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FAIN, ADELINE EDEN. A Study of the Feasibility of Employing Cable Television in the Winston-Salem/Forsyth County Public Schools. (1972) Directed by: Dr. Dwight F. Clark. Pp. 141.

It was the purpose of the study to investigate the feasibility of employing cable television in the Winston-Salem/Forsyth County Public Schools.

Relevant literature and research findings were reviewed concerning the nature and educational benefits of television as instructional television, educational television, closed-circuit television and cable television. It was concluded that the use of cable television in the Winston-Salem/Forsyth County Schools could be of educational benefit to the system.

Present status of television in the Winston-Salem/Forsyth County school system was analyzed, and estimated cost figures for various proposed CATV configurations in the Winston-Salem/Forsyth County Public Schools were presented. Problems associated with the use of instructional television in the schools were discussed, and possible economies and benefits deriving from the use of cable television in the Winston-Salem/Forsyth County Schools were enumerated.

The concept of feasibility was defined through investigation of the physical, legal, pedagogical, administrative, technical, economic, and political aspects involved in the employment of cable television in the Winston-Salem/Forsyth County Public Schools.

It was concluded that the employment of cable television in the Winston-Salem/Forsyth County Public Schools was feasible. It was further suggested that the Winston-Salem/Forsyth County school system give serious consideration to the employment of a system of in-school television through the use of cable television. It was finally suggested that, upon such consideration, the school system administration be responsible for the formation of a minimum of three committees to deal with matters of funding, utilization, and curriculum planning for such a system.

A STUDY OF THE FEASIBILITY OF EMPLOYING CABLE TELEVISION IN THE WINSTON-SALEM/FORSYTH COUNTY PUBLIC SCHOOLS

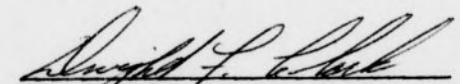
by

Adeline Eden Fain

A Thesis Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education

Greensboro
1972

Approved by



Thesis Adviser

APPROVAL-PAGE

This thesis has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

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September 6, 1972
Date of Examination

ACKNOWLEDGMENTS

The author wishes to express her sincere thanks, in writing, to:

Dr. Dwight F. Clark, thesis adviser, for his interest, encouragement and limitless patience.

Dr. Lois V. Edinger and Dr. Hugh Hagaman, members of the oral examination committee, for suggestions and comments as perceptive and constructive as they were helpful.

Dr. Michael H. Molenda, for his technical advice throughout the study.

My husband, who made it all possible.

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CHAPTER I

INTRODUCTION

TELEVISION

Television today is a salient feature of American life. Its presence throughout our society is both prominent and pervasive. It has become a force to be reckoned with, no less in the classroom than in the living room. Our school children are the products of an age of telecommunications; they bring the world of television with them to school in the morning. In a growing number of classrooms across the country and around the world, television is making its presence felt in a more immediate sense through the use of televised instruction. Given the established status of in-school television and its educational potential when augmented through the application of cable television, it was felt that a study of the feasibility of employing cable television in the Winston-Salem/ Forsyth County Schools at this time would be beneficial.

Nature and Influence

A medium is defined as a substance through which a force acts or an effect is transmitted, a channel through which messages can be sent. Television is quite possibly the single most influential medium ever devised by man. It is synergistic; the

Educational Media Panel, established as an advisory group to the Commissioner of Education and the United States Office of Education, described it as ". . . a device which uniquely can transmit sound, live images, film, print, and charts, and thus can serve as a distribution system for all other media."[1] Television can represent the lightest of light entertainment; it can compete with the qualities of serious journalism; adapted to an educational context, it can offer a channel for the most effective of straight teaching. A medium with its own unique psychological and emotional appeal, it is able to leap barriers of time and place, disciplines and personalities.

Television is a means of human communication, one of the most effective known. It has no ability except to communicate, but it can do that exceptionally well. It is graphic; it is immediate; it is widespread. Possessing its own discipline of audio-visual language, it derives graphic vigor from frequent variations in visual presentation, heightening the viewer's attention and awareness. Campion suggests that the immediacy of television may be due to the fact that audio is primary in television and only secondary in film.[2] Paul Ryan, in an article entitled "The Raw and the Overcooked" looks at film and television in this way:

> Film edits the experience of others for you . . . film is the packaging of information in cans. Videotape is involved in the feeding back of process. Film rips information away from a situation for use elsewhere. Videotape can feed back

> into a given situation and enrich experience. Film extends man as a spectator. Videotape extends man as a cybernator. Film imports information. Videotape implodes indigenous data.[3]

Imploding the indigenous data within man may well be the key to dealing with learning and the information explosion. As Father Walter J. Ong, Professor of English at St. Louis University notes, we are not merely living with more information but with information in a different state. Unlike earlier man, we are in constant touch with what is going on everywhere. And while books give us access to what has already happened or perhaps abstractions and fixed truths, they do not give us access to what is going on. Electronic media do.[4]

The evocative quality of television has great possibilities for learning situations. Marshall McLuhan has noted that the low-information, mosaic-mesh quality of a television image results in a "cool", or highly participative effect. The omitted information must be filled in by the viewer, and this neutrality presents the essential challenge of television.[5]

Man does much of his learning by means of symbols. The control of symbols and reinforcement conditions is a fundamental operation of all instruction. A medium, such as television, is an intervening device that produces (or reproduces) and extends symbols. Albert Einstein once commented that the unleashed power of the atom had changed everything except man's way of thinking.

It may well be that television will effect this change. To quote McLuhan:

> Media, by altering the environment, evoke in us unique ratios of sense perceptions. The extension of any one sense alters the way we think and act--the way we perceive the world. When these ratios change, men change.[6]

Broadcast Television and Cable Television

Broadcast television transmits images of fixed or moving objects together with sound through space, radiating them as electromagnetic waves from a transmitting antenna in every direction (literally "broadcasting" the waves). These waves are intercepted by receivers tuned to the transmitter's wavelength and reconverted into visible light rays and audible sound. This is conventional television as we know it. Unfortunately, VHF television, which handles the lion's share of commercial programming today, is constrained by physical laws and the needs of other communications media (FM and mobile radios; space, amateur, government and satellite communications) to operate in a limited frequency spectrum. There is only enough room for twelve channels all told, and physical limitations cut this down to a maximum of seven available to viewers in Los Angeles and New York City, the cities with the largest number of VHF stations. This scarcity of space led to the concept of mass programming, since a commodity so valuable must return optimum financial gains for its usage. Then came cable television.

Cable television, or CATV, refers to a system where broadcast signals are "picked up" by a favorably situated highmast antenna, pre-amplified, and delivered to a head end. They are then further amplified and sent out to individual subscribers by means of a coaxial cable. (For definition of VHF, head end and coaxial cable, see below under Definition of Terms.) With cable television, the subscriber should get television pictures of the color and clarity they possessed originally at the broadcast station.

Commercial cable television originated in 1950 in Lansford, Pennsylvania, as a means of picking up television signals blocked by the surrounding mountains. Its designation, CATV, stood for Community Antenna Television but it has been changed to cable television, or simply, cable.

If conventional television was one of scarcity, cable is the television of abundance. As there are many channels available due to the capacity of coaxial cable, so cable can cater to the particular audience; it does not require mass appeal and mass returns to justify its existence. It can become a basic medium of information and education, like the press.

Cable presently serves about nine per cent of its potential audience, mostly in small towns with insufficient commercial television coverage or in big cities which have local problems with reception. Most cable systems are small and self-contained with

virtually no local program origination. There are some 2,600 cable systems serving perhaps five million households today. The industry is growing, however, and predictions for its expansion are very positive; Michael H. Molenda reports that a penetration of fifty per cent of capacity is achievable by 1980,[7] and other estimates are more optimistic still.

The capacity of cable television at present is limited by the capacity and cost of its amplifiers. Cable can, however, be laid in such a fashion as to enable the cable operator to replace his amplifiers as new systems become available and thus enlarge his system capacity. Systems today can be upgraded from twelve channel capacity to twenty channel capacity through the use of converters; several school systems have obtained the use of mid-band channels for their own use this way.

