.

One of the educational goals of *Sesamstrasse*, as stated by the German editorial staff, was 'development of role understanding and role flexibility and reduction of sex-specific role fixations'. In spots explicitly pursuing this aim, it was
demonstratively shown, for example, that girls like to play football and that boys can cook. But of course in other spots with other topics and educational intentions, boys and girls, men and women, were portrayed in other roles. All elements of the programme, not simply those which are intended by the producers, provide opportunity for emulation by viewers.

Analysis of programme content. A content analysis was done to investigate the way that males and females are presented generally in Sesamstrasse. It was found that there are far more male than female actors in the programme, especially in spots of American origin as noted in Table 2.

### Table 2

<table>
<thead>
<tr>
<th>Presence in spots</th>
<th>Both Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>American origin</td>
<td>German origin</td>
</tr>
<tr>
<td>Females (percentage)</td>
<td>18</td>
</tr>
<tr>
<td>Males (percentage)</td>
<td>82</td>
</tr>
<tr>
<td>Number</td>
<td>1,326</td>
</tr>
</tbody>
</table>

This disproportionately high frequency of male actors might be interpreted as a sensible, planned compensation for the absence of fathers in the everyday life of pre-school children. If true, the male emphasis could be accepted for such realistic characters as Bob, Gordon and Mr Hooper. But there is no reason why all of the funny figures among children like so much and easily identify with, such as Ernie, Bert, Cookie-Monster and the other monsters, Oscar, Grover, Sherlock or Kermit, should be male. It gives the impression that the predominance of males in Sesamstrasse results from a thoughtless and general tendency in television, both German and American, to present men and women in an unbalanced way.

Not only are there far more males than females portrayed, but, as noted in Table 3, males are also over-represented in social activities — e.g. interaction with other actors or with the audience by words, gestures and mimicry. The average boy in the programme is active, the average girl is more passive, roles that are parallel to traditional stereotypes of male and female character. Although 22 per cent of all actors are boys in the programme is active, the average girl is more passive, roles that are parallel to traditional stereotypes of male and female character. Although 22 per cent of all actors are female, only 19 per cent of the leading characters within a programme, not simply those which are intended by the producers, provide opportunity for emulation by viewers.

### Table 3

<table>
<thead>
<tr>
<th>Presence in spots</th>
<th>Both Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>American origin</td>
<td>German origin</td>
</tr>
<tr>
<td>Females (percentage)</td>
<td>22</td>
</tr>
<tr>
<td>Males (percentage)</td>
<td>78</td>
</tr>
<tr>
<td>Number</td>
<td>1,825</td>
</tr>
</tbody>
</table>

In addition to underrepresentation in sheer frequency and in social activities, two other traits in Sesamstrasse show girls and women at a disadvantage — their relative lack of humour and their emphasis on didactics. Jokes, slapstick, comic exaggeration and other funny elements are present in 62 per cent of all male appearances. Females have these attractive attributes only 38 per cent of the time. On the other hand, females tend to teach, to correct, or to order, especially when they tend to the viewers — 49 per cent of all female interactions with the audience and 17 per cent of female interactions with other actors have such 'pretentious' quality. The same figures for males are only 34 per cent and 15 per cent, respectively.

Part of the content analysis of Sesamstrasse involved an interaction analysis described more fully elsewhere [Berghaus, 1974]. Both verbal and non-verbal kinds of social intercourse were defined as interactions. Ten categories were developed to describe different manifestations of interpersonal relations, ordered on a scale with the extremes of claiming power over the partner at one pole (aggression) and submission to the partner at the other (subordination). As noted in Figure 3, the ten categories express degrees of actual relation to the partner.

### Figure 3. Interaction categories in abbreviated form as used for rating quality of interaction in Sesamstrasse

A definition and examples are given the rater for each category. Every ten seconds, the film is stopped to code the interactions. Within this action period, the social behaviour of each actor is classified according to quality (one of the ten categories) and to direction (toward actors or toward audience).

Using this scale, 12,135 interactions of male and female actors were analysed. Most of them were coded in categories ordered more or less in the middle of the scale: Autonomy received 30.4 per cent of the interaction units; Pretension, 18.7 per cent; and Co-operation, 17.5 per cent. As expected, even on television extreme behaviour was more unusual and infrequent than moderate behaviour.

### Figure 4. Qualitative comparison of 12,135 social interactions by male and female actors in Sesamstrasse
A comparison of the interactions of male and female actors in Sesamstrasse is given in Figure 4, revealing a remarkably high difference between them. The difference occurs mainly in the two extreme categories near each pole of the scale. Figure 4 shows what proportionate share male and female actors have in each of the ten interaction qualities (the dissimilarity in quantity of males' and females' interactions has been eliminated).

Boys and men in Sesamstrasse tend to more extreme behaviour, in the direction of aggressive activities as well as devoted, submissive actions. Girls and women tend to cluster more in the middle of the scale, recalling the female stereotype that a girl should be balanced and helpful, e.g., 'motherly'.

It was also noted in the content analysis for each actor whether a particular position or role (such as an occupational or family role) was indicated. As presented in Table 4, female actors much more often assumed a role such as daughter, sister, mother, or grandmother, than an occupational role. Males, however, were more often presented in a work setting than within their family group.

Table 4

| Percentage of professional versus family roles for male and female actors |
|-----------------------------|-----------------------------|
| Males | Females |
| Occupation role | 18 | 4 |
| Family role | 6 | 16 |
| Number | 1,428 | 397 |

These findings on programme content are surprising, since they contradict the producers' explicit wish to reduce specific sex-role fixation by means of this series. Despite their good will, in this area the producers seem to have concentrated too much on a few progressive, goal-oriented spots with football-playing girls and cooking boys while ignoring the programme as a whole.

Programme impact on children. If social behaviour can be taught at all to pre-school children by Sesamstrasse, it is probably that this representation of boys (or men) and girls (or women) influences the sex-role understanding of the programme's regular viewers. Using tests and interviews, a sample of 167 5-year-olds and 167 6-year-olds was studied to determine children's behaviour and attitudes on this point. The total of 354 cases was divided about equally into boys and girls. Nearly half were viewers (children who watched Sesamstrasse about five times per week during more than a year) while the rest were non-viewers. Programme-specific effects could be isolated by comparing viewers and their controls, the non-viewers.

Information about the children's specific play habits was collected by asking them for their preferences for certain toys and tools. Seven times the children had to choose between two pictures, one showing a traditionally male play object, the other a traditionally female play object (for example, racing car versus doll). A comparison between viewers and non-viewers showed that the tendency toward a high degree of sex-role conformity had not been altered by Sesamstrasse.

On the contrary, one group - the 6-year-old female viewers - showed a stronger interest in girlish play objects than did their non-viewing controls. Why this effect appeared only at the age of 6, not at 5, cannot be explained.

Another set of questions in the interview dealt with the child's ideas on occupations. Each child was asked: (1) what occupation he (she) wished for him/her (2) what occupation he (she) would like, if he were a girl instead of a boy (or if she were a boy instead of a girl). The children were also asked for their reasons. The children who were regular viewers of Sesamstrasse gave a significantly higher frequency (80 per cent) of appropriate responses to such questions ('baker', 'policeman', or 'painter' rather than 'dog' or 'mother', for example) than those who were non-viewers (64 per cent). The viewers also gave good reasons for their answers more often (62 per cent) than did the non-viewers (41 per cent). In general, Sesamstrasse helped children to understand what an occupation was and to imagine a job for themselves.

In Western society, many occupations are considered to be either typically male or female. The jobs desired by the children were classified in traditional fashion - for example, captain, policeman or postman as male, and nurse, housewife or secretary as female. (Others such as doctor, musician or keeper of animals were defined as neither male nor female.) Among the 6-year-olds who gave appropriate answers to the question on desired occupation, more than three-fourths mentioned a job that is traditionally considered typical for their sex. No significant differences occurred between viewers and non-viewers in desired occupation.

A remarkable difference between viewers and control groups was noted, however, in responses to the question on other-sex occupation. When imagining themselves as girls, 83 per cent of the male viewers chose a 'female' occupation while only 56 per cent of the male non-viewers did so. For the girls imagining themselves as boys, 68 per cent of the viewers and 57 per cent of the non-viewers chose a typical 'male' occupation. Sesamstrasse viewers, especially the boys, had a more stereotyped conception of jobs that were most suitable for the opposite sex.

Still another analysis revealed that the boys conceived of a much greater number of jobs open to males than to females. Their choices as imaginary females showed a paucity of selection in comparison to their own desired occupation as males. The opposite was true of the girls, who cited a small variety of desired occupations for themselves and a large number for males. Boys and girls alike, then, see a greater variety of jobs open to men than to women. A comparison of viewers and non-viewers revealed that Sesamstrasse did not alter this fundamental orientation.
CHAPTER 7

EVALUATION STUDIES ON THE IMPACT OF EDUCATIONAL TELEVISION
UPON PRE-SCHOOL CHILDREN IN JAPAN

by
Takashi Sakamoto
and
Takashiro Akiyama

Educational television broadcasting is undertaken largely by Nippon Hoso Kyokai (NHK - Japan Broadcasting Corporation), the only public broadcasting organization in Japan, through its nationwide colour networks. Some commercial television stations also have educational programmes for small children throughout the country.

NHK started to broadcast ETV programmes in 1953. Today it presents programmes for pre-school children daily except Sunday—one of twenty-five minutes duration on the general services network and the others of fifteen minutes duration on the educational services network. Including repeats, the total weekly on-air time is 550 minutes. The programme for pre-school children on the general network is intended mainly for individual children who are at home, while the target audience of the programmes on the educational network is chiefly groups of children at kindergartens or nurseries. Fairly large audiences view these programmes either at home or at pre-school institutions.

Table 5 shows the television programmes broadcast for pre-school children in 1977. There are fifteen programmes. Among them, only two (Open!, Ponkiki and Curricular Machine) are of the same type as the American Sesame Street. A third, Jack-in-the-Box, is also influenced by the basic concepts underlying Sesame Street.

Surveys of children. Results of a survey of educational television for children conducted by NHK in 1976 are summarized in Table 6. It shows the viewing rates for NHK school television broadcasts by different kinds of educational institutions (Akiyama, 1977).

Table 6

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Total No. of institutions</th>
<th>Percentage</th>
<th>Percentage continuously viewing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergartens</td>
<td>13,071</td>
<td>81</td>
<td>42</td>
</tr>
<tr>
<td>Nurseries</td>
<td>19,020</td>
<td>91</td>
<td>50</td>
</tr>
<tr>
<td>Elementary schools</td>
<td>24,572</td>
<td>95</td>
<td>80</td>
</tr>
<tr>
<td>Junior High schools</td>
<td>10,618</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>Senior High schools</td>
<td>4,593</td>
<td>54</td>
<td>8</td>
</tr>
</tbody>
</table>

The pre-school child is usually too young as the target for evaluation studies on ETV programmes to be measured reliably by cognitive, personality or achievement tests. Because of this problem, subjective accounts by observers who study children by examining their behaviour before and after viewing a broadcast are more prevalent than are objective reports put forward as a result of evaluation tests.

The earliest systematic survey using interviews with children who were regular viewers of television (327 in Tokyo and 200 in Takamatsu) and their parents was conducted by the Ministry of Education in 1963. The results showed that 60 per cent of all children, if given a choice, preferred to see television rather than to play (boys 65 per cent; girls 56 per cent); only 30 per cent of the children preferred play to television (boys 26 per cent; girls 34 per cent). A questionnaire answered by the parents revealed that, as compared to their behaviour prior to the introduction of television, 77 per cent of all the children had been stimulated by television to ask

+ NHK nationwide; others Tokyo area only.
* For ETV, these six short programmes are each broadcast three times per week in staggered fashion on different days at the times noted.
more questions, 55 per cent of the children had been stimulated to ask their parents to give them things shown on television, 32 per cent of them were eating more irregularly in order to accommodate a favourite television programme, and 29 per cent of the children spoke more rudely to others as a result of television viewing [Japan, Ministry of Education, 1963].