It isn't the present reality of cable television that is so interesting, however, but its future. The Sloan Commission on Cable Communications reports that twenty and forty channel capacities on sets with forty, sixty, perhaps even eighty per cent of the homes in the country "on the cable" is a distinct possibility.[8] More optimistic still, Arthur L. Singer, Jr., vice-presicent of the Alfred P. Sloan Foundation, suggests that by 1975 a minimum of twenty-five per cent of all American homes will be wired with twenty or more channels and that some few years after 1975 that number will rise to at least sixty per cent. "If anything," he remarks, "both

predictions are likely to be on the low side, and perhaps widely so."[9]

TELEVISION AND EDUCATION

All television is in one way or another educational. Some kinds, of course, are more educational than others. Much of commercial broadcast television offers an informal widening of horizons and manages to implode some of the indigenous data latent in us; there are any number of reports and special programs and documentaries carried by the major networks that are certainly educational in nature if not by intent. It is the intent of this study, however, to concern itself solely with television as a means of instruction, a teaching medium.

Educational Television

Organized education depends on human communication. It would seem, therefore, that a means of communication as effective as television would provide invaluable assistance in processing and transmitting the ever-increasing amount of information and perspectives available to our teachers and required of our students. It is perhaps ironic that one of the major difficulties in utilizing television in the schools has been due to a misunderstanding of its nature and so its proper function; in effect, we have had a failure to communicate.

Television is not a cure-all. It will not work miracles; it will not transmute bad teaching into good. When considering the

instigation of a program of instructional television of any size, it is well to remind ourselves that television is not a teacher; it is merely a conveyor of teaching. If we remember, as Lewis A. Rhodes puts it, that television is a medium of communication and not an electronic teaching device, we are less likely to make exaggerated claims on its behalf.[10] With this caveat in mind, the study began by looking at the various methods of conceptualizing and distributing this unique means of communicating instruction. Educational and instructional television and their distribution by means of closed circuit and cable systems will be dealt with in the remainder of Chapter I, along with a definition of relevant terms appearing in the body of the thesis.

Chapter II deals with the scaope of the study itself: the present state of instructional television and cable television in the Winston-Salem/Forsyth County School System; the approximate cost estimates for a complete cable system to fit local educational needs, and for smaller adaptations of that system; and the problems that might need to be considered in planning such a system.

Chapter III defines the feasibility of employing a cable system in the schools in terms of physical, legal, pedagogical, administrative, technical, economic and political considerations. Chapter IV summarizes the study and presents the conclusions and recommendations resulting from it.

Educational television refers to that aspect of the medium

concerning itself with organized programs intended to convey information in a broad sense. It deals in specifics; specific subjects for specific audiences. John W. Powell noted the following characteristics of educational television:

> 1. It's television that you watch on purpose.
> 2. It's television that invites you to do something, learn something, think about something—it expects you to participate.
> 3. It's television whose purpose is to get you to turn off the set and do what has been suggested: read, paint, experiment, discuss.[11]

The idea of educational television as use of the medium for a particular purpose might best be summed up by the philosophy of Dr. George Bair, director of the North Carolina Educational Television System. Dr. Bair wants his system to reach some of the people some of the time with something that makes a significant difference in their lives.

Using television to make a significant difference in people's lives certainly isn't indigenous to North Carolina, or to the United States, for that matter. Educational television is world wide in scope. Programs for instruction and enrichment are being broadcast and sent by coaxial cable in Europe (Britain, France and Italy are notable examples), Latin America (Colombia and Nicaragua in particular), Asia (Japan is certainly a leader in the use of educational television). Educational systems as varied as those in the U. S. S. R.

and American Samoa use television.

The United States has its share of ETV (for educational television) ventures. There are now two hundred sixty-seven air channels reserved for the exclusive use of noncommercial, educational television stations. The 1971 Directory of the National Association of Educational Broadcasters lists more than two hundred seven ETV stations on the air and sixteen more ready to begin broadcasting within the year.[12] In the years 1964-1968 carriage of ETV signals increased 673 per cent; the number of educational television stations increased fifty-four per cent.[13] In the history of educational television, only one station has ever failed.

ETV stations differ widely in their finances, orientation and audience. They do have in common a goal of complementing commercial television by offering programming which doesn't fit into commercial television's broadcast pattern. The Ford Foundation has been a primary source of funds for research, innovations and utilization in educational and instructional television. George Gordon notes that most probably the next share of fiscal responsibility has gone to the U. S. Office of Education, either directly or through state departments of education. A poor third in monetary supplements for ETV has been existing school budgets, county or municipal funds, private contributions or other foundations; in other words, the local revenue sources.[14] ETV stations can be owned by community groups

(Boston, Chicago), universities (Wisconsin, North Carolina), school systems (Denver, Miami), state departments of education (Alabama, Oregon), or other educational institutions (Louisville Public Library). They can be connected into statewide or regional networks, for greater variety and flexibility of programming. Station WGBH in Boston is the flag station for the Eastern Educational Network, which also includes the highly successful KQED in San Francisco.

WUNC-TV, the ETV station for the University of North Carolina, came on the air in January, 1955, the twelfth station to do so. Almost 250,000 pupils watch in-school television in North Carolina at present; by 1975, the State Department of Public Instruction hopes to have 500,000 viewing pupils in the state. WUNC-TV blends its educational and instructional television programming about half and half. As George Bair spoke on the station's role in an interview with the researcher in March of 1972, "Part of the warp and woof of an educational institution, we conceive ourselves to be in the business of providing opportunities to learn. Our business is education, learning across a broad spectrum from general educational development to narrowly defined specifics."

Instructional Television

Lawrence E. McKune, editor of the National Compendium of Televised Education, estimates that about nineteen million American

students are exposed to television in some part of their schooling every year.[15] In-school television is no longer a subject of interest to a small group of educators; it has become a topic of considerable – and growing – interest to the entire educational community and the community at large as well. And in-school television usually implies the use of a particular form of educational television, instructional television (ITV).

ITV is television designed to teach students a specific body of material as a part of their formal education. The programs are intended to convey specific instruction for the purpose of obtaining specific curricular objectives. ITV can be broadcast on commercial or non-commercial television stations, sent by closed-circuit transmission within the school building or school system or sent by means of a cable television system. In addition to the specific (and clearly defined) curricular objectives, ITV implies a specific course of study, individual lessons with discrete objectives and almost always the presence of a studio teacher (The series Mathematics on Television by Margo Perkins, produced at the University of North Carolina at Greensboro for WUNC-TV is done without a studio teacher and is an excellent example of instructional television.)

Instructional television offers the educational community the challenge of growing with education itself. It is a distinct challenge to the classroom teacher with imagination to extend the horizon of

her classroom; as George Bair phrases it, ITV builds an instructional floor below which no teacher could fall and on which a good teacher can build.

Perhaps more than any other form of television, ITV fills the four requirements of communication as defined by Schramm in Mass Media and Education:

> 1. The message must be designed and delivered to gain the receiver's attention.
> 2. It must refer to experiences common to both sender and receiver.
> 3. It must arouse personality needs in the receiver and suggest some ways to meet them.
> 4. It must suggest a way to meet them appropriate to the receiver's group situation when he is moved to make the desired response.[16]

The primary purpose of using ITV is to raise the quality of instruction; ITV programs that are carefully thought out, designed, researched and produced succeed in raising the quality of instruction by communicating with the students through common experiences and arousing needs within them which can best be filled by additional knowledge or experience, and then by suggesting to them the means through which they can obtain this knowledge. Students whose schools are using instructional television in regular series of programs are exposed to subject matter that is relative to their formal schooling; the courses of study are definitely related to the curriculum at their level of schooling. Television for these classes is the medium of instruction

and results are measured in terms of learning.

As McLuhan has noted, the new media begin by doing the job of the old media better (the "wireless telegraph", the "horseless carriage"). In an article for Saturday Review titled "A Schoolman's Guide to Marshall McLuhan", Father John Culkin of Fordham University remarked that "The new learner is the result of the new media, and a new learner calls for a new kind of learning."[17] This new kind of learning is a natural consequence when television's peculiar impacts, both visual and auditory, are put to use in teaching.

Depending on curriculum needs, teacher competencies, pupil enrollments and television facilities, instructional television has applicability in several forms. It can be used for:

1. TTV - total television teaching. This has the studio teacher and the telelesson taking over the entire burden of instruction for the class. In situations where there is an acute lack of trained teachers in a subject area, or no teachers at all, TTV can make available instruction which would otherwise be entirely lacking in the curriculum. Foreign languages have been taught by television where there was a lack of specialized teachers, with considerable success. Philadelphia taught French and Russian, and New York, Florida and North Carolina have taught French using the basic technique of total television teaching.

2. MRTV - major resource television. This is one of the

two major uses of ITV. Projects such as MPATI (Midwestern Program for Airborne Television Instruction) used MRTV, where the studio teacher handles the informational part of the lesson and the classroom teacher follows up with supervision, suggestions for further study, classroom discussion and personal encouragement. The programs shown on WUNC-TV in series such as American History and Physical Science can be considered MRTV.

3. STV - supplementary or enrichment television. This is the other major use of ITV, and is often the one preferred by classroom teachers because they can request its use at their discretion, knowing what the program or series will provide in areas where they are weakest in resources or subject matter. STV would imply the use of programs such as WUNC's Mathematics on Television or series making extensive use of visuals and visits to places outisde the range of ordinary classroom experience.

4. Observational television. This is the use of ITV for purposes of observing classroom behavior, and finds its main employment in teacher education courses at the undergraduate level. Since the camera that is more or less permanently installed in such a way that the room teacher can control its operation quickly becomes an article of furniture to the children, classroom behavior can return to normal much more easily than with the presence of several observers. There is less chance of a Hawthorne effect after the

camera has been installed for a short time, and the student teachers can get a much more realistic picture of a class in progress. This method can also be used to record a "master teacher" at work, either for student teacher purposes or for in-service training for working teachers. Observational television can also be used for micro-teaching on the in-service level.

One of the problems of producing programs for instructional television is the multiplicity of course and curriculum levels throughout the country. Programs that are excellent for use in Boston simply don't fit into the curriculum in St. Louis, and so forth. As a result, most ITV programs and series still tend to be locally produced and locally shown. The National Educational Television and Radio Center (NETRC) has tried to act as an intermediary and clearing house for instructional television materials, but due to this great variety of educational practices has had to limit its activities mainly to disseminating programs of a broad cultural nature. It has had to date a small role in the use of television for teaching. There is, however, a role for libraries of ITV materials apart from their handling of enrichment programs and series. Perhaps their best use could arise from the collection, indexing and distribution of single-concept materials for integration into locally produced ITV lessons and courses. This would allow for local control of curriculum and still provide the benefits of additional resources

and specialized instruction when they are needed.

Instructional television is a going concern in many parts of the world today. Its use in Europe, Latin America and Asia has been mentioned. Inner London is presently constructing a system for ITV using six channels which will transmit programs to two thousand schools and fifty colleges, with a potential school audience of four hundred thousand.[18] Alabama has made good use of its statewide educational television network to provide instruction where there was an acute scarcity of source teachers. This resulted in programs providing Russian to four hundred fifty students in fifteen high schools, in a return of Latin to high school curricula after an absence of over a generation, of schools without pianos or record players being able to offer their pupils "Music Time."[19]

North Carolina has been a good customer for ITV. For the National Program in the Use of Television in the Public Schools, North Carolina developed four series for instructional television: grade 8 Mathematics, grade 9 Physical Science, grade 10 World History and grade 11 United States History.[20] At the present time, WUNC-TV broadcasts thirteen series during the week for in-school television in addition to Sesame Street and The Electric Company (which are not considered in-school television programming), and is readying at least two more series for the Fall. Four of the series (Physical Science, U.S. History, Cultures: Asia and

Africa and Mathematics for Television) are produced at WUNC studios. One is produced in Charlotte, North Carolina for WTVI-TV (Granny), and the remainder of the programs are obtained from the Great Plains National ITV Library in Lincoln, Nebraska and the NIT Center in Bloomington, Indiana. Reta Richardson, Chief Television Services Consultant for the North Carolina Department of Public Instruction, estimates that over two hundred twenty-five thousand school children in North Carolina will receive instruction from television this year. This is an increase of one hundred twenty-five thousand over last year's in-school viewing audience, and an audience of nearly five hundred thousand by 1975 is projected for North Carolina in-school television.

Closed Circuit Television

A good deal of educational and instructional television is received, like commercial television, directly off the air; WUNC-TV broadcasts its programs over the state by means of a microwave system. Antennae on the individual school buildings pick up the signals and distribute them to the various classrooms by means of a master distribution system. However, a growing number of school systems have instigated the use of closed-circuit systems for televised instruction. Since the study is concerned with the employment of cable television in the Winston-Salem/Forsyth County Public Schools,

the focus will be narrowed to closed-circuit educational systems, and in particular the implications of cable television in the schools.

The use of cable communications in education is certainly not a new idea. Closed-circuit facilities have been in operation in some universities for more than fifteen years; the Hagerstown, Maryland project was begun in 1956. Tele-lectures (using voice transmission over telephone lines) have been in campus use at institutions like Stephens College for over a decade. The use of CAI (Computer-Assisted Instruction) and CCTV for demonstrations in medical and dental schools has made individual student instruction a reality for students today.

Closed circuit television (CCTV) is a system in which signals are transmitted by means of a coaxial cable linking the transmission origination point and the receiving areas rather than having them broadcast through the air. CCTV provides for the electronic transmission and reception of images within a definitely prescribed area or system not available for general viewing, and receivers or monitors must be linked directly to the coaxial cable to receive the image. CCTV can also imply the use of microwave transmission for educational purposes. This requires decoder receivers, uses the mid-band wave length range (2500 mHz), and is known as Instructional Television Fixed Services (ITFS). ITFS can carry five channels at once and has been considered quite useful for some

school systems where off-the-air reception was difficult or unsatisfactory, such as the schools in the Diocese of Brooklyn. Equipment purchases and maintenance can be costly, however, and the advent of cable television has been welcomed by many school systems since it can provide several signals simultaneously (like CCTV and ITFS) and since the cable company frequently maintains the cable free of charge (since he is using the same cable for his commercial customers and must maintain services for them) and often will install the necessary wiring free or at cost. The school system is still obligated to maintain its own equipment, both for transmission and reception, but this is usually much less costly for cable use than for transmission by microwave.

Any system of closed circuit television can carry several signals at once via the coaxial cable, whereas broadcasting open circuit can carry only one program on each channel. The educational implications of a system able to carry several ITV programs at the same time has not eluded schoolmen; well over eight hundred educational institutions, according to George Gordon, operate CCTV systems today and presumably are involved in using television for teaching purposes.[21] CCTV set-ups range in size from a single classroom to a complete system with equipment and reception range comparable to that of a commercial broadcasting system. CCTV educational projects include the statewide system in South Carolina;

one-school systems at Pennsylvania State University and New York University; a neighborhood education project in New York City called the Hudson Guild Neighborhood Project linking a settlement house, a housing project and a school; and the prime example of closed-circuit usage in the public schools, the project in Washington County, Maryland.

The Washington County project was built under the patronage of the Ford Foundation. Begun in 1956, it today links nearly fifty schools and twenty thousand students in Hagerstown and the surrounding county with one hundred thirty miles of cable. It set out to prove the educational potential of ITV in that it could both bring about improvement in the educational program and be reasonable in cost. The first objective was realized beyond a doubt, the second is by no means a certainty. "Reasonable" is a most subjective word, and equipment on the scale employed at Hagerstown can be expensive by any standards. With its costs underwritten by the Ford Foundation and its equipment supplied by the Electronics Industries Association at a cost of two hundred fifty thousand dollars, and the lines installed by Potamac Telephone, it cost three hundred fifty thousand dollars a year to operate in 1965.[22] The Ford Foundation's report on ETV, in talking about the Hagerstown project, notes that in 1962 the Foundation and its Fund for the Advancement of Education had spent a total of $1,173,910.[23]

Of course, the Hagerstown project is more extensive than most school systems would even begin to consider; it was, after all, built as a showplace for ITV. Capable of handling six programs simultaneously (one of these from the film chain), it has five separate origination studios, a film chain, a film storage section, VTR equipment and office and production space. During the 1959-60 school year, the program offered thirty-one courses ranging from arithmetic to U.S. history, with six grade levels of reading improvement. Today it offers more than fifty courses in its television program.[24] Most of its telecasts are live, about one hundred twenty-five a week, and except for the chief engineer and his assistant, all the personnel in the engineering department are students at the junior college or recent high school graduates. The schools lease the cable facilities from the telephone company, which installs and maintains the cables and charges for its services on a leasing basis.