The next large-scale survey, conducted by Professor A. Yoda from the University of Tokyo in 1964, focused more specifically on the educational value of television. Some of the findings were based upon the mothers' free response to the question: 'What are the harmful effects, if any, of television on the education of children?' Responses were classified according to the following categories: (1) physical health, (2) life style, (3) ways of comprehending or thinking, (4) language usage, (5) general behaviour, (6) mental functioning, (7) emotional stimulation, (8) adult behaviour modelling, and (9) others. The same set of categories was also used for coding responses to a similar question dealing with the beneficial effects of television. On the basis of this survey, Yoda concluded that the beneficial effects of television were found mainly in an increase of general knowledge, but that few parents believed that television had desirable effects on language usage, emotion or general behaviour [Yoda, 1964].

The third large-scale survey was done by a research team of the NHK Radio and Television Culture Research Institute in 1968 [NHK, 1970]. In order to comprehend the state of television viewing by children, NHK examined the following: (1) development of television viewing with increasing age, (2) hours of viewing, (3) behaviour during viewing, (4) side effects upon non-viewing behaviour, (5) parental attitudes toward children's viewing, and (6) parental control of children's viewing. Answers to questionnaires were obtained from 1,319 mothers of kindergarten children in the cities and rural villages of Shizuoka Prefecture. Figure 5 shows the percentage of children viewing television with noticeable interest and the percentage who had a favourite programme, according to the age of the child. Similar data from two earlier Japanese and one American survey are also presented in Figure 5 for comparative purposes.

The results of this comparison in Figure 5 show that increased viewing by age is similar in every survey. They also show that Japanese children start to watch television earlier than do American children, and that viewing by Japanese children has increased in recent years. The average amount of viewing by Japanese children was about two to three hours a day; 16 per cent of the children watched television for four or more hours a day.

According to the mothers' observations, children exhibit various behaviours while viewing television: 85 per cent of the children took meals, 82 per cent asked questions about the contents of the programmes, and 75 per cent moved their bodies according to the rhythm of the programme. Regarding the mothers' views, 94 per cent of them felt that the main effect of television was the imitation of verbal expressions, 81 per cent pointed out the imitation of playing games shown on television, 73 per cent said their children demanded toys shown on television, and 49 per cent felt their children weren't getting enough sleep. The effects were much more pronounced for heavy viewers than for light viewers.

On the positive side, 53.5 per cent of the mothers recognized that television was useful for acquiring knowledge, 46.5 per cent recognized it was useful for expanding interests, and 40.0 per cent felt that television showed models for ways of living, while on the negative side, 21.1 per cent felt that children were becoming bad-mannered and 19.7 per cent felt that children were prematurely mimicking adult behaviour.

Experiments with young children. Sakamoto [1968] investigated the instructional effectiveness of ETV programmes for pre-school children. His method was first to ask teachers to prepare an evaluation sheet for each programme. In order to do this, twenty teachers from different kindergartens and nursery schools were asked to describe freely on pieces of paper their feelings and opinions about each of six television programmes. These pieces of paper were then classified by the teachers to develop constructs for rating purposes. Some examples of items which resulted are: to make children enjoy themselves, to give them dreams, to give them impressions, to nurture an aesthetic feeling, to nurture affections, to make them interested in various things, to arouse motivation, to stimulate thinking, to stimulate various sorts of actions, to mature their ways of thinking, to give them information on things they have not experienced, to teach them the structure of society and nature, and to make them familiar with common tools. Finally, the various items were classified into six categories — motivation, affection, attitudes, knowledge, thinking ability, and creativity.

A group of thirty-six teachers from different kindergartens and nursery schools in Tokyo analysed the content of six television programmes and rated them in each category. Puppet Show, a programme in which various types of dramatic stories for pre-school children were played by puppets, was judged to be useful for developing affection in children. How Shall We Play?, a programme in which the performer made various sorts of creative handicrafts and fine arts set to rhythmical music, was judged to be useful for stimulating motivation and developing creativity in young children. Let's Observe Well, a filmed science programme, was judged to be useful for stimulating motivation. And, Want To Go, a social study programme, was deemed useful for acquiring knowledge. The different programmes were each evaluated as having their own characteristic effectiveness.

F. Harada [1974] studied 5-year-olds who every week watched Jack-in-the-Box, a variety show series made for children. The children watched both the first and the repeat broadcasts. They were told to watch the first broadcast with an expectation of 'What's going to happen?' Afterwards the children acted out what they thought had happened from the programme. Then, when they saw the repeat show, they were told by the teacher to think about the implications of the pictures on the screen and to follow the story. Harada

---

**Figure 5. Age when children started to view television, according to various surveys**

<table>
<thead>
<tr>
<th>Age in years</th>
<th>NHK, 1968 (percentage of children viewing television with interest)</th>
<th>NHK, 1968 (percentage of children who have a favourite programme)</th>
<th>Ministry of Education (Takamatsu rural city), 1953 (percentage of children starting to look at television)</th>
<th>Ministry of Education (Tokyo), 1958 (percentage of children starting to look at television)</th>
<th>Dwight Schraiem Survey (United States), 1961 (percentage of children starting to look at television)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td>1</td>
<td>20%</td>
<td>40%</td>
<td>60%</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>30%</td>
<td>60%</td>
<td>90%</td>
<td>120%</td>
<td>150%</td>
</tr>
<tr>
<td>3</td>
<td>40%</td>
<td>80%</td>
<td>120%</td>
<td>160%</td>
<td>200%</td>
</tr>
<tr>
<td>4</td>
<td>50%</td>
<td>100%</td>
<td>150%</td>
<td>200%</td>
<td>250%</td>
</tr>
<tr>
<td>5</td>
<td>60%</td>
<td>120%</td>
<td>180%</td>
<td>240%</td>
<td>300%</td>
</tr>
<tr>
<td>6</td>
<td>70%</td>
<td>140%</td>
<td>210%</td>
<td>280%</td>
<td>350%</td>
</tr>
</tbody>
</table>

Legend:
- NHK, 1968 (percentage of children viewing television with interest)
- NHK, 1968 (percentage of children who have a favourite programme)
- Ministry of Education (Takamatsu rural city), 1953 (percentage of children starting to look at television)
- Ministry of Education (Tokyo), 1958 (percentage of children starting to look at television)
- Dwight Schraiem Survey (United States), 1961 (percentage of children starting to look at television)
reported that, as a result of television viewing, the children learned to elaborate on their play and developed an interest in words and numbers.

S. Sato [1973] showed a series of puppet-theatre programmes, to 3-year-old children for one year. At first the children would not sit in front of the television even for the fifteen minutes of the programme. But the teacher then involved them in concurrent related activities, such as singing along with the music in the programme or laughing at something in the show, in the hope that she could improve communication with them. The teacher also took particular care to improve the viewing conditions by attending to such details as the position of the television set, the brightness of the screen, the volume of sound, and the distracting behaviour of restless children in the group. After one month, most of the children in the group were able to watch television in a reasonable manner. Sato observed that, 'Television helps develop sociability, consideration for others, controlling one's own emotions, etc.' After half a year, the children were able to communicate the contents of the programme, even creating their own stories which they told their friends. It was found after a year that many of the children identified with Mogu, the main character in the programme, even wishing to behave like him.

Teachers of the First Bunkyo Kindergarten, working with Sakamoto [Akiyama, 1977], examined the effects of a series of puppet-theatre programmes, on children's behaviour. The teachers asked 4-year-olds to create and play themselves the drama in which Mogu would act. Those children who watched the programme were more inventive, than the other two groups.

The situations were those every child was likely to find himself in upon entering kindergarten. At the beginning, it was difficult to keep the children attentive during the programme's on-air time of just fifteen minutes, for they failed to find the characters interesting. After three months, however, the situation changed. The children looked forward to the day of the programme, and after they had seen it, they expressed their opinions through body movements about scenes which had strongly impressed them. They also made drawings of those scenes. After seven months, when the teachers suggested that the children make plaster dolls like those puppets on the television, the children willingly began, enjoyed and successfully completed this creative work. After ten months, it was reported that the children themselves actually made their own drama-in-play, based on the story of that week's puppet show, but with the addition of their own ideas.

M. Nemoto and other teachers of the First Bunkyo Kindergarten [1973] showed a television programme, Machines, to three groups of 5-year-olds. A different teaching method was employed with each of the three groups. In the first group, the children were given such examples of machines as a clock and a musical box before they watched the programme. In the second group, the children were given the same examples, but after viewing Machines, Children in the third group only watched the programme, without examples or other form of instruction.

The teachers asked the children questions three different times, namely, a week prior to, immediately after, and one week after viewing. Typical questions were, 'What is a machine?' 'What is the difference between machines and man?' 'How does a model differ from its original?' The children's answers were evaluated on a five-point scale. It was consistently found that the two groups where the children had seen some machines either before or after viewing gave replies superior to those of the children who did not have an opportunity to see and handle any machines.

Fujimura and others [Fujimura and Yanashima, 1974, 1975, 1976; Fujimura et al. 1978] have repeatedly examined the effectiveness of a Sesame Street type of programme, Open! Ponkiki, on children's cognitive development since 1974. In 1975, their subjects were ninety-three 3-year-old children who were divided into four groups. One group viewed Open! Ponkiki, the second viewed Curricular Machine, the third viewed both, and the fourth viewed neither. The fourteen tasks given the children tapped such abilities as the following: guessing the whole from the part, discrimination of distinctive features of (Japanese) characters, number reading, judging differences between number and quantity, and reading of (Japanese) characters.

The viewers of Open! Ponkiki clearly showed a better level of performance than did the others in the Block Design Test. In 1976, 117 children 3 to 4 years old were tested on the same tasks. Compared to those who viewed Open! Ponkiki less than two times a week, the daily viewers showed better levels of performance in the reading of (Japanese) characters, reading of numbers, judgements of sizes, visual comprehension of sets, and the reading of Japanese hirakana (syllable) characters. These results mean that a Sesame Street type programme such as Open! Ponkiki seems to accelerate the development of visual operative abilities in preschool children.

The value of mothers and children watching the same programme was demonstrated by F. Harada [1975]. She had asked mothers of kindergarten children to watch at home the same programme their children watched at school. Various educational effects were brought to light by this practice of mothers and children first viewing the same programme separately and then talking about it with each other afterwards. Parents and children spent more time at home talking to each other, the children improved in their speaking ability, and the parents acquired a better understanding of their children's thinking and behaviour.

---

1. Rubbings are done by rubbing a piece of paper with a crayon to transfer decorative patterns of things placed upon the paper, for example, by putting a piece of paper on top of a coin and rubbing it with a red crayon, the decorative pattern of the coin can be transferred to the paper; matching halves is done by painting a design on either half of a piece of paper and then folding the paper in half and pressing the halves together. For example, if one paints an apple on the left half of a piece of paper and then folds the paper in half, pressing the halves together, two apples appear on the paper. If a child paints his father's hat on the left half of the paper and paints his father's hat on the right half, he can get two pictures of his father with his hat on his head, one on each side of the paper.
Discussion and conclusions. Evaluation studies on the impact of educational television in Japan have not only focused on the effectiveness of broadcast materials, but also, and more often, have dealt with how the teacher in the class attains maximum results through what sort of teaching. This emphasis is probably because Japanese educational television is concerned with enrichment rather than direct teaching. Japanese producers make programmes which anticipate instruction by the teacher in the classroom, including pre-school.

There exists an assumption in Japan that teacher's participation can be minimal because television relates itself directly to children, but this assumption has been disproved by research results. On the contrary, the above research seems to show that the effectiveness of television programmes improves with the use of instruction by teachers, rather than deteriorating. The research also shows broadcasters that since children's abilities to comprehend through television change considerably according to the different stages of their development, materials that are produced must take into account the age and developmental stage of the children for whom they are being prepared.