William Brish, Superintendent of Schools for Washington County, is highly enthusiastic about the project. Noting the savings produced from redeployment of personnel and equipment, he states that the project pays for itself in that respect well enough to cover the annual operating costs. In terms of duplicating in conventional classes what television offers his students, the system would require more than one hundred additional teachers and nearly one million dollars, more than three times the annual operating costs of the CCTV network.[25]

More important to Brish, however, are the advantages gained in areas other than finance; these will be considered below in Chapter II under Economies.

Cable Television

Cable television has been defined above and a diagram of a typical CATV distribution system appears in the Appendix. Basically it is a system of distributing programs in a given area that provides more signals, better signals or different signals than broadcast television, or all three of these. The educational possibilities of CATV go far beyond the improved reception of broadcast programs, but in Winston-Salem even this is no small matter. Programs broadcast over Channel 4 (WUNC-TV) encounter serious reception difficulties depending on the time of day, the weather, airplane traffic, location in the city, even local appliance usage. According to John Shore, Director of Educational Media for the Winston-Salem/Forsyth County Public Schools, reliable program reception was such a problem in Winston-Salem that the schools became reluctant to use the ITV programs broadcast over Channel 4 and there has been very little television viewing in the schools since the mid 1960's. Teachers have a right to expect good re ception every time they turn on the set if that set is to take over a portion of their lesson, and this was a real problem in Winston-Salem. With cable, however, Channel 4

comes in perfectly no matter where the school is located or what kind of antenna arrangement it might have. One more plus for the future use of cable in connection with Channel 4 and WUNC is that cable also insures a much better color image than broadcast television if there is likely to be interference. The schools have no plans for color reception at present, but cable's capacity in that field is certainly not going to be a detraction when it comes under consideration for major implementation by the schools.

Other educational institutions and organizations have already decided in favor of CATV. According to the report of the National Conference on Telecommunications Policy in Education held in Athens, Georgia in 1968, 73 per cent of the educational television stations were being carried by cable televisions systems.[26] The National Education Association has favored Federal Communications Commission rule-making on CATV policies such as twenty per cent channel capacity for ETV stations, minimum twenty channel capacity for new CATV systems, two-way capability built into new systems and implemented into existing ones, public dividend plans and the development of public cable corporations. NEA and JCET (Joint Council on Educational Telecommunications) positions on education and CATV have been backed up by the National Cable Television Association. In a resolution passed at the 1970 meeting, the NEA made its position on CATV in education clear:

> The NEA believes that the use of Community Antenna Television (CATV) channels for education is essential to preserve the public interest, to afford an opportunity for educational innovation, and to encompass the learning needs of a diverse society.[27]

Led by men such as Harold Wigren who are concerned to protect the place of educational priorities in the future of this growing young giant, the JCET and PubliCable are working to acquaint the educational community with CATV's potential for education.

Today, local CATV systems are cooperating all over the country with school systems to provide educational opportunities in the form of access to the learning possibilities of television. Cable operators in Suffolk County, New York; Whitewater, Wisconsin; Pasadena, California and Los Angeles have cooperated with their local schools in providing, in addition to free channel space and free hookups to the cable, help in building, equipping and staffing production studios for school use.[28] CATV operates a flourishing ITV network in Michigan's Upper Peninsula. Eighteen cable companies have linked together Northern Michigan University's campus at Marquette with towns all over the Upper Peninsula. The network offers in-school programming, adult education and educational television programs to its viewers.[29]

Both Pocatello, Idaho and Willingboro, New Jersey have gained good public relations and public support for their schools through the cooperative use of CATV. Pocatello has direct ITV and electronic

distribution of movies to its schools (and viewing homes) and beams school-originated programs to the community. Willingboro uses CATV for school-to-home informational and instructional purposes and has gained wide community acceptance for its school program.

Colorado has two communities with forward-looking cable programs for the schools. In Grand Junction, the local CATV operator went partners with the school system. He built the production studio and the school district bought thirty thousand dollars work of equipment under a joint-use contract. From this arrangement they get four channels of local educational and public service television; one for general audience programming, two for instructional television and one for special school administrative programming such as inservice and orientation programs.[30] The CATV system in Fort Collins is even more ambitious. It will have sixteen channels to start with, including an ETV station from Denver. At the beginning, allotment will include one area educational network channel and three city educational channels. The second phse planned includes ETV stations from Los Angeles and San Francisco.[31]

CATV use in the schools closer to home takes in the system in use in Salisbury, North Carolina. The local cable company has wired all the city schools in Salisbury (including the parochial grade school) into a network with studios in the basement of an old school converted to a TV and Art Center. Since one of the purposes of the

Salisbury project was to demonstrate the uses of a CATV system for schools that could operate on a minimal budget, there is little spent on fancy production equipment or personnel. The system operates on the principle that the townspeople like to see what their own children are doing in school and that the students can get a good enrichment program from television by utilizing local resource people and off-the-air tapings from commercial programs.

Equipment includes half-inch VTR equipment and portable cameras for taping in the classrooms and on the playing fields, and all the filming is done by high school students who receive credit for their daytime work and standard pay at night. The program was originally funded by the Elementary and Secondary Education Act of 1965, but it has been so successfully received by the community that Mr. Herbert Rhodes, Salisbury's ITV Director, feels no qualms about being able to continue the program under local funding next year when the grant runs out. Mr. Rhodes stresses the importance in his program of being able to run an educational resource facility on a shoestring budget and at the same time involve the members of the community intimately in its programming. They do respond, phoning in suggestions for programs and volunteering to do them - the fire department, the Jaycees, the personnel department head of the local hospital, the high school counselors - and the people in Salisbury watch the programs. They respond. When a poet-in-residence comes

to talk with their children for a week about writing, they tune in and then they get in touch with Mr. Rhodes and let him know about it. If something is shown that they don't like, they let him know about that too. Salisbury has developed between its schools and the people in its community and through the medium of cable television a real channel of public access. Fred Wilhelms in an article appropriately titled "Cable TV - Protecting Its Future in Education", speaks of the probability that in the future, and especially for education's purposes, the importing of distant signals will take second place to local origination.[32] It would seem that Salisbury has already grasped this idea, and has put local origination programs to work for education's purposes.

In the same article, Mr. Wilhelms, along with Harold Wigren of the NEA's Division of Educational Technology, mentions some educational developments he can foresee with the use of CATV in the schools and in the community. They include:

High school equivalency courses for the public.
College equivalency courses for the public.
Teaching through the use of two-way feedback.
Direct two-way student communication for participation - art groups, music groups, public discussion groups.
Communication for special interest groups.
School Board "Meetings of the Air".
Informal, creative reaction in-service training.
Development of outstanding programs.
Wrestling collectively with tough problems.
Opening up any part of the CATV system to:

All the community
The community in one part of town
Pinpointing exact audiences.

For further "blue sky" possibilities, they consider:

Reaching homebound or hospitalized students with selected programs.
Having one set of programs for one school or cluster of schools and other sets for other schools.
Service computer terminals at school or at home.
Almost instantaneous opinion polls - of any group.

The really interesting point in all this is that they remark that, so far as the technology is concerned, all this will soon be completely practicable, and with the economy of abundance, none of it will be prohibitive in cost.[33] All of the ideas in the article could be used in Winston-Salem; some have implications of wider use and greater community acceptance than others. The planning necessary to implement a workable and worthwhile cable system in the schools should prove most valuable for future considerations concerning the use of still newer technology. Such planning takes considerable time, and is absolutely essential if the system in question wants to get the most for its money and effort from in-school television. George Bair is both interested and optimistic about the future of CATV. "Cable is where we're all going in TV," he remarked. "It's what's coming. How fast we'll move is another matter." This study will inquire into

the feasibility of employing cable television in the public schools of Winston-Salem/Forsyth County. Should such action prove feasible it might be well to suggest a thorough study on the part of local school authorities of instructional goals and objectives the system might gain through the use of cable television, along with the changes in curriculum, schedules, and facilities which a system-wide use of cable television would require.