The main characteristics of evaluation studies on ETV in Japan can be summarized as follows. First, few evaluation studies for educational television have been conducted at the pre-school level. Second, in particular, there are even fewer evaluation studies on the impact of television upon the child's mental and social development. Third, although studies of television use in kindergarten are often conducted, they are seldom carried out within a scientific, experimental framework. Fourth, large-scale, systematic evaluation studies deal mainly with the viewing patterns of children and are normally based on interviews with parents rather than direct observations of children themselves. Finally, from a practical viewpoint, educators may not feel a need to measure television effects in order to promote ETV, since the rate of television use for education is already quite high.

Scientific and experimentally well-designed evaluation studies of ETV are seldom conducted on children of pre-school age. There are many reasons for the dearth of such research. Many educators believe children should not be taught by television but by teachers; in any case, children usually view ETV under the guidance of the classroom teacher. As a result of this link between ETV and the teacher, many educators are more interested in studies on the effective use of ETV rather than on its impact upon child development. Modes of television use, such as continuous versus selective use or presence versus absence of associated teaching activities, are seen as more important variables to be evaluated. Teachers are not willing to provide children as subjects for evaluation studies — in principle, they believe that education should not be disturbed by research activities. Since television viewing is a complex situation involving various kinds of audio-visual stimuli as well as complicated patterns of behaviour and attitudes, it is very difficult to control experimental conditions and identify effects. For this reason, most investigators are discouraged from undertaking major experimental evaluations. Finally, Japanese specialists usually do not regard television evaluation studies as a worthwhile form of academic research.
At the NHK Broadcasting Centre in Tokyo, during the 1975 session of the Japan Prize International Educational Programme Contest, the fifteen-member international jury headed by Wilbur Schramm selected the best from ninety-two educational television programmes submitted to the contest from the main countries of Europe, the Americas, Asia, Africa and Oceania. Números interos relativos (Relative whole numbers), a Brazilian programme produced for the Televisão Cultura in São Paulo, was one of the winners. Such acknowledgement was not surprising for people familiar with the development of educational television in Brazil that began many years ago. Some of the best commercial television producers and directors made excellent contributions to that development; some of the most respected content specialists were involved in it; and some well-known educators and psychologists were engaged in educational television planning, production, research and administration.

But there is also a dark side to the history of Brazilian educational television. Financial support has been meagre. Misunderstandings of the scope of educational television are beneath several attempts to stop its growth. Non-educational or non-cultural reasons are sometimes stronger than the arguments of educational and institutional television specialists and technicians. And the broadcast area attained by educational television stations is a very restricted one, limited to the metropolitan areas of São Paulo, Rio de Janeiro, and several state capitals plus a few densely populated cities in the hinterland. At the commercial television stations, the time allotted to educational programmes is limited due to the need for selling time to sponsors. But in spite of the troubles and obstacles placed here and there by fear of competition, lack of knowledge of the roles ETV can play in a huge country like Brazil, ill-will, or sheer ignorance, Brazilian educational television is making a significant contribution in a slow but sure way to the solving of the many educational and instructional problems that Brazil faces.

After an outline of the beginnings, development and present status of television broadcasting in Brazil, descriptive data and evidence gained from research will be presented with a focus on two main aspects of television influence: the intentional, systematic, planned effects of educational instructional television programmes (sometimes in combination with other media and teacher involvement in the classroom) designed to change students' behaviour, cognitions, attitudes and values; and the non-intentional and pervasive effects of commercial television in the lives of Brazilian children and adolescents.

TELEVISION IN BRAZIL: BEGINNINGS, GROWTH, PRESENT PATTERNS AND OUTLOOK

Professor Roquette Pinto, a pioneer in the development, research and utilization of educational cinema and radio in Brazil and one of the founders of the first Brazilian radio station in 1923, conducted preliminary experiments with television transmission in 1932, in Rio de Janeiro [Espinheira, 1934]. By 1939, during the Industrial Fair in Rio de Janeiro, German engineers were making experimental transmissions of closed-circuit television with Brazilian singers and speakers. But the real birth of television broadcasting in Brazil (and in South America) occurred in 1950 in São Paulo, when Channel 3, Televisão Tupi-Difusora, began its regular emissions, São Paulo had only 200 television sets at that time. Shortly after São Paulo's Channel 3, several other television stations began to operate in São Paulo, Rio de Janeiro and Belo Horizonte.

Television broadcasting in Brazil has been from its beginning an almost totally commercial enterprise, regulated by federal law. Three commercial networks were gradually organized during the fifties and the sixties — Typi-Associados, Globo and Independentes. The first two were linked from the beginning with organizations already active in the radio and press business. The third Brazilian network combined the efforts of stations that began as independent units, from whence came its name, Independentes.

Currently there is also a small number of autonomous commercial and educational television stations. Only eight educational, non-commercial stations are active in Brazil, located mainly in the larger cities. Almost all the funds for the educational stations come from the federal government which also provides technical and educational help, organizes professional meetings, and establishes the general policy of educational television and radio throughout the country. While there is no regular network operation in the Brazilian educational television system, some series and programmes produced in Rio de Janeiro and São Paulo are presented in other states by videotape or kinescope. Some of these programmes have also been presented by commercial television stations.

Special mention should be made of Projeto SACI. This satellite transmission project began in 1968 when the Comissão Nacional de Atividades Espaciais, CNAE, (National Commission for Space Activities), proposed to the United States National Aeronautics and Space Administration, NASA, a project called Satélite Avançado para Comunicações Interdisciplináres, SACI (Advanced Satellite for Interdisciplinary Communications), establishing a pilot zone in the State of Rio Grande do Norte that would receive television and radio signals from satellite. CNAE, now renamed INPE (Institute of Space Research), divided Project SACI into several phases, with the ultimate goal of establishing a nationwide educational system. Since 1972, SACI has conducted the Rio Grande do Norte experiment, with television and radio transmissions made to schools via VHF and medium-wave, using radio and television stations. Over 600 schools have participated in the experiment. Besides its own productions, INPE used programmes made by Channel 2, Educational Televisão Cultura, in São Paulo.
Almost 90 per cent of all television sets in Brazil are located in the south east (states of São Paulo, Rio de Janeiro, Minas Gerais, Espírito Santo) and south (states of Paraná, Santa Catarina, and Rio Grande do Sul). About 95 per cent of families in the city of São Paulo have television sets. Nearly 80 per cent of urban families in all Brazil have television in their homes. In 1977, some 12 million television sets were in use. Approximately 10.3 million were black and white and a little more than 1.7 million were in colour. The number of television sets in Brazil has doubled in the last five years—an unparalleled growth rate in comparison with other countries during the same years.

Brazilian television plays an important part in changing traditional views, social structures, and individual and social patterns of thought and behaviour. Despite the lack of deep analysis in academic literature of the relationship between Brazil's economic boom and its mass-communication system, it can be said with a fair degree of certainty that television broadcasting serves as a powerful medium for national integration, stimulating optimism, enthusiasm and involvement in the tasks of economic development, changing motivations, creating new expectations for personal and social life, developing ambition and instilling 'a strong need to achieve' in the sense mentioned by McClelland and Winter [1974].

All this does not mean that Brazilian broadcasting might not have its disfunctional or negative influences. It is quite true that some of the worst characteristics of mass-communication systems are plaguing Brazil—too much television violence, an excessive amount of low-quality soap operas, direct and covert pressures from commercial advertising, and too little emphasis upon education, culture and information while concentrating on entertainment and escapism.

TELEVISION BROADCASTING RESEARCH IN BRAZIL

The first Brazilian investigation on the effects of communication media upon children appeared in 1928. Carried out by an educator and psychologist, Lourenço Filho [1928], the study explored the effects of children's exposure to cinematographic films. Before the expansion of television, other theoretical and empirical studies appeared, almost all of them related to cinema [Laurito, 1962]. Mello [1968] made a bibliography of Brazilian research on mass media during the sixties. Pfommet Netto [1972, 1975a, 1975b, 1976] contributed extensive lists and reviews of studies made in Brazil in the last forty years, mainly from psychological and educational frames of reference. A general sociological view of mass communication was presented by Cohn [1973]. Some books and articles have been devoted to the history of mass media in Brazil [e.g. Lopes, 1970; Almeida, 1971]. Educational broadcasting in Brazil has been the subject of useful summaries, although somewhat out of date, like Oliveira [1971], Brezt and Shinar [1972] or Kraft [1973]. Reis [1972] summarized the development of educational television in Brazil, reproducing several basic documents. Books on educational television were also published by Campos [1970], Torres Neto [1971], Aguiar [1972], Coloda and Vian [1972] and Soifer [1974].

The best available sources on the current status of communication media in Brazil are the reports by SS&C&B-Lintas Brasil [e.g. SS&C&B-Lintas Brasil, 1974] for the use of advertising and marketing personnel. They present a vast amount of basic information on printed and broadcasting media and their consumers. Educational broadcasting studies, recommendations, policy and perspectives in Brazil appear in the papers presented at the annual Seminários Brasileiros de Teleeducação (Brazilian Seminars of Tele-education), sponsored by the Associação Brasileira de Teleeducação (ABT), with headquarters in Rio de Janeiro (Rua Campos do Pato, 60). Some of the main contributions are selected for publication in Tecnologia Educacional, the official organ of ABT.

EFFECTS OF TELEVISION ON BRAZILIAN CHILDREN AND ADOLESCENTS

Concerns with the effects of mass media have been traditionally rooted in the possibility of the deleterious consequences of children's exposure to debasing and questionable materials or to spectacles made for adults. Contemporary writers are worried about the mounting violence and objectionable patterns of behaviour and values in commercial television and cinema. On the positive side, the educational effects of television, radio programmes and motion pictures have been subjected to extensive research. As a result, there is a general agreement among specialists that television, movies and radio can teach equally well as (or better than) a good teacher in a live presentation.

An analysis of television effects must consider first the patterns of use and then the contents presented by the medium. Some representative findings will be mentioned.

Patterns of use. Broadcast ratings are used by Brazilian advertisers, as in other countries, in order to understand audience trends and to make decisions about advertising campaigns. Indications of audience size, characteristics, distribution, etc., come generally from specialized organizations like IBOPE, MARPLAN and AUDI-TV.

Age ranges included generally begin with 15-19 year-olds. Children less than 15 years of age are not frequently mentioned. However, one study by Prado (1973) includes audience data in the metropolitan area of Rio de Janeiro, showing that 34 per cent of the total audience from 6 to 12 p.m. is composed of children and adolescents less than 19 years of age. Of this number, 22.5 per cent are less than 13 years old and 11.7 per cent are 13 to 18 years old. The maximum audience of children is attained from 6 to 8 p.m. when 29.5 per cent of the audience of all ages are children of less than 15 years of age and 11.4 per cent are viewers between 13 and 18 years of age. The maximum audience of adolescents (13 to 18 years old) — 15.3 per cent of the total audience — is attained from 10 to 12 p.m.

Most viewers have little formal education. Prado found that 63 per cent of the total audience in greater Rio de Janeiro had no more than elementary school training, 29 per cent had some secondary level, and only 8 per cent had a college education. Data from IBOPE show that on a typical day in March 1977, only 21 to 25 per cent of television sets were turned off in the prime hours throughout Brazil (Siqueira, 1977). The predominance of a young population in Brazil and the greater prevalence of low socio-economic status viewers dramatize the importance of content and impact studies.

Among university students, television has been considered as one of the less important media of mass communication. Recent research with university students has explored media images using twenty semantic differential scales to study the connotative meanings of different mass media [Pfommet Netto, 1972]. Radio was viewed as the most 'real', 'ugly', 'coarse', 'agitated', 'partial' and 'dangerous' of the several media examined, and television was rated as the most 'disagreeable', 'bad', 'silly', 'confused', 'boring' and 'emotional' medium. Soiffer [1974] selected the nine most significant semantic differential scales of Pfommet Netto and used them with a sample of 146 heads of middle-class families who had completed primary education in the urban area of Rio de Janeiro. In a comparison of radio, television, newspaper and school, radio was judged as the least dangerous, easiest and emotional, while television was seen mainly as up-to-date, partial and emotional.

In an unpublished study by Angellini in 1965, 208 mothers estimated the hours per week spent by their children in leisure activities. As indicated in Table 7, the average weekly hours for television viewing by children 7-18 years old was 29 per cent, 12 per cent for newspapers and 11 per cent for magazines. Of this total, 10 per cent was spent in the prime hours throughout Brazil (Siqueira, 1977). The predominance of a young population in Brazil and the greater prevalence of low socio-economic status viewers dramatize the importance of content and impact studies.
The daily programme diet of Brazilian children and adolescents consists largely of dramatic programmes, with comedies, studio shows and sports in second rank. Among the most common from the United States are SWAT, Baretta, Kojak, Hawaii 5-0, Cannon, The Waltons, Disneyland, Streets of San Francisco, Charlie's Angels, The Father and the Father's Gang, Starsky and Hutch and Bonanza. As the names suggest, many programmes are characterized by violence, criminal actions and fighting with detectives and policemen. Violence is also a common component of imported cartoons.

Television violence and emphasis upon morally objectionable characters, values, attitudes and behaviour are now under criticism by newspapermen, scientists and government representatives such as the Minister of Telecommunications. On one night in March 1977, between 9 and 12 p.m., there were 64 murders, 38 shootings, 7 types of sexual violence, 22 fights with physical violence, 5 robberies, 16 intimidations, and 7 extortions on the seven channels of São Paulo [O Estado de São Paulo, 1977a]. Nearly 90 per cent of the violence displayed on television comes from the United States [O Estado de São Paulo, 1977b].

Television effects on children. In spite of public criticism of television content, Brazilian studies of effects are very few. Almost no attention has been given by psychologists to the potentially more dangerous exposure of children to violence and objectionable behaviour and attitudes. Also lacking are studies of immediate and long-lasting effects of exposure to television, including children's commercials. Appeals directed to children are widely used in Brazil by advertising agencies in their commercial messages. Advertising messages also related smoking and drinking to success, the good life, beautiful places and adventure. No research has been conducted to determine if such exposures are 'seducing the innocents', thereby creating more smokers and drinkers than in the past. A commission of scientists and media specialists has been appointed by the Ministry of Communication (July 1977) to study television influences on Brazilian children and society in general.

Scanty evidence collected by some researchers suggests that the introduction of a television set into the home may have reduced the time used by elementary schoolchildren for study, play, reading books and radio listening. In one study of high school students [Pfromm Netto, 1976], girls claimed a reduction of time (in decreasing order of importance) given to motion picture viewing in theatres, newspaper reading, radio listening, magazine reading, book reading, and going for walks. In the case of boys, a different rank order appeared: radio listening, book reading, newspaper reading, movies at a theatre, magazine reading and walks. Asked about the medium that will be most missed if it disappears, almost all teenagers indicated television. Similar results were obtained in a study of teenagers in Londrina, State of Paraná [Coutinho, 1972].

Table 7

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 - 8</td>
<td>10.5</td>
<td>8.2</td>
</tr>
<tr>
<td>9-10</td>
<td>9.8</td>
<td>12.9</td>
</tr>
<tr>
<td>11-12</td>
<td>11.5</td>
<td>14.2</td>
</tr>
<tr>
<td>13-14</td>
<td>9.3</td>
<td>11.2</td>
</tr>
<tr>
<td>15-18</td>
<td>7.9</td>
<td>13.0</td>
</tr>
<tr>
<td>Average</td>
<td>9.8</td>
<td>11.9</td>
</tr>
</tbody>
</table>

These findings concerning viewing habits and preferences of children in Brazil are similar to results obtained for other industrialized countries. When given the opportunity, children devote as much time per week to watching television as to learning activities at school. The role of television in the lives of 755 junior high school children was studied by Coutinho [1972] in Londrina, State of Paraná. Almost all were regular viewers of television. They attributed great importance to television, which was habitual consumers of television, wanted to learn from television, and seemed to satisfy their fantasy needs as much as their reality needs through television. As noted in other studies, Coutinho found more television viewing by students from lower socioeconomic backgrounds. While the average student spent a little more than three hours daily with television, in some cases, five to nine hours daily were spent watching at television. Soap operas were the most popular, a finding confirmed by Castro et al. [1973] for elementary schoolchildren in Rio de Janeiro.

These findings concerning viewing habits and preferences of children in Brazil are similar to results obtained for other industrialized countries. When given the opportunity, children devote as much time per week to watching television as to learning activities at school. The role of television in the lives of 755 junior high school children was studied by Coutinho [1972] in Londrina, State of Paraná. Almost all were regular viewers of television. They attributed great importance to television, which was habitual consumers of television, wanted to learn from television, and seemed to satisfy their fantasy needs as much as their reality needs through television. As noted in other studies, Coutinho found more television viewing by students from lower socioeconomic backgrounds. While the average student spent a little more than three hours daily with television, in some cases, five to nine hours daily were spent watching at television. Soap operas were the most popular, a finding confirmed by Castro et al. [1973] for elementary schoolchildren in Rio de Janeiro.

The daily programme diet of Brazilian children and adolescents consists largely of dramatic programmes, with comedies, studio shows and sports in second rank. Among the most common from the United States are SWAT, Baretta, Kojak, Hawaii 5-0, Cannon, The Waltons, Disneyland, Streets of San Francisco, Charlie's Angels, The Father and the Father's Gang, Starsky and Hutch and Bonanza. As the names suggest, many programmes are characterized by violence, criminal actions and fighting with detectives and policemen. Violence is also a common component of imported cartoons.

Television violence and emphasis upon morally objectionable characters, values, attitudes and behaviour are now under criticism by newspapermen, scientists and government representatives such as the Minister of Telecommunications. On one night in March 1977, between 9 and 12 p.m., there were 64 murders, 38 shootings, 7 types of sexual violence, 22 fights with physical violence, 5 robberies, 16 intimidations, and 7 extortions on the seven channels of São Paulo [O Estado de São Paulo, 1977a]. Nearly 90 per cent of the violence displayed on television comes from the United States [O Estado de São Paulo, 1977b].

Television effects on children. In spite of public criticism of television content, Brazilian studies of effects are very few. Almost no attention has been given by psychologists to the potentially more dangerous exposure of children to violence and objectionable behaviour and attitudes. Also lacking are studies of immediate and long-lasting effects of exposure to television, including children's commercials. Appeals directed to children are widely used in Brazil by advertising agencies in their commercial messages. Advertising messages also related smoking and drinking to success, the good life, beautiful places and adventure. No research has been conducted to determine if such exposures are 'seducing the innocents', thereby creating more smokers and drinkers than in the past. A commission of scientists and media specialists has been appointed by the Ministry of Communication (July 1977) to study television influences on Brazilian children and society in general.

Scanty evidence collected by some researchers suggests that the introduction of a television set into the home may have reduced the time used by elementary schoolchildren for study, play, reading books and radio listening. In one study of high school students [Pfromm Netto, 1976], girls claimed a reduction of time (in decreasing order of importance) given to motion picture viewing in theatres, newspaper reading, radio listening, magazine reading, book reading, and going for walks. In the case of boys, a different rank order appeared: radio listening, book reading, newspaper reading, movies at a theatre, magazine reading and walks. Asked about the medium that will be most missed if it disappears, almost all teenagers indicated television. Similar results were obtained in a study of teenagers in Londrina, State of Paraná [Coutinho, 1972].

Table 7

<table>
<thead>
<tr>
<th>Type of Programme</th>
<th>Percentage of Broadcast Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign movies and series</td>
<td>32.7</td>
</tr>
<tr>
<td>Sports</td>
<td>10.6</td>
</tr>
<tr>
<td>Soap operas</td>
<td>9.9</td>
</tr>
<tr>
<td>Advertising</td>
<td>8.6</td>
</tr>
<tr>
<td>Children's programmes</td>
<td>5.7</td>
</tr>
<tr>
<td>News</td>
<td>4.9</td>
</tr>
<tr>
<td>Women's programmes</td>
<td>3.5</td>
</tr>
<tr>
<td>Adult education</td>
<td>3.2</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>13.2</td>
</tr>
</tbody>
</table>

In 1965, fifteen years after the beginnings of regular broadcasting in the country, fifty VHF channels and seventy-five UHF channels in the capitals of states and territories were reserved by the Federal Government for educational, non-commercial, television broadcasting. Two years later, the number of VHF channels reserved for education was increased to 143 [Reis, 1972]. Only eight educational television stations are currently in regular operation, but there are plans for the operation of four or five more. Only two are wide in scope and have a significant amount of production and broadcasting hours — Fundação Padre Anchieta in São Paulo and Fundação Centro Brasileiro de Televisão Educative in Rio de Janeiro.
The Fundação Padre Ancheta operates Televisão Cultura which is relayed to various parts of the State of São Paulo. Televisão Cultura covers three-fourths of the state. Supported by State funds, Fundação Padre Ancheta supplies educational/instructional series to several ETV and commercial stations outside the State in the form of tapes and kinescopes. Fundação Centro Brasileiro de Televisão Educativa is a federal centre of educational television, established in 1967. It represents the interests of the Ministry of Education and Culture in the television broadcasting field and also supplies other ETV or commercial stations with educational and cultural programmes. From 1967 to 1975, it worked exclusively as a production centre. By 1976 it began the regular operation of its own broadcasting station in Rio de Janeiro, João da Silva, a soap opera (or romantic serial tele-drama) with educational content, represents its main contribution, and will be considered later.

In the north and north-east of Brazil several attempts were made by educational television stations to provide less ambitious contributions as adjuncts to the formal system of education. Projects such as these are in operation in the states and Amazonas. The Television University in the State of Rio Grande do Norte is also active and using mainly programmes made in São Paulo and Rio de Janeiro. Two other educational television stations are located in the states of Pernambuco and Rio Grande do Sul. Facilities, financial support and production quality differ greatly from one ETV station to another.

Nobody would deny how vigorous and dedicated have been the efforts of Brazilian ETV. But if we consider its small audience coverage, its limited resources, its limited influence, and its very modest growth in the last ten years, ETV seems like a pygmy in comparison with the gigantic commercial networks. Located in state capitals with only limited coverage and broadcasting more or less only three or four hours per day, ETV is misunderstood and confronted by the competition for great audiences so characteristic of commercial television.

At the same time, there is hardly anything that could contribute to the educational and cultural needs of the country with the same speed and with the same instant coverage of millions of people as television. In a special report prepared by one of the authors [Pfromm Netto, 1975d] as guidelines for the state of São Paulo Educational Television Policy, several points related to these matters were emphasized and can be summarized here.

1. The achievement of national goals is closely linked to an improved educational, cultural and intellectual level for the people of Brazil. ETV, in particular, can contribute to this goal in the primary stages of education.

2. It is impossible to obtain rapidly more and better educational or intellectual and cultural development when restricted to the conventional media. Throughout four centuries, Brazil maintained a pattern of highly elitist education. Only several decades ago, Brazil was one of the most backward countries of the world. The time has come for the most intensive and extensive use of non-conventional media of instruction such as television.

3. Brazil's future will depend more and more on general public understanding of science and technology, as well as the specific skills involved. A national campaign against scientific and technological 'illiteracy' must be developed.

4. Commercial television broadcasting as a rule puts its major emphasis on the formula of 'giving the public what it wants', being directly dependent upon its very large audiences and its programme sponsors. The contributions of commercial television for the cultural and educational enlightenment of the public is very limited. Nevertheless, few stations must be made by educators, scientists, responsible citizens and community leaders to change for the better the 'hidden curriculum' that commercial television is offering the general public.

5. Children learn how to learn from television. But in almost all Brazilian homes, there is only one television set and it is generally controlled by adults who mainly want entertainment from soap operas, movies, or sports. During the period from 6 to 12 p.m., most children are not permitted to change the channel for viewing educational programmes. The children's behaviour, attitudes, and values are modelled by the examples of significant adults surrounding them. If these adults simply use television for escapism and entertainment, refusing to consider the world of knowledge and learning, it is most improbable that their children will develop a view of television as contributing to one's self development. For this reason, in developing countries like Brazil, non-commercial, public, educational television is of critical importance, whether used in the classroom (less than 1 per cent of Brazilian classrooms are now provided with television sets) or broadcast in the home.