Definition of Terms

Technical terms appearing in the body of the text include the following:

amplifier - an instrument utilized to boost an audio or video signal electrically.

coaxial cable - a specially designed cable in which one conductor lies within another and is separated from the first by some form of insulation such as air.

head end - that portion of the CATV system where the signals received by the master antenna are filtered, translated and amplified for retransmission to the coaxial cable for distribution.

ITFS - Instructional Television Fixed Service. A system of up to five channels for short television transmission over the air, not capable of reception on home receivers.

master distribution system (MATV) - equipment which consists of an antenna or cable hookup for receiving television signals, distribution amplifiers for increasing signal strength, and coaxial cables and connectors for distribution of the signals throughout the building or group of buildings.

microwave - a system of direct line-of-sight transmission of VHF signals from a transmitter to a receiver for distances of up to fifty miles.

monitor - TV receiver in control room used to check the progress of the show. By use of several monitors the director can anticipate the progress of the show.

transmitter - electronic equipment used to generate radio and television signals.

UHF - Ultra High Frequency. A bandwidth of the electromagnetic wave frequency ranging from 300 to 3000 mHz. Channels 14-82 on most home receivers.

VHF - Very High Frequency. A bandwidth of the electromagnetic wa ve frequency ranging from 30 to 300 mHz. Channels 2-13 on most home receivers.

VTR - video tape recorder. An instrument capable of recording both audio and video signals on a magnetic tape ($\frac{1}{2}$, 1 or 2 inch) which can be replayed later.

CHAPTER II

SCOPE OF STUDY

POTENTIAL EDUCATIONAL BENEFITS OF CABLE TELEVISION

Educational Benefits of ITV

Where does television in the classroom fit in the modern educational system? What role can it be expected to play? How might television relate to learning?

The process of education is commonly believed to possess at least three characteristics: the acquiring of knowledge, the training of skills, and the influencing of attitudes. According to Donald Paden, effective teaching (which is in direct relation to the quality of education) involves finding the most effective combination for a particular subject matter of the three inputs involved in the learning process:

1. The teacher
2. The student
3. The physical paraphernalia of education (blackboards, visuals, maps and charts, audiovisual systems)

Moreover, he continues, good instruction is achieved with the accomplishment of three objectives:

1. Stimulating student interest.
2. Transmitting and retaining information.
3. Creating in the student a permanent emotional and intellectual commitment to the subject matter.[34]

Television is capable of adding new dimensions to the processes of learning and instruction. It can present material that is inaccessible to the ordinary school classroom, and it can do so more effectively than most teachers. As a medium with immense visual and auditory impact it can reach the students quickly, hold their attention and retain their interest in the subject so that they can go on to explore new ideas on their own. The use of instructional television in particular corresponds to A. N. Whitehead's three stages of intellectual progress:

Romance - it can bring novelty and awaken curiosity, attract attention, motivate the student to learn.

Precision - it can demonstrate facts and present analysis.

Generalization - it can invite the student to apply the ideas he has learned, to explore new possibilities and relationships between areas of knowledge.

Not only can television progress from the general to the particular in presenting facts for subsumption; it can then take the student a step further to where he makes his own analyses, his own connections, to where he begins to think. It is this latter capability of instructional television which has received the least attention and which may well prove to be of the most value for in-school television.

The essence of education is learning, and the values of any instructional activities must be judged by the learnings they produce. Too often in considering the value of instructional television, however, the intangibles in learning have been given secondary positions at best. Perhaps this is because intangible learning is harder to measure and so harder to justify. In any event, it would seem that the potential of instructional television in promoting the essential third step, the ability to generalize from specifics, should be given close consideration in further studies of teaching with television.

In this age of books, magazines, newspapers, assumptions of almost universal literary, television may strike chords in the learner which do not respond to the printed page. It speaks to the individual, and brings him back to the center of the business of learning; it can make learning his individual responsibility. In any learning experience theory, the learner is considered to be the central figure. He is recognized as a reasoned human being who has his individuality provided for, who is stimulated and equipped by the process at hand to continue his learning. Interaction with the teacher is a vital part of this process.

Interaction with the classroom teacher is provided for in the suggested periods of preparation and follow-up which accompany most television courses. Satisfactory interaction between the student and the television teacher, however, remains very difficult. It is

best, therefore, instead of attempting to have such direct interaction, to accept this fact and concentrate on interaction between classroom teacher and television teacher as the source of feedback.

In addition to interaction between student and classroom teacher, television can serve to stimulate interaction between the learner and other learners and between the learner and his environment. Televised instruction can add provocative presentation of ideas and questions to the evocative presence of the classroom teacher. The combination can provide many opportunities for interacting in the learning environment, and interaction need not be defined as verbal interchange. In the learning of intangibles, it is the orientation of the teaching itself that it important, not the medium through which the instruction is received. Television is educational only as it provides the occasion, the materials and the incitement for an experience of learning.

Society in this age of printed circuitry is generating a number of phenomena which are likely to prove problems unless we can respond to their challenge promptly and cope with them adequately. Modern man is faced with more leisure time, more mobility, more urbanization. He must deal with an increasing amount of technology in his life, more service industries, a greater influence of both the government and mass media in his concerns and in his thinking. Dealing with these new facts of life more and more requires

an education better than many American children are receiving at the present time. As Lee Campion notes in his booklet And TV, Too!, "The salient educational fact of our time is that the quantity and quality of our education must be drastically and rapidly increased if our people are to meet successfully the social, economic, political, and moral challenges with which they are faced."[35]

If we are to increase the quantity and quality of our education, we must make full use of our existing educational facilities and our qualified teachers while building for the school system of the future; this insures that neither today's children nor tomorrow's are short-changed in school. Television can help solve the problems facing schools today.

Increased enrollments almost invariably mean larger classes and lectures, more sections, more visual problems for demonstrations, less time to concentrate on individual problems. The increasing amounts of information available to our students and required of them necessitates new curricula, yet textbooks are often not up to date or even available. With increasing numbers of children to be taught, we are still short in some areas of qualified people to teach them. In 1961, two-thirds of the elementary and secondary classrooms in this country had more than thirty students. Of the 1,200,000 teachers employed in 1961, 100,000 had not fulfilled even the minimum requirements for training and were teaching with sub-standard licenses.[36]

Today, even with an oversupply of teachers, we are still short teachers of special education, mathematics and subjects for educationally disadvantaged students.[37] Higher paying jobs in industry attracts male teachers with families to support, leaving fewer male models in the schools for an increasing number of young children from broken families, usually headed by women.

The phenomena noted above as being generated by our society will place increased responsibilities on the school. David Irvine, in an article for the Phi Delta Kappan, says that the educational system of the future must:

> Be able to deal with increased numbers of students.
> Accomodate itself to new and different patterns of population.
> Be capable of utilizing new technological developments for educational purposes. Increase their productivity by extending the impact of the individual teacher.
> Capitalize on the many other educational forces existing in society.
> Be able to bring learners in contact with a wide variety of realistic learning experiences.
> Accomodate itself to changes in the natural resources available to man.
> Be capable of coping with increased amounts of information.
> Be concerned with economy of learning. Synthesize complex fields of information and feeling, not store and retrieve information.
> Emphasize the development of learning skills.
> Progressively involve the learner in making decisions about his educational program so that he will ultimately control his own learning.
> Develop broadly educated specialists.
> Provide the means by which the individual can determine the overriding purposes in his life.

Help the individual break down the dichotomy between work and play.
Help each individual to release the potential he possesses.[38]

Television in the schoolroom can be an enormous learning aid to the schools concerned with performing the services noted above, completely or in part. Schools would do well to consider the use of television in the present; the children now in school have been raised in an age of television and they are ready for tomorrow's learning now. Children have limited first-hand experience of life; they turn to television in order to broaden their understanding of life and the roles they will be expected to play in it. Due in large part to the influence of television, today's child has a more dynamic concept of the world than did the child of a generation ago. It is not only prudent but essential that the classroom teacher take into account the influence of this medium; the child lives as a unitary person, not as a person having a school personality and an out-of-school personality. He brings his out-of-school experiences to the school.