Present patterns of planning, production, utilization and evaluation of educational television programmes in Brazil are varied, ranging from primitive components (a teacher and a blackboard in front of one television camera) to very sophisticated ones where other instructional components (printed materials, examinations, workshops) are co-ordinated with television.

Examples of ETV for children. Two cases have been selected to illustrate some of the most representative efforts in the areas of pre-school and elementary education. Space does not permit a discussion of secondary school, state examinations, or elementary adult education.

Case 1: Pre-school education, Vila Sésamo. The first attempt to contribute through the medium of television to the education of very young children resulted from a co-operative project involving Televisão Cultura, Televisão Globo (a major commercial television network), and Children's Television Workshop (CTW) in the United States. Following the pattern adopted by CTW in the production of the original Sesame Street [Palmer, 1972], Vila Sésamo, a Portuguese language version, was developed for Brazil. Only part of the original Sesame Street series was retained (mainly some cartoons, Ernie and Bernie, and excerpts of animals in zoos). Close relationships were established between research and production staffs. Brazilian children were given many tests of attention, understanding, active participation, behaviour modification, appeals, language, most preferred character, etc., in the formative evaluation studies during development. New Brazilian characters were created and several American characters were given up. All the live characters were planned from Brazilian reality and the place created for them was a typical and modest village (Vila Sésamo), a kind of synthesis of all Brazilian villages, a little community in which ordinary people are living — the repairman and his wife, the grocer, the elementary school teacher, plus a Brazilian version of 'Big Bird' and other characters.

A pilot programme was produced and submitted to a council of educators and psychologists before the start of the series' production. Data from research on Brazilian children's reactions, critical analyses, opinions and suggestions were employed. Decisions were made about key words, use of several resources, definition of target population, main characteristics of the series, and materials to be borrowed from the American Sesame Street.

Formative research conducted by a team of psychologists and educators was discussed with the producers throughout production. Observation of children's behaviour, questionnaires, and interviews were the main methods used in formative research. As a general rule, the research dealt with 100-120 children 5 years of age who saw the sample programmes in groups of five or six.

Items considered included: attention and understanding, increase in valuation of people, verbalization, aggression, humour, active participation, telling stories, conflicts between characters, and crying.
As in the original Sesame Street series, formative research efforts can be summarized under three headings: establishment of the instructional goals; testing for the determinants of appeal, attention and understanding; and testing for achievement.

A curious shortcoming affected the utilization of Vila Sésamo in Brazil. As it is widely known, the original Sesame Street was made with a special emphasis on serving the urban disadvantaged. But in Brazil, it was unfortunately impossible to obtain the close cooperation of external sources (private or government agencies) for systematic use of the series with children in deprived areas. The series has been seen mainly by children of middle and high socio-economic status. Some critics noted that Vila Sésamo gave help to children who had no need of help. Such criticism led to a summative research effort with deprived children in Brasilia, a field study named 'Projeto Garibaldo' in which 2,600 children, 5 to 6 years of age, were exposed to a new version of Vila Sésamo. The results of this evaluation have not yet been publicized, although the basic plan has been described elsewhere [Aguiar, 1974, 1975].

Case 2: Elementary schoolchildren, Telescola. At Fundação Padre Anchieta in São Paulo, the most ambitious and well-supported project in Brazil for helping elementary schoolchildren by television was developed. Telescola began in 1972 when, under the direction of one of the authors [Pfromm Netto], some of the main public school weaknesses in the state of São Paulo (school failure, school drop-out, poor teaching, and learning resources and materials in the vast majority of the elementary schools) were analysed and discussed in the Division of Education of Fundação Padre Anchieta, Televisão Cultura, with the help of elementary school specialists. A list of curriculum objectives was defined with top priorities given to the areas of mathematics and general science. Mathematics was singled out as the key subject responsible for school failures. General science was admittedly in a very poor state of affairs due to a lack of equipment and materials, as well as the fact that teaching was mainly by lectures.

Content specialists, supervisors and auxiliary personnel concentrated upon mathematics and science for the fifth grade. Fifty-six public schools were accepted as initial participants. Direct supervision was furnished by Fundação Padre Anchieta and pupils were given daily tests, before and after viewing each television programme. Nearly 8,000 elementary school pupils and 300 teachers participated in Telescola in 1975. Each classroom received a television set from Fundação Padre Anchieta. Eight well-integrated groups of specialists constituted the teams: mathematics consultants, science consultants, writers, educational guidance counsellors, project managers, mathematics producers, science producers and school supervisors.

Telescola produced and presented 180 programmes (90 of mathematics and 90 of science) from 1973 to 1975. Formative evaluation was constantly employed to provide feedback for the teams involved in the planning and production of the series. Large amounts of printed materials (teacher guides for each programme, printed forms for testing, supplementary materials, etc.) were also made and distributed weekly to the participating schools.

An important innovation was the use of daily pre-test and post-test measures, with feedback to the students of correct responses by the television medium immediately before and after each programme. Pre-tests provided cues for significant points to look for in the programme. Comparisons made by students of their own responses in pre- and post-tests with the correct responses served as reinforcement for the immediate knowledge of results. Comparative pre-/post-test results substantiated in general the good quality of television teaching and the advantages of its combination with classroom activities under the teacher supervision. In the first series of thirty mathematics programmes, eighty-four objectives (terminal behaviours) were subjected to the pre-/post-test pattern of evaluation. Only four objectives produced unsatisfactory gains. The same results occurred with the science objectives.

The procedures adopted for writing Telescola programme scripts deserve special mention. Writers, producers and educators were given principles of instructional technology on how to specify terminal behaviours and how to develop test items for each programme. A series of six steps was employed by one of the authors [Pfromm Netto] in the production of television programmes and printed materials: behavioural specification of goals; behavioural specification of audience characteristics and entry-behaviour; analysis of each behavioural objective to determine the structure of knowledge and skills, generalizations, discriminations, and chains to be learned, examples, and counter-examples; writing of teaching/learning sequences; production; and evaluation. Special types of graphic presentation were developed for each step.

As a general rule, summative evaluation studies made at the end of each school year in 1973 and 1974 showed better results by children from Telescola classrooms in comparison with children from conventional classes. The summative criterion for evaluation was pass/fail in final examinations. Such results confirmed what pre-/post-test comparisons previously demonstrated: television can be a very effective medium for teaching elementary schoolchildren the complex cognitive facts and skills in mathematics and general science. It is important to note that many elementary schools participating in the study lived in deprived areas. Children from disadvantaged homes were the most suitable ones for television instruction because their classrooms usually lacked instructional materials and had poor facilities and ill-prepared teachers [Pfromm Netto, 1975c].

An interesting feature of Telescola was the programme style. Several prototype units with different styles were subjected to preliminary scrutiny and empirical field evaluation. The most effective was a combination of a simple story with wide use of visual resources directly linked to the behavioural objectives. More sophisticated (and more expensive) styles did not make a positive contribution to the test results. In fact, contrary to what was expected, expensive showmanship (e.g. a lesson made in the format of a beautiful circus show with many actors and resources, for mathematics teaching), although entertaining, produced less learning than a plain, more direct, less ambitious script played by three or four characters. The poorest programme style, a teacher lecturing to the camera, was also very unsatisfactory. Our results and observations suggest that too much 'artistry' works as distracting stimuli for learning, while traditional television lectures are very ineffective as attention-getting devices for Brazilian elementary schoolchildren. The best programmes fall between these extremes.

**GENERAL CONCLUSIONS**

In its twenty-seven years of development, Brazilian television has shown an amazing growth of sets in use, almost all of them manufactured in Brazil during the last ten years. Television broadcasting has also developed swiftly and is dominated by two big corporations, Globo and Associadas, with a group of independent stations loosely affiliated in second rank. Eight ETV stations maintained by federal and state funds are the most fragile sub-system of Brazilian television. A large part of the success of the television business comes from its power as an advertising medium. To be successful in broadcasting and marketing means to offer something that will be accepted and understood by the maximum number of people. Here resides paradoxically the greatest power and the greatest danger of television in a developing country like Brazil. Contributions to community well-being, to the educational needs of the country, to the preservation of society's and the family's most important values and mores are receiving
only minor attention from the commercial television organizations. One hour several times a week of entertainment or educational programmes designed for children is not enough. Such infrequent broadcasting contrasts very vividly with the many hours per week of violence, poor taste, objectionable patterns of behaviour, cynicism, hypocrisy, and human conflicts generally shown as verbal or physical aggression, together with the most persuasive advertising appeals to buy anything — good or bad, useful or useless, important or rubbish.

Some recent signs of greater concern in Brazil for correcting these distortions are evident in spite of the difficulties noted. Much of this greater public awareness must be credited to the efforts of several educational television stations, as illustrated in the two cases that were presented. But there is also a deeper desire to improve television on the part of certain government agencies, especially the Ministries of Education and Culture and Communication. Even some people linked to commercial television are demonstrating a better understanding of social responsibility and acting accordingly. Given these new trends in seeking better television programmes for children, there is reason to hope that the potential power of television for the education and development of young children will at last be realized within the next decade. Scientific evaluation based on sound experimental and empirical data will be an essential part of any such enterprise if it is to prove successful.
The Satellite Instructional Television Experiment, popularly known as SITE, took place in India between 1 August 1975 and 31 July 1976. This bold experiment was based on a memorandum of understanding between India and the United States in which a NASA satellite (Applied Technology Satellite-F) was loaned to India for a period of one year. The NASA satellite made it possible to provide television to remote villages by relatively simple antennae designed to pick up the single transmitting channel from the overhead satellite. Responsibility for the design and execution of the experiment rested with India, including the entire ground segment and hardware, as well as the development of programmes for television and evaluation of the experiment. Planning for Project SITE is presented in more detail elsewhere [Chander and Karnik, 1976].

Project SITE offered a huge challenge to an immense variety of people who carried out the experiment with a personal involvement and commitment rarely seen. A great variety of disciplines and training of new workers was involved — anthropologists, sociologists, psychologists, educators, television producers, writers and actors, as well as scientists, technicians and engineers. Project managers, operations researchers and support staff of all kinds were also employed. The individuals involved were required to set aside their particular biases in the team efforts that were mounted. Social scientists started using unfamiliar PERT work flow charts and associated vocabulary. Scientists and engineers started talking about audience profiles, attention, learning and holistic studies. The location and organization of Project SITE are outlined in Figure 6.

The one-year experiment was designed to expose people of far-flung, rural areas, particularly those poorly served by other means of communication, to educational television programmes without the technology of ground-based television relay stations. Satellite television provided rural communication, an innovation that, for the first time, did not discriminate against people who live far away from urban areas. The satellite system was designed to address the needs of isolated villages throughout India. Public television services would be delivered to rural areas before many urban ones, thus reversing the usual flow of technology and services.

Objectives of Project SITE. The general objectives of SITE were as follows.

To gain experience in the development, testing and management of a satellite-based instructional television system, particularly in rural areas, and to determine optimal parameters for the system.

To demonstrate the potential value of satellite technology in the rapid development of effective mass communications in a developing country.

To demonstrate the potential value of satellite-broadcast television in the practical instruction of village inhabitants.

To stimulate national development in India, with important managerial, economic, technological, and social implications.

Specific instructional and developmental objectives were in the areas of family planning, agriculture, national integration, children’s education, teacher training, occupational skills, health and hygiene. For the present discussion, children’s educational programmes and their evaluation are of special interest.

Essential features of SITE. These are discussed below under six headings.

Hardware technology. Ahmedabad, the headquarters of the experiment, had the main earth station from where the programmes were originated. A second earth station was built in Delhi especially for the project. The earth station at Ahmedabad was linked by microwave to a television transmitter set in Pij, about fifty kilometers away. The Delhi earth station was linked to the operating television studio and transmitter of All India Radio (now called Doordarshan), the main producer and broadcaster in India. Signals originating in Ahmedabad and Delhi were transmitted to the satellite by the earth stations which, in turn, amplified them and transmitted them back to the parabolic antennae and converters in each village so that standard, battery-operated television sets could receive them. One video and two audio channels were provided in this manner.

Participating villages. Direct reception was provided for 2,400 villages in six states — Rajasthan, Bihar, Orissa, Madhya Pradesh, Karnataka and Andhra Pradesh. These villages were isolated, backward and deprived of the basic educational and social benefits taken for granted by more fortunate communities. About 400 of these villages had television sets placed in a public building where hundreds of individuals could watch the programmes at one time. In many cases, the entire community would fill the village square and surrounding trees, staring at the strange device placed in the window of the community centre with the screen turned outward.

Educational backwardness of the area, availability of nearby electricity, and accessibility during most of the year were key considerations in the final selection. The majority of the villages were visited by teams of technicians and social scientists prior to selection. The technicians were particularly concerned with the precise locations of the community antenna; the social scientists focused upon an assessment of local needs, paying special attention to the demographic and socio-cultural characteristics of the villages. After selecting the villages, it was discovered that more than 80 per cent of them did not have electricity in the building in which the set was to be installed. To take care of this programme, a special project was undertaken that involved working with the state governments and persuading them to find quickly money, people, and resources to undertake the urgent task of electrifying as many as possible of the 2,000 villages.
Figure 6: Location and organization of Project SITE activities
About 150 villages had battery-operated television sets since these villages were in the deep interior and no electricity was available nearby. Although they did not have electricity, nevertheless they were included in the experiment because of their great need for education. A special system was set up to charge these batteries once a week. Twenty-four maintenance centres were established, four in each regional cluster, each with a vehicle and all the staff needed for both hardware and software activities.

Management. Partnership in SITE was many-faceted. The largest partner was All India Radio, the producer and distributor of programmes. The American space agency, NASA, worked closely with the Indian Space Research Organization. A number of other central ministries and agencies also had to be involved in order to conduct the experiment. The Ministry of Education, especially its Department of Educational Technology, played a very important role in SITE.

The excitement and spirit of adventure in Project SITE extended even to civil servants within the ministries — individuals who would normally just participate in ceremonies. Full-time, dedicated people designated at central and state levels diligently carried out their responsibilities in a harmonious fashion. The concept of a programme manager, with different divisions responsible for different tasks, was introduced in India for the first time in SITE, and it worked very well. Each division had its own funds and complete responsibility for specific tasks. The programme manager often had only indirect authority over individuals; relationships were often horizontal or diagonal rather than vertical. Many experts were involved from different disciplines and a traditional hierarchical authority would have created serious problems.

Television programmes. The instructional objectives of SITE were aimed at better family planning practices, improved agricultural practices, national integration, better children’s education, and improved health by nutritious food and clean habits. SITE was also designed to increase the number and quality of trained teachers in the village schools and to improve the occupational skills of children and adults. SITE transmission was divided between morning and evening broadcasts, involving over 1,200 hours of programmes in order to achieve all these objectives within one year. This large production order was more than the annual feature film production in India, which produces the largest number of feature films of any country in the world.

Programme logistics. Programmes were broadcast for four hours every day — 60 minutes in the evening and 90 minutes in the morning. These morning programmes were exclusively for classes of children, 5 to 12 years old. Although the topics for these programmes sound as if they were curriculum-based, they were not at all meant to be syllabus-oriented. Rather, they were intended to provide a broader perspective and ‘enrichment’ of school lessons.

Educational programmes for adults were broadcast for 150 minutes each evening and covered areas of family planning, agriculture, health and hygiene. Programmes were transmitted in four different languages — Hindi, Oriya, Telugu, and Kannada. Hindi was common to three states — Rajasthan, Madhya Pradesh, and Bihar. Therefore each cluster of villages of a specific language within a state received thirty minutes of programming in the native language plus thirty minutes of ‘News and Current Affairs’ in Hindi, the national language. This means each cluster got one hour of evening programmes. Similarly, each language cluster received twenty-two minutes of programmes for children in the morning. A summary of this plan is presented in Table 9. Other special programmes added to this core make up the total of four hours each day.

Programme philosophy and production. The main principle behind all programming was that the programme should be user-based and ought to address the needs and problems of the villages. Five production studios were set up in the cluster areas to facilitate the production of meaningful regional programmes. Delhi was responsible for producing Hindi programmes for Rajasthan, Madhya Pradesh, and Bihar plus the national hour in Hindi which was common to all the clusters. Cuttack developed programmes in Oriya; Hyderabad in Telugu, and Kannada. Ahmedabad also had a studio which served primarily Kheda, a district in central Gujarat formerly known as Kaira. The fifth studio in Bombay specialized in children’s science education programmes that were originally produced in Hindi and later dubbed into all the other languages of SITE.

All India Radio was responsible for producing all the programmes except the science education programmes for children and programmes for the district of Kheda. The Indian Space Research Organization (ISRO) assumed responsibility for producing the programmes for Kheda as well as the science education programmes for the entire country. One-third of the children’s programmes dealt with elementary science and its applications. The programmes for Kheda were produced in the Space Applications Centre Studio at Ahmedabad, while the science education programmes for children were produced at the Space Applications Centre Studio in Bombay. The Space Applications Centre, a branch of ISRO, was responsible for all of the hardware, maintenance of television sets, and utilization of television programmes.

Production of programmes took place in the field as well as in studios. Special attention in selection of equipment was given to: very low capital and the operating costs; good signal quality (although it need not necessarily conform to high quality standards, internationally speaking); suitability for recording programmes in the field, i.e. in the villages where electricity and good roads were often missing.

For most of the producers, Project SITE was their first job, requiring special training and orientation in advance of production. The whole approach was very different from the one used in producing programmes for sophisticated urban audiences in India.

Evaluation. Responsibility for evaluation of the total experiment was assigned to ISRO. The novelty of producing programmes for unfamiliar, isolated villages called for initial survey studies and the preparation of audience profiles for each regional cluster prior to any production. The most basic question, For whom are producers creating programmes? had to be answered. What are the special characteristics, problems, and needs of the villagers constituting the audience? Extensive information was gathered on patterns of agriculture and animal husbandry as well as village life. Needs assessment was done systematically in each area pertinent to the SITE objectives. These studies revealed that the villagers were genuinely
interested in simple, do-it-yourself guidance which would lead to practical solutions of everyday problems.

Besides preparing audience profiles and assessing local needs in each region, ISRO exhibited a few pilot programmes very early in the experiment to get early feedback on which kinds of programming strategies would be most effective and what kinds of visuals would be best understood by the villagers. This exercise provided valuable guidelines for producers. Of course, simply having the findings and guidelines from this initial feedback was insufficient to ensure that they would be properly used by all concerned. The feedback had to be timely and stated in the language of the producers rather than in the language of the social scientist. Both researchers and producers had to co-exist in a meaningful way. A mechanism had to be worked out ensuring the effective use of the evaluator's input.

A system of regular feedback was set up whereby audience reaction to programmes was surveyed, analysed and immediately relayed to production teams so that they could make midcourse corrections, change programmes, or adopt completely new programme strategies. A total of 112 villages from SITE clusters served as early feedback stations. Formative evaluation data were collected daily from twenty-seven villages and sent to SITE headquarters in Ahmedabad where they were analysed immediately. Summaries and recommendations were then sent from Ahmedabad to the different base production units. This feedback dealt routinely with such variables as audience size, composition, seating arrangements, regularity of viewing, and popularity and understanding of programmes. Periodic meetings of evaluators and producers were held to analyse and discuss the findings of the feedback.

Several strong trends emerged from the early feedback studies. (1) Audience size depended upon the different operations in the village. In the beginning, a large number of people came to watch television because it was something new. Then the number levelled off to about forty except on special occasions when the crowd would swell to 100, 200, or even 500 viewers. (2) The news hour appealed much less to viewers than anticipated, especially in villages where Hindi was a second language. (3) The seating arrangements gradually changed until high and low caste villagers, both men and women, intermingled completely for the first time as television viewers. (4) The most consistent and faithful visitors and viewers of television were children in every cluster of villages. (5) Programmes with useful, straightforward, unadulterated messages on agriculture, farming, and animal husbandry were welcomed most by people who had nothing practical to offer. (6) Children learned and remembered more than adults.

In addition to researchers analysing audience feedback as part of the formative evaluation, other social scientists, both within SITE as well as outside, were conducting studies on different aspects of the experiment. Both large and small surveys were carried out to measure the impact of SITE on different target audiences. In-depth case studies were made to gain insight into social changes that took place, as well as the process of change itself. Small studies were undertaken dealing with content analysis of selected television programmes, the effect of teacher training on teaching, and the impact of science programmes on children. Interesting social issues concerning the general impact of television have also been addressed. Has television closed or widened the gap between rural villages and city dwellers? In short, the plan for evaluation was conceived as both inter- and multidisciplinary in nature, involving large numbers of social scientists from such fields as psychology, anthropology, sociology, communication research and education.

All of these independent studies focused upon television, the medium as well as its content, as a new social phenomenon. In this case, evaluation studies were designed to be of a summative nature. However, the results from these studies will be part of the formative input for new programmes in the future after completion of the one-year experiment.

Programme research activities just prior to the experiment dealt with audience profiles, needs assessment surveys, and surveys on the state of the art in agricultural practices, animal husbandry, etc. In addition to these preliminary studies, the pre-testing of prototype programmes comprised an important research activity. The first exercise in formative evaluation was carried out for the production of children's science education programmes in the Bombay SITE studio. The main purpose of this formative research was to seek answers to the following questions: What language would be understood by the village children? What kind of visuals will be understood and will hold attention? What format would be interesting and aid in the child's comprehension of new ideas? How much content should be put into a programme of ten to eleven minutes duration? How should the content be placed sequentially within the programme? What features enhance the credibility of the presenter? What kind of presenter would be most effective? What kind of presentation would be most effective? What kind of character and settings would have the most credibility for rural children?

No controlled experiments were designed to answer these questions. Quick feedback was generally required for the producers. Some studies were designed in advance, e.g. an investigation to answer the first question on language. A script with more than one draft was taken to the target area where it was evaluated. Programmes taped in the SITE studio were tested with village children to determine the language level that could be understood by the majority of the children.

In terms of content, several programmes of ten minutes duration would be taken to the target villages. Trial groups of children would view different versions and then be asked questions of comprehension and recall. From these results, a decision would be made about how much content of what difficulty level should go into a programme of ten minutes duration.

To seek an answer to the question concerning the most effective kind of presenter, different pilot programmes of approximately the same subject matter and format were shown to children. From subsequent interviews with these children, it was determined which kind of presenter would be most likely to result in better comprehension and liking of the programme. In a similar manner, quick, effective solutions were sought for the other questions by repeated in-depth studies employing groups of children as subjects. A considerable amount of effort went into programmes on an ongoing daily basis. At the SITE studio in Bombay, a full-time research specialist carried out formative evaluations, working with six or more producers in developing the science education programmes. Formative research activity dealt with the total programme, from its inception to its final production and broadcast. The findings from the formative research listed below are typical. (1) The science education programmes were most appropriate for children above 7 years of age; few if any elements were suitable for rural children below 7. (2) Programmes which appealed to Madhya Pradesh children also appealed to rural Dahisar near Bombay and Orissa children. In other words, all rural children like similar programmes. (3) A combination of interesting format with an element of familiarity seemed to work best for all rural children, regardless of region. (4) All children responded in basically the same way to the characters or the presenter in the programme. A lively presenter with a lot of empathy for children was preferred, whether young or old, male or female. (5) All children generally preferred a 'live' image of the presenter on the screen, rather than only the voice of a narrator, other things being equal. (6) An imageless voice with high credibility was preferable to image and voice when the presenter had low credibility or was lacking in warmth and feeling for the children. (7) All children loved the music.
of SITE was the formation of teams that included behavioural scientists to produce programmes. Inclusion of social scientists on such teams was a new idea in India. This new team concept is best stated in the words of Mr Kiran Karnik, manager of the Production Cell.