What role can television play in the classroom? It can best be described as another teaching tool, one which deserves a fair place in the classroom, but which is going to produce no miracles by itself. All television, whether used as ITV or enrichment TV, is in a sense supplementary to the teacher. The inclusion of telelessons robs the classroom teacher of his own dominant role no more than

the text he assigns, or the supplementary readings he suggests, or the films he uses. But it can, very effectively, perform some functions of the teaching process. It can spare the teacher the performance of what Keppel calls "taking the kids' boots off"[39]; duties that are demanding and time-consuming but not necessarily concerned directly with the teacher's main role as a source of both information and inspiration to his students. Instructional TV's potential for using the teacher's time wisely and not squandering it on trivia is important to consider whether there's an actual shortage of teachers or not; productive teaching time is an absolute necessity.

The medium of television can be used in the classroom to great advantage if care is taken to utilize to the fullest extent its peculiar abilities. Television can do some things extraordinarily well. It is capable of magnification, transportation, transformation (through the use of ultraviolet light), storage and distribution of data and information, assembling large amounts of heterogeneous material into a coherent whole, relaying or distributing vision instantaneously (and usually the related sound along with it) and then storing the visual material by means of videotape. It can handle image multiplication (through the use of several TV sets), association (split screen), memory (single frame). It has been used for visual presentations for behavioral analysis and for group testing, for simulation and gaming experiences, for auto-tutorial study and both linear and branch

programed materials for group use. It can handle lectures, panel discussions, interviews, dramatizations, audio-visual devices (slides, movies, maps, etc.), realia and documentary material and pupil participation lessons.[40] See Chapter 2, Costello and Gordon for examples.

Television's use in education today lies for the most part in the following categories:

1. Extended instruction - live or prerecorded. Can reach many rooms, many buildings, other campuses. Can be used for adult education, preschool training, teacher training and inservice.

2. Programed instruction - can be used for individual instruction, curriculum enrichment and review.

3. Instant replay and observation - can replay manipulative skills for instruction and criticism or self-evaluation. Used in medical and dental schools.

4. Preserving material for later use - Can be used for classroom or inservice presentations of guest speakers, performance analysis and comparison.

5. Magnifying device - used for medical and surgical procedures, laboratory experiments enlargement and display, part/whole relationships with split screen.

6. Research - mass simultaneous testing, display and analysis of behavioral attitudes.

Beyond these uses of television, however, its power still lies largely in its ability to transmit the humanity of individuals and their unique talents through time and space. Not only what television itself can do should be considered, but what television makes it possible for people to do; what it can encourage and suggest in the way of providing creative and innovative learning situations. It can stimulate (and even demand) renewed thought about, and inquiry into, the nature of the learning process. By providing resources often unavailable to the classroom, by presenting the talents of a master teacher with the resources of a visuals artist and a production studio behind her, by insuring a basic minimum learning for all students regardless of teacher competencies, by acting as a source of inspiration for new ideas to the classroom teacher; by providing these, television can make possible one more contribution. It can stimulate learning. Acting as a springboard for the student's imagination, it can stretch his horizons, provide him with factual bases from which to proceed and build readiness and skills within him to equip him for sound reasoning on his own. It piques him to thought.

A new role is provided for the classroom teacher as well. With ITV, the teacher becomes a manager of resources. Her students are put in touch with virtually unlimited resources and given greater responsibility for independent study. Television means that the talent and creativity of the finest teachers may be

combined with a skilled production team to provide the best possible presentation to an unlimited number of students. This in turn frees the classroom teacher to devote more of her time and energy to bringing out individual potential from within her students. The National Association of Educational Broadcasters recognizes this value in television which ". . . greatly reduces the requirement that a teacher have substantial responsibility for planning, making or selecting basic presentation - and does so to such an extent that a system can reinvest the time and energy of the classroom teachers in the other vital parts of the instructional process."[41]

Dr. E. DeAlton Partridge, president of Montclair State Teachers College, speaks to the necessity of specializing with ITC when he notes that

> Television . . . may mean development of new skills on the part of the teacher, and it may require a different type of specialization in the teaching profession. Sometimes teachers who are particularly skillful in motivating pupils to learn and in the transmission of subject matter may be able to specialize in this and thus release the time of other teachers to do a more intensive job of personal guidance.[42]

In addition to providing the classroom teacher with the opportunity to give her students more personal help, encouragement and direction, instructional television has other advantages to offer. No studio teacher will ever appear before the camera totally unprepared, nor will he be interrupted in his presentation by

messages from the office. Audio-visual materials and visuals are more available to the television teaching staff. They have access to greater resources of time, money, and talent than the average classroom teacher. Working from this basis they can produce materials with relevance, appeal and impact for each individual program.

Often with ITV, students won't have one basic text; instead they will gather information from many sources, started on their search by the studio teacher and encouraged and directed by the classroom teacher. The advantages of such a partnership are particularly apparent with the use of specialists as studio teachers. Hagerstown, Maryland found that children reacted much better to instruction in music and art over CCTV than formerly when these areas of instruction were left entirely to the classroom teacher.[43] Oklahoma City uses ITV for elementary art. It had three art teachers for the eighty elementary schools in the city; with ITV, the children can watch a teacher trained in art education talk with them about art and demonstrate just how the project should be done, then they can do it in their rooms.[44] In Salisbury, North Carolina, Bill Rankin, the school system's art director, has acquired a personal following among the school children through his programs. In addition to "how-to" demonstrations for teacher inservice programs, Mr. Rankin goes out into the schools every week and works with the children in their art classes, which in turn are televised over the

CATV system so that parents can watch their children at work with the art supervisor.

A great deal of planning and talent must go into the production of instructional television lessons. ITV by itself has no intrinsic magic; it needs wise programming, artistic presentation and creative, imaginative utilization. Programs, not facilities, determine the educational value of television. Since learning is the primary purpose of ITV, its programs will pursue both motivation and instruction for the students. Utilizing local resources in the form of people, places and materials can give the students empathy and perspective for the lession; using a lead time of at least two weeks but not too much more will add immediacy without sacrificing quality touches in the production.

In planning television lessons, particularly with a view to encouraging inquiry among the students, the studio teacher and director may want to consider cross-references with other courses and other disciplines. Telelessons are encouraged to come to an "open end", to avoid definitive answers, to auggest that the viewing students work on the problems presented and come up with some answers. They are encouraged to go to other sources for information after the lesson, to take notes, to marshal their own resources and to assume responsibility for their own learning. They cannot stop the television teacher for questions or repetition, and

so they learn to listen attentively and with discrimination.

This self-directed pattern of inquiry should be a prime educational objective for the studio teacher, as for any teacher. You wish, as Bruner puts it, not so much to get something into the learner, but to get something out of him. Further, Bruner says, good teaching encourages discovery on one's own.[45] If television, therefore, is to become integral rather than peripheral to instruction in the classroom, it must become an excitor and motivator of learning rather than a tube through which capsules of information are poured. Learning entirely dependent on the presence of a teacher and directed only toward a problem organized by a teacher isn't likely to continue after dropout or graduation.

Student viewing of ITV needs to be purposeful, but participation need not always be overt. Program followups can include oral and written reports by the students, additions to one's vocabulary and general knowledge, critical thinking and sensitive taste. ITV can stimulate discussion among students in a variety of ways. Pupils who fail to grasp an idea from reading may understand it when explained and illustrated on television. Because the studio teacher isn't around for the discussion, talk is freer and the classroom teacher is regarded more as a participant than a judge. Interest in the subject matter is raised and the research is taken to libraries and to families for discussion there.

In teaching the humanities on television, the emphasis is not so much on communicating factual information as on motivating and stimulating the student toward self-education. Television can put him into direct contact with creative minds. Given our commitment to universal education, given our commitment to equal educational opportunities for all, television can follow up the advantages of the printed book by making generally available as teachers our wisest, most thoughtful, and most effective people in every field, making them available to be seen and heard as well as merely apprehended through the coldness to type. Therefore, the humanities and the social sciences, as well as the physical sciences, can be taught very effectively by television with the inquiry approach. (For Schwab's comments on inquiry and television, see Appendix.)