‘After much debate it is now accepted that the person who calls the shots [producer] is the general and therefore he is the one who calls the tea breaks! But the general is in charge only on the battle field when the production is on. At other times he is part of the now famous social researcher-science educationist-producer team [for science programmes]. In the early days of SITE, putting these persons together was the formula for an explosion. In fact, empirical evidence showed that adding a social researcher to a producer was itself sufficient; putting the two egos together was to go beyond the critical mass. How these early problems were overcome is a subject for a doctoral thesis, but one must admit that feminine charm did play a considerable role. There is now one social scientist in Bombay working full time in providing inputs to programme production and doing it with such success that she has become as indispensable as the lone VTR [videotape recorder] at Bombay. (One hopes that in spite of the producers, she is not subjected to the same frequency of breakdowns as the VTR.) In fact she is doing her job so well that at the end of SITE all the Bombay producers are likely to become social scientists and join REC [Research Cell].’

The Bombay collaboration of social scientists, science educator, and producer is just an example to show that a team requires of those working in it that they be sympathetic and understanding of the other persons’ role, point of view, difficulties and needs. It is important that the producer not get the impression that he has to curtail his creativity and understanding of the other persons’ role, point of view, difficulties and needs. It is important that the producer not get the impression that he has to curtail his creativity and ability in order to comply with the guidelines growing out of formative research.

Formative research and the team concept were also tried for other kinds of programmes in making a series for children in the Kheda district. Nearly forty programmes were produced, and later observation revealed that the children enjoyed them. Evaluative studies demonstrated that the children not only liked the programmes but actually understood their objectives very well. They were also able to reproduce many elements of the series.

Preliminary results and future plans. A huge amount of data has been collected in Project SITE, only a portion of which has been analysed so far. While most results are still not ready for final interpretation, the findings from two studies of SITEs impact upon children can be summarized briefly.

The first study deals with the impact of total (morning and evening) SITE programmes on children and was done by the Department of Educational Technology, National Centre of Educational Research and Training (NCERT). This study revealed that there was very little difference in actual school performance between children in the experimental (viewing) and the control (non-viewing) schools, but certain other measured effects apparently related to SITE television were very revealing. Children exposed to television programmes were more likely to borrow books and to seek information elsewhere. They tended to think scientifically and logically as shown by some differences in the pre- and post-viewing performance of these children in general science. Their language skills developed more as compared to non-experimental group children. There was also evidence that television classrooms were more likely to have inquiring children and teachers who encouraged curiosity rather than rote learning.

The second study concerned the impact of science education programmes on children in villages of a Hindi-speaking cluster (Rajasthan). There were five results of this study. After viewing the programme series, the experimental group scored significantly higher in science information. No significant change was observed, however, in the way this information was applied to a specific situation to solve a problem. Qualitative changes in responses to science education occurred in the post-viewing period for the experimental group, whereas the quality of responses for the control group remained the same. Differences approaching statistical significance were observed in the physical and intellectual aspects of child development, but no improvement in the social, emotional and cultural areas was observed. Findings from large surveys and continued observation of changes in the villages by anthropologists suggest that the children’s science education programmes were enjoyed also by adults and that considerable learning of useful knowledge and widening of horizons occurred as a result.

Closing comment. The observation of Prof. Chitnis, Programme Manager for SITE, is worth quoting as a conclusion to this brief case study.

‘SITE has shown that it is possible to reach remote areas of India with high quality television signals day after day. This has been one application of advanced technology which has not penalized rural areas for their distance and isolation. We have diffused useful information and skills easily, quickly, and cheaply to many more people than ever before. We have hooked up different TV stations into a national forum. But we have also learnt that an advanced satellite delivery system demands an advanced software system. A rapid and widespread expansion of software facilities and trained manpower is required. Development agencies must have dedicated funds and competent persons to provide inputs for television programmes. Software design and hardware planning must be built around social goals. A concerted programme plan with clearly spelt out educational objectives must be prepared well in advance. Timely formative research and pre-testing of prototypes are needed. Quick and continuous feedback on programme performance must be available, and midcourse corrections can be made.’

Wilbur Schramm, who was recently in India, also commented on the project:

‘The most obvious lesson to be learnt from SITE is that India can design, manage, and operate a national project involving highly sophisticated communication technology, maintain it in remote villages, and programme it at least at a minimal level with a due regard to the different clusters and languages involved. India’s experience holds out hope that other nations can also do this if they want to.’

The NASA satellite was only available for one year, limiting SITE from its inception as a massive, but short-term experiment. Initially it was planned that at least 40 per cent of the SITE areas would be continued by means of a ground relay and transmission system. This transition from satellite to ground transmission has already begun. A domestically produced satellite is being developed in India and should be launched by the end of this decade. The new satellite will cover nearly all of India. Meanwhile, research and programme activities grow and SITE continue in anticipation of these future developments. The role of evaluation has been firmly established and will undoubtedly be a key feature of expanded educational television for the entire nation.
Conclusion

Educational television and its impact upon young children is of special interest in many countries because it offers a promising new opportunity for the pre-school education of millions of children in the home, a community centre, or any other location where television can be viewed by children. The policy implications of such television programming at both the national and local levels are highly important, leading many educators and government leaders to consider seriously launching such programmes. Once the ramifications of ETV for young children are examined, it should be clear that controversy regarding the actual impact of ETV on young children can only be resolved by evaluation based upon modern scientific techniques. Psychologists, educational specialists, and other behavioural scientists have joined together in many countries to develop a capability for such scientifically based evaluation. The principles, concepts and techniques for evaluating the impact of ETV upon young children have been presented briefly in the first three chapters which comprise Part 1 of this monograph. A diverse set of case studies of evaluation in different countries illustrates these basic ideas in Part II. This final chapter contains a brief summary of major points previously presented, as well as a series of recommendations concerning the evaluation of television for young children.

A general theory of educational television can best be formulated in terms of system theory integrating concepts from both education and communication. Different aspects of educational television can be grouped into the following six components: the technology of transmission; the transmitted content; the social context of viewing television; the language or symbol system characteristic of the television medium; educational-didactic factors such as the format and style of presentation, the use of feedback, or the level of difficulty of the content; and finally, organizational factors dealing with the entire set of activities leading up to the final audio-visual product that appears on the television screen. Educational television differs from general television with respect to content, social context of viewing, and the educational-didactic factors that are present.

Linking communication and education in one system’s approach yields a paradigm for the evaluation of educational television. Basic to his general paradigm are five assumptions or premises as follows: any educational act, ETV included, involves all the commonly known components of a communication process; the process of communication or teaching starts out at different points for different participants in the process; learning outcomes depend as much on factors mediating between input and output as they do upon input variables themselves; any given role attributed to an ETV system may serve different functions for different receivers at different points in time; and evaluation of ETV serves the function of feedback of a primarily diagnostic rather than judgemental kind. Various evaluation models emphasize different parts of three major components — the input, including the purposes of the programme as well as the specific content units in the curriculum or message; the output, such as the change of attitudes, the acquisition of skills, or the learning of new behaviours; and the intermediate process or mediation factors, such as the viewing conditions, social context, and activities of participating adults such as parents or teachers. Although the most comprehensive evaluation plan involves systematic measurement and analysis of input, process and output variables, other more specific kinds of evaluation can also be undertaken.

A comprehensive evaluation study of educational television can be divided into seven major steps: establishing goals and concepts, developing programme content, defining and surveying the audience, measurement of organismic, treatment, or outcome variables, designing and implementing the research plan, analysing the data, and interpreting the results. Certain principles and concepts, both general and technical, have been briefly introduced under these seven general headings. A check list of questions to consider in designing an evaluation of educational television is presented in Table 1, page 17.

The sex case studies in Part II were selected to illustrate a wide variety of approaches to evaluating television. The major evaluations of Sesame Street undertaken by the Educational Testing Service in the United States established a new peak of comprehensive evaluation for educational television. The summative evaluation carried out over a period of several years cost over a million dollars and involved a large staff, as well as thousands of children and their parents throughout the United States. The sampling of children’s television in the United States also includes studies of the influence of children’s educational television upon social behaviour and personality. This series of studies illustrates content analysis, as well as experimental methods employed in studying the actual behaviour of children.

Plaza Sesamo, an evaluation in Mexico, consisted of a series of experiments starting with formative investigations and ending with summative evaluations of over 1,000 preschool children, half of whom watched Plaza Sesamo while the other half watched cartoons for an entire year. This massive study is without parallel and illustrates many features that are desirable in any major evaluation dealing with outcomes under field conditions.

Educational television research in the Federal Republic of Germany has been centred primarily at the Hans-Bredow-Institut for Radio and Television in Hamburg and at the Munich International Central Institute for Educational Television. Recent follow-up studies on Sesamstrasse, the German version of Sesame Street, have focused upon detailed content analysis, investigations of children’s reactions in controlled settings, comparisons of viewers and non-viewers for impact of Sesamstrasse upon social and cognitive development,
examination of home and family factors as intervening variables for interpreting the effects of Sesamstrasse, analyses of teacher attitudes toward Sesamstrasse, and surveys of families with young children in order to ascertain the degree to which Sesamstrasse was watched and how it was evaluated and used within the family. While the general results of the impact studies for Sesamstrasse were similar to those obtained earlier in the United States for Sesame Street, a number of different and interesting findings specific to Sesamstrasse were also discovered. Adult encouragement was found to be a very important factor in realizing the full potential of Sesamstrasse for learning in young children. Rather surprisingly, the attitudes of Sesamstrasse viewers toward minority groups were more negative after watching the series than were the attitudes of non-viewers, in spite of the developers' expectations. Similarly, the educational aim of reducing sex-role fixations was not realized, largely because the programmers failed to overcome traditional stereotypes concerning male and female activities, as revealed by the detailed analysis of programme content in the evaluation studies.

Educational television programmes broadcast for young children are fairly common in Japan. With its nationwide colour networks, NHK provides an impressive array of short programmes throughout the day for pre-schoolchildren. These are augmented by commercial television stations as well. Evaluation studies in Japan have consisted primarily of descriptive analyses of viewers and attitude studies of parents and teachers. Annual surveys by the NHK Radio and Television Culture Research Institute provide interesting information about television viewing habits and program preferences, viewing reaction, and adult perceptions of ETV for young children. A few experiments have also been undertaken which deal with creative behaviour and cognitive development in young children. In general, however, few comprehensive evaluation studies have been undertaken. A number of reasons for the dearth of such research has been advanced.

Television broadcasting in Brazil has been from its beginning an almost totally commercial enterprise dominated by three major networks. Most educational programmes are produced in Rio de Janeiro and São Paulo for broadcast over a limited number of ETV stations as well as commercial stations. While there is a long history of research in Brazil on television, the greatest interest centres upon the possible deleterious effects of general television upon children and adolescents, rather than the specific evaluation of educational television programmes and their impact upon young children. A comprehensive review of the history and current status of television and research on its impact in Brazil reveals only a scattered number of systematic evaluation studies. The most widely known example of ETV for young children is Vila Sésamo, a Portuguese language version of the original Sesame Street series. The Teleescola programme designed for the instruction of elementary schoolchildren dealt mainly with science and mathematics, closely linked to the school curriculum. Extensive formative evaluation to provide early feedback, as well as summative evaluation studies at the end of each school year, characterized this ambitious project. Greater public awareness and recent governmental developments provide hope for the future that the potential power of television for the education and development of young children will at last be realized within the next decade in Brazil. Comprehensive scientific evaluation will be an essential part of any such enterprise if it is to prove successful.

Project SITE, the Satellite Instructional Television Experiment that took place in India in 1975-76, is a bold, ambitious experiment to employ sophisticated space and communications technology for delivering educational television programmes to thousands of rural villages. From its inception, this imaginative experiment incorporated the ideas of formative evaluation in the development, revision, and field studies of programme content. In hundreds of villages, a single television set was placed in a public building where large numbers of individuals could watch the programme at one time. The various steps in carrying out the formative evaluation, as well as typical findings from the research, are well documented. The experiment lasted only one year, the time in which the space satellite was available for transmission. The role of evaluation has been firmly established and will undoubtedly be a key feature of expanded educational television for the entire nation in the coming decade.