In addition to its faculties for presenting visuals and for conveying evocative personalities, television teaching possesses two additional advantages from the educational standpoint. It is rich in factors which allow the presentation of ideas and concepts in a variety of situations. Information can be carried in words, gestures, facial expressions, intonations, along with music, sound effects, visuals and demonstrations. Use of multiple like situations can serve to give the learner a deeper and more comprehensive grasp of the concept and can enhance his subsumption and reinforcement. An article in a recent copy of North Carolina Education noted that tea chers who have

become frequent members of the Sesame Street audience agree with its use of repetition to reinforce something previously introduced. All the teachers interviewed also praised the thoroughness with which concepts are taught in Sesame Street and the creativity used in their conveyance.[46]

The other advantage television possesses is brevity. Tele-lessons have what A. N. Whitehead calls "a certain ruthless definiteness essential in education." He goes on to remark:

> I am sure that one secret of a successful teacher is that he has formulated quite clearly in his mind what the pupil has got to know in precise fashion. He will then cease from half-hearted attempts to worry his pupils with memorizing a lot of irrelevant stuff of inferior importance. The secret of success is pace, and the secret of pace is concentration.[47]

Not only does the studio teacher work within the strict confines of a set time limit for his presentation, he also is given a chance to rehearse the production and check it for errors and minor lapses. Many of the best series are also pre-tested with students to insure their presentation being of the best quality possible.

One final comment on the advantages of teaching by television concerns itself with TV and the one-to-one relationship. Many teachers are reluctant to use television in the classroom, feeling that the impersonality of the set will destroy the student's feeling of individual importance and interfere with his learning. In practice,

and particularly with elementary students who do not view class time primarily as an opportunity for personal exchange with the teacher as high school and college students do, television does prove to establish a good working relatio nship between the studio teacher and the viewing students. Because of its eye contact, which has the teacher looking directly into the camera and thus directly at the students, television is an intensely personal medium. As one student put it, "In a class, the teacher talks to us. On television, he talks to me."

In investigating the subject of television in education, we have tended, as Robert Diamond notes, to emphasize its effects on learning while overlooking an aspect that may have equally important administrative implications: TV's effect on teaching efficiency.[48] Television reduces what William Brish of Hagerstown calls the "insulation and isolation" of the classroom, it keeps classroom teachers on their toes. They need to prepare for the time left from the telelesson, to guide and direct their students. ITV is pegged to a norm and the classroom teacher is challenged to identify and help students who are ahead of or behind the norm.

The problem of providing for individual differences in television classes is not basically different from that in conventional classes. Both Schramm and Mary Howard Smith of MPATI comment on the fact that television has something to offer both the bright student and the slow learner. Smith notes that bright students work more

individually and progress more rapidly using television, and both average and slow learners learn more easily through the use of oral and visual lessons not dependent on reading and writing skills.[49] Schramm reports that good students find that televised instruction offers them more and varied responses to learn, and that poor students do better with televised instruction because TV concentrates their attention.[50] It should be noted that these studies were concerned with television lessons of ordinary content, not lessons specifically designed for slow students. A recent thesis[51] concluded that television was superior to highly skilled individual instruction for certain types of mentally retarded children because it caused them to better focus their attention. Television can work with the teacher right in the classroom to see that the "different" student is able to learn at his own pace. Remedial reading is an essential part of elementary education, but it carries a social drawback, a stigma. Pupils are classed as "different" if they attend remedial classes in another room, where if they work with the television teacher right in the room there is no social penalty attached.

With the other "different" student, the gifted child, the problem is one of boredom, lack of challenge, often leading to disruptive behavior in the classroom. The teacher cannot take time from the rest of the class to provide the gifted child with enough materials to test his mettle, but the television teacher can. Telelessons can

challenge the bright student to go on beyond the confines of the TV lesson on his own, in fact they encourage him to do so. Costello and Gordon estimate that at least one-fourth of the gifted boys in this country, and at least one-third of the gifted girls, never have the opportunity to enter college.[52] Considering our concern with preserving natural resources, this would seem to indicate a serious concern with using television in the schools to preserve this most precious natural resource of human intelligence.

Mention should also be made here of one other positive factor ITV contributes to the teacher working with individual differences, the benefit of common experience, the opportunity to see a thing in the same perspective as other people. Television is a medium of common experience.

Inservice training makes the widest use of television in the field of teaching education, and is probably television's most significant contribution to learning taking place on the teacher's side of the desk. Used for observational purposes television provides an unobtrusive eye in the classroom for surveying classroom behavior, teaching techniques, typical problem situations; it is valuable in this respect both for undergraduate teacher trainees and working teachers interested in perfecting their performance on certain skills. Through the use of VTR equipment, classes taught by master teachers as well as talks by leading authorities, panel discussions and administrative meetings

can be preserved for replaying at a later time for the teachers' convenience either at staff meetings or for individual perusal and reflection. Melvin Barnes, Superintendent of Schools for the city of Portland, Oregon, talks about the value of teacher contact with other teachers and with new developments in the field. "A teacher cannot live on hoarded intellectual capital," he remarks. "He must have the incentive to keep mentally in tune with that which is new and changing. As long as he teaches, he needs the stimulation of other scholars in his subject field."[53]

Inservice education via television has included programs on arithmetic in Florida, on drama and play production in Alabama, on art education in Memphis and Salisbury, North Carolina, on spelling in Houston, and on topics of general interest to all teachers in North Carolina's state ETV network. Beginning in September of 1957, North Carolina has had a weekly inservice teacher education program. At present it is on Wednesdays from 3:30 to 4:00 p.m., and has included subjects ranging from mathematics teaching to new foreign language textbooks, drug education, efficient reading, and conversations with Dr. Craig Phillips, State Superintendent of Public Instruction.

A medium with the immediacy, simultaneity and availability of television can prove to be of immense value for administrative purposes, and has generally come to be adopted by administrators

before reaching a level of general teacher acceptance. It can be an excellent way to introduce a new course of study to many teachers in a wide area at one time, giving each of them a close look at the materials involved and perhaps exposure to experts in the field, who would otherwise go unheard by large numbers of classroom teachers unable or unwilling to attend large meetings at inconvenient times and places. Viewing the programs in the teachers' lounge or office or library, the teachers also have the advantage of common viewing experience mentioned above. The administrator can be sure that all the viewing teachers were given the same directions, explanations and demonstrations; should he wish feedback from the teachers on the new course, the program on television is an ideal means for putting their ideas in perspective and giving them any directions on how to arrange their reactions so they will be most useful to the curriculum coordinators. In-school television can make a real contribution to the ongoing process of curriculum construction.

Hagerstown, Maryland has found in its ITV project a boon for upgrading the curriculum in its public schools. Before television, there was a minimum of science instruction: one year each of physics, chemistry and biology in the high school and whatever the individual teacher felt qualified to teach in the elementary schools. Now the system has a sequential science program from grades one through twelve which allows the high school to offer two years each

of biology, physics and chemistry and gives children in the elementary grades a good basic foundation in the sciences.[54]

Summing up the advantages that television can offer the schools, the study cites two sources. In his newest book on instructional television, George N. Gordon agrees very strongly with a Ford Foundation report by Lester A. Nelson (Toward a Significant Difference) in which Nelson reports that television's most significant potential for education lies in two areas: first, as a long-range means for achieving more nearly equal allocation of available resources; and second, as a facilitating strategy to begin critical programs needed to prevent any further erosion on human resources.[55]

The school source cited comes from the Anaheim, California public schools. Further reference to the Anaheim ITV project will be made later in the study, but it is pertinent at this point to cite the major advantages of ITV which Anaheim reported in a statement to the President's Commission on School Finance.[56] This statement listed the following advantages resulting from the use of ITV in Anaheim:

1. Redeploying teachers and regrouping students in larger or smaller groups according to need - permitted greater instructional flexibility and individualization.
2. Reduction of teachers' total work and planning load.
3. More careful and systematic planning of curriculum for day-to-day instruction.
4. Improved utilization of space and personnel.
5. Increased teacher acceptance of instructional technology.