When one considers the seven steps mentioned in Chapter 2 that are essential to any comprehensive evaluation, it is small wonder that so few good evaluation studies have been completed. Most of the work done outside Europe and the United States tends to be descriptive and formative in nature. Only rarely are there studies of the actual impact of television upon young children. The reasons for this lack of strong evaluative research are several.

First, only in certain countries does one find a sufficient number of highly competent behavioural scientists to conduct this type of research. While there may be competent behavioural scientists in some of the developing countries who could carry out such work, inevitably they are overburdened with many other responsibilities that prevent their concentration upon research.

Second, the culture itself may not be conducive to this kind of research even though resources are available. In Japan, for example, there is a real hesitancy to intrude upon the child, the family and the school. Little actual impact measurement is undertaken, although the capability certainly exists. For this lack of strong evaluative studies is the simple fact that they tend to be rather costly for the benefits that are achieved. The thorough evaluation of Sesame Street in North America cost over a million dollars. The evaluation research in Project SITE for India focused mainly upon audience studies, feasibility studies and formative research to improve the programme development rather than to study systematically the impact of the programming upon behaviour on the part of viewers. The cultural setting in Brazil, though conducive to some evaluation, emphasizes commercial television and private enterprise in television broadcasting. The systematic evaluation of Plaza Sesamo was made possible only because of a major grant from the Ford Foundation, an event unlikely to recur in other countries or indeed even in Mexico, for that matter.

And finally, most evaluative research of a summative nature which examines impact upon children takes too long to complete in order to have a practical influence upon the programme in question.

In spite of these reservations and difficulties in undertaking significant evaluative research of television impact upon children’s behaviour in countries outside of North America and Western Europe, there is considerable hope for the future. Most of the countries surveyed, among which the examples cited earlier are only illustrations, are very heavily committed to national development of television as a ‘public good’. As these television developments accelerate in the next few years, one can expect the governments and both professional and political leaders to raise serious questions about the quality of the television programming and its positive or negative effect upon children. Indeed, this question is foremost in the minds of many public leaders in Brazil at this very moment.

Once the question of television impact upon children is raised as a serious national issue, it is only a small step further to acknowledge the importance of some kind of evaluative research. Using emphasis on formative research, where strong behavioural science and resources already exist, there is good reason to expect the development of scientifically sound evaluation research on this important topic. Unfortunately, the majority of developing countries does not have sufficient strength in the social and behavioural sciences to undertake such research.
RECOMMENDATIONS

(1) Major centres of television research in North America, Western Europe, and Japan already provide strong capability for undertaking comparative studies such as those that have been done in a preliminary manner on *Sesame Street* and *Mister Rogers' Neighborhood*. In particular, the research centres in the United Kingdom, Scandinavian countries, the Federal Republic of Germany and France have competent psychologists, sociologists and other behavioural scientists on their staffs where a great deal of research is already under way. Similar developments are rapidly taking shape in Japan. Within the next two years, considerable progress could be made in the development of comparative international studies among the developed countries if encouraged by international leaders. Such organizations as the Children's Television Workshop in New York, the Hans-Bredow Institut für Rundfunk und Fernsehen in Hamburg, and the NHK Radio and Television Culture Research Institute in Tokyo could form the nucleus for co-operative studies of this kind.

(2) Comparative research in the developing countries where capability now exists for research on the impact of television upon young children, such as India, Israel, Brazil, and Mexico, should be drawn into co-operative projects as rapidly as possible. Bilateral or multilateral co-operative efforts among the developing countries can be established now with a little leadership from North American and European social scientists, government organizations, and private foundations. Working with very different cultures from those of Western Europe and North America has decided advantages in any comparative research. Indeed, certain kinds of experimental studies, such as those undertaken in the evaluation of *Plaza Sesamo* for Mexico several years ago, can no longer be conducted in Western countries because audiences are so saturated with current television programming. The developing countries offer new opportunities both for more rigorous control of experimental variables under field conditions and for impact studies upon populations not yet exposed to television.

(3) Short-term experimental studies under laboratory conditions can be undertaken in the highly developed countries of North America, Europe and Japan with greater ease and greater likelihood of success than in most other countries, because of their extensive resources, large numbers of qualified behavioural scientists, and strong tradition of experimental research. Research dealing with aggression, pro-social behaviour, inter-group attitudes, and other important outcome variables for children's television should be strongly supported by existing resources and review groups under government and private foundation sponsorship within these countries.

(4) For countries around the world other than the few highly developed and developing nations where capability already exists, the vigorous development of general behavioural science capability is essential. Until such general capability has risen to a critical mass where talent and technology can be diverted from other high priority needs to the study of television's impact upon young children, it is unlikely that scientifically significant research of a sustained nature will be undertaken in these less developed countries except where special circumstances are present. Improving the climate for behavioural science research and its acceptability for evaluating national programmes that have policy implications in other countries is a noteworthy goal for the foreign policy of the highly developed nations.

(5) Television uses images and symbol systems that deal with more concrete levels of an individual's cognitive structures than other educational media, according to recent research. Additional basic studies are urgently needed to understand more clearly the mental abilities that facilitate learning by television. Exploiting the full potential of television as an educational medium can be accelerated by further basic research on cognitive and perceptual development as they relate to the 'language' of television.

(6) For an evaluation of ETV to be most effective, a systems approach should be adopted in which the interactions among input, process and output variables are explicitly taken into account. Where limited resources are available, a series of small evaluation studies can be undertaken using different samples and research methods appropriate to the specific objectives of each study. From such a series of related studies, corrective feedback to designers and producers can be given while also addressing the question of what components of the programme, interacting with what individuals under what kinds of conditions, are more or less effective as measured by criterion variables that are highly relevant to the programme objectives.

(7) The design and production of an educational television programme for young children will be greatly improved by the incorporation of principles and concepts in the modern science of evaluation right from the inception of the project. A team approach with frequent interaction among script-writer, producer, artist, actors, educational specialist and evaluation expert is the surest way of yielding a high quality ETV programme.

(8) A programme that is successful for one viewing audience should be adapted and re-evaluated before it is broadcast on a large scale to a different kind of viewing audience. Such adaptive studies need not be very costly or time consuming in most instances.

(9) Recent findings from research in developmental psychology can be immediately applied to make learning by ETV more effective. A review of recent research in child development indicates that television can also have a major impact upon pro-social behaviour, the maturity of moral judgement, and the improvement of racial attitudes, as well as language and cognitive development.

*  *

The work that has been described in Japan, India, Brazil, Mexico, the Federal Republic of Germany, and to some extent in Canada and the United States, illustrates the kinds of research that have been completed recently and points to important new emphases that should be given high priority at the international level. The number of studies dealing specifically with social and personality development is disappointingly small outside of the United States and Western Europe. Quite understandably, most countries are more immediately concerned with feasibility studies, audience surveys, formative evaluation, and perhaps some beginning research on the impact of educational television upon cognitive learning and school achievement in young children. It is hoped that the international effort represented in this monograph will create wide interest in the very challenging and important research yet to be done throughout the world on educational television and its impact upon young children.
References

Barcus, F.E. 1971.
Evaluation Study, (1) (2) (3). Tokyo, Fuji TV.
---; Gordon, N.J.; Graves, S. (n.d.) A Proposed Agenda for Research on Children and Television. (To be published in Fernsehen und Bildung.)
---; Hoffman, H. 1972b. Explorations in Patterns of


<table>
<thead>
<tr>
<th>Country</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portugal</td>
<td>Dias &amp; Andrade Lda., Livraria Portugal, rua do Carmo 70, LISBOA.</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>Textbook Sales (PVT) Ltd., 67 Union Avenue, SALISBURY.</td>
</tr>
<tr>
<td>Romania</td>
<td>ILEXIM; Rozentel Sr. Biserica Armeii 20, 3-7, P.O.B. 134-135, BUCUREȘTI.</td>
</tr>
<tr>
<td>Senegal</td>
<td>La Maison du Livre, 13, avenue Romaine, B.P. 20-60, DAKAR; Librairie Clairafrique, B.P. 2005, DAKAR; Librairie &quot;Le Steigel&quot;, B.P. 1294, DAKAR.</td>
</tr>
<tr>
<td>Singapore</td>
<td>Federal Publications (S) Pte. Ltd., 20, 1 New Industrial Road, off Upper Paya Lebar Road, SINGAPORE 19.</td>
</tr>
<tr>
<td>South Africa</td>
<td>Van Schaik's Bookstores (Pty.) Ltd., Libri Building, Church Street, P.O. Box 774, PRETORIA.</td>
</tr>
<tr>
<td>Spain</td>
<td>MUNDI-PRENSA LIBROS S.A., Castelló 57, MADRID 1; Ediciones LIBER, Apartado 17, Maçãs de Cima 8, OPORTO (Viseu); DONAIRE, Ronda de Osorio, 20, Apartado de Correos, 341, LA CORUÑA; Librería AL-ANDALUS, Romana, 1 y 3, SEVILLA 4; LITEXSA, Librería Técnica Extranjera, Tucet, 8-10 (Edificio Monitor), BARCELONA.</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Issam House Bookshop, Sir Chitramalammal Gardens, P.O. Box 244, COLOMBO 2.</td>
</tr>
<tr>
<td>Sudan</td>
<td>Al Darwah Printers, P.O. Box 1116, KJRTON.</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Europa Verlag, Rämistrasse 5, 8024 ZÜRICH; Librairie Payot, 6, rue Grenus, 1211 GENEVA 17.</td>
</tr>
<tr>
<td>Thailand</td>
<td>Sukaapang Pans, Mansion 9, Rajadamnern Avenue, BANGKOK; Nibondh and Co. Ltd., 40-42 Charoen Krung Road, Sirapong Plaza Sr., P.O. Box 403, BANGKOK; Subi Shis Company, 1715 Rama IV Road, BANGKOK.</td>
</tr>
<tr>
<td>Togo</td>
<td>Librairie Evangélique, P.B. 378, LOMÉ; Librairie du Bon Pasteur, B.P. 1154, LOMÉ; Librairie Moderne, B.P. 777, LOMÉ.</td>
</tr>
<tr>
<td>Turkey</td>
<td>Librairie Faschette, 455 Isikliel Caddesi, BEYOGLU, ISTANBUL.</td>
</tr>
<tr>
<td>Uganda</td>
<td>Uganda Bookshop, P.O. Box 125, KAMPALA.</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>H.M. Stationery Office, P.O. Box 259, LONDON SE1 9NH; Government Bookshops: London, Belfast, Birmingham, Bristol, Cardiff, EDINBURGH, Manchester.</td>
</tr>
<tr>
<td>United Rep. of Cameroon</td>
<td>Le secrétaire général de la Commission nationale de la République Unie du Cameroun pour l'Unesco, B.P. 1600, YAOUNDE.</td>
</tr>
<tr>
<td>United Rep. of Tanzania</td>
<td>Dar es Salaam Bookshop, P.O. Box 9030, DAR ES SALAAM.</td>
</tr>
<tr>
<td>United States of America</td>
<td>Librairie Attie, B.P. 64, OUAGADOUGOU; Librairie catholique &quot;Jeunesse d'Afrique&quot;, OUAGADOUGOU.</td>
</tr>
<tr>
<td>Upper Volta</td>
<td>Editorial Losada Uruguay, S.A., Maldonado 1002, MONTEVIDEO.</td>
</tr>
<tr>
<td>Uruguay</td>
<td>Editorial Losada Uruguay, S.A., Maldonado 1002, MONTEVIDEO.</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Editorial Losada Uruguay, S.A., Maldonado 1002, MONTEVIDEO.</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>Jugoslavenska Knjiga, T亮相 Republice 5/8, P.O. Box 95, 11-001 BEograd; Družava Založba Slovenije, Titova 25, P.O.B. 50-1, 51-000 Ljubljana.</td>
</tr>
<tr>
<td>Zaire</td>
<td>La Librairie, Institut national d'études politiques, B.P. 3907, KINSHASA; Commission nationale salivaire pour l'Unesco, Commissariat d'état chargé de l'education nationale, B.P. 32, KINSHASA.</td>
</tr>
</tbody>
</table>