6. A basis for curriculum quality control.
7. Better student retention of the TV-taught subjects.
8. Cost effectiveness.

It is necessary at this point to mention a brief word of caution. Television is not a cure-all, it is not a miracle drug for ailing school systems. To be used effectively it must be understood and its limitations must be appreciated. There are, after all, some things instructional television cannot do. It cannot conduct a discussion efficiently, nor can it give students specific and direct personal help. It is limited in the presentation and application of abstract ideas, although it can set the stage for self-learning among the students. Personal contact is still the best way to assure the teacher that the class has digested the abstractions, and class discussion provide the feedback and defense which assure the teacher of this. But television can concretize abstractions for students and can show them working, as it does in mathematics. This personal human contact is still the realm and responsibility of the classroom teacher.

Perhaps the best method of instruction in the end is one that provides students with a wide variety of learning situations, situations which will develop the varied learning skills that they will need for continuing their education throughout their lifetimes. With this in mind, the best approach to quality in instructional television, both in its production and its application, would be a team approach, neither

teacher-oriented nor media-oriented, but learner-oriented. This approach would combine the television teacher and the classroom teacher in a total learning environment for the student. It would also enable the classroom teacher to cease regarding the set in her room as a threat and welcome it as a teaching aid. In a report to the President by the Commission on Instructional Technology, Dr. Dwight Allen, Dean of the School of Education at the University of Massachusetts, suggests that the major issues in the use of technology in education reside not so much in the development of technologies as in the re-education of teachers and educators in the value of technology as an aid to instruction.[57]

Additional Educational Benefits With Cable Television

Many of our educational goals and objectives, such as individualized learning, equal opportunities and relevant, developmental curriculum materials have too often been limited by the capabilities of our "hardware". The result has been group teaching; geographical, social and economic restraints; mass-produced, standardized resources. Most of our goal impediments relate to the organization, distribution, storage and sharing of information, ideas and personnel. Television, and more specifically cable television and the use of video tape can help schools manage their time and preserve and distribute their information much more widely and efficiently.

Cable television offers school systems more and better access to ETV programs being broadcast in their area. The reception problems encountered in Winston-Salem for the programs broadcast by WUNC-TV have been noted above, and while a new tower is being built on Sauratown Mountain, thirty miles from town, it will not obviate all the problems in reception for the schools. Moreover, programs will still be broadcast only at certain specified times, regardless of when classes are scheduled. CATV can help to solve this problem by working with VTR equipment to allow for flexible access to programming. ETV programs can be taped off the air and rebroadcast whenever it is most convenient for the school system, or certain parts of the system. Programs applicable only to the time schedule of one school, or one teacher can be taped and the video tape sent to the school for distribution on the school's VTR.

This is only the surface of cable television's possibilities for education, however. Use of the coaxial cable allows for multi-channel programming; several different ITV or enrichment programs can be carried simultaneously to different schools or clusters of schools. Specific programming can be provided for specific groups; this has wide administrative implications for the carriage of curriculum meetings, principals' or teachers' conferences, school board hearings, guest speakers. Individual and group access to centralized audio-visual data banks is another possibility opened up

with the advent of cable, and along with it, the option of two-way communication - audio, video, or digital.

The basic structure for these innovations, the coaxial cable, is provided by the local cable company and this in turn engenders a mutually profitable situation for both parties as noted by Harold Wigren. The educational institution, he points out, is freed from the expense of constructing broadcast, 2500 mHz, or cable transmission facilities. The cable operator, in turn, not only garners substantial good will from his service to education but is enabled to offer subscribers and potential subscribers new program services at minimal cost to himself.[58]

Frederick W. Ford, former chairman of the F. C. C. and president of the National Cable Television Association, has made several suggestions on ways in which a cable system may serve community needs. These include:

1. Carrying one or more ETV signals to citizens who would otherwise not receive them.

2. Providing connections and multiple outlets to local schools, enabling teachers to make use of educational and commercial programming in the classroom.

3. Providing a channel through which educational programming originated by a local school or educational agency may be distributed to the entire school system and community.[59]

Through the use of cable, the school system can use television more intensely, have control of its programs and, to some extent (with the use of mid-band channels for specific audiences) of its audience, and can determine its programming on the basis of the money and talent available. In addition to simultaneous transmission to varied audiences and re-transmission of programs for schedule flexibility, individual access possible with CATV allows for teacher previewing of films from the central film library, and for pre-service observation of classrooms by student teachers. Appalachian State University in Boone, North Carolina is now using a cable hookup for student teacher observation. The fact that student teachers can view a class in progress without actually standing in the room allows the teacher being observed to conduct her class in the usual manner. Both teacher and students are able to proceed in their work without playing to a visible audience and being on their best behavior, and the student teachers gain a much more realistic picture of typical classroom activity.

Future possibilities of CATV in education concern themselves mainly with two-way communication and the use of multimedia. Pennsylvania State University has experimented with the use of two-way audio and video transmission during class, and the State University of Iowa has been much concerned with the use of

"talk-back" to bring students closer to the instructor on television. A note on this from the MITRE Corporation: the possibility may be raised of gaining two-way interaction using a computer to screen class questions during the course of the lecture and then giving the questions to the teacher as the class proceeds.[60]

The same MITRE Corporation report discusses the use of CAI (Computer Assisted Instruction) in the classroom or at home, another innovation possible with the use of cable.[61] This is one means of allowing for completely individualized instruction in the future, along with dial-access retrieval of information, programed instruction and video/audio-tutorial laboratories. All of these innovations are possible with today's technology; what use the educational structure will make of them and when it will make its commitment will depend to a great extent on the practical considerations attendant on the balancing of infinite wants and finite resources.

PRACTICAL CONSIDERATIONS

Present Status of Television in the Winston-Salem/Forsyth County Schools

Winston-Salem/Forsyth County has a unitary school system. It employs 1,969 teachers (and four special teachers for homebound students) full time, 125 teacher aides, and 10 parttime teachers/assistant principals. These teachers work with 47,058 pupils in 66 public elementary and secondary schools in the city and county,

nearly half of whom (23, 558 to be exact) are in the first six grades of school. Television equipment in the schools at the present time consists of:

3 Concord VTR's (owned by system)
1 Concord Vidicon Camera (owned by system)
1 Sony Portapak VTR (owned by system, used in Driver Ed.)
Receivers in each school. (Estimates suggest that about one receiver per school is in good working order.)

There are no personnel on the staff specifically employed for television purposes; whatever repairs are presently required on the equipment are effected by the repair staff in the audio-visual department. There are no funds specifically alloted for in-school television, nor is there at present any official suggested programming for its use. This seems to be due to the problem of poor and uncertain reception of the programming on channel 4, WUNC-TV. In an interview with Raymond Sarbaugh, Assistant Superintendent of Schools for Instruction for the system, he noted that the schools in Winston-Salem had at one time received the programming on WUNC-TV by means of a local VHF station; the reception was reliable and they had been fairly well satisfied with ITV. When the station decided not to carry in-school programming any longer, however, the problems in reception that followed became so numerous that the system felt it would be unfair to the teachers and to the students to maintain a program of in-school television. This is the chief reason for the city's present lack of television equipment and apparent lack of interest in

instructional television. (It will be seen later that the advent of CATV has again sparked school interest in television, particularly at the administrative level.)

Since Tele-Cable (the local cable television company) has begun operations in January of 1971, it has laid cable in front of approximately half the public schools in the system. Although there is no provision for the schools in city ordinance #3000, the basic enabling ordinance for CATV systems, and no mention of educational institutions in the final franchise (approved January 19, 1970), the company has stated that it is in full favor of cooperating with the school system in establishing CATV in the schools. In the proposed rate schedule dated November, 1970, Bryan McMurray, local manager of the cable company, states:

> Free service will be provided to public schools in the Winston-Salem/Forsyth County system, to City, County and State supported schools, and to private and parochial educational institutions which lie within the Tele-Cable service area . . . . A condition of this free service is that the affected institution shall use its CATV facilities for educational purposes only.

The researcher interviewed Mr. McMurray, who seemed most cooperative and highly enthusiastic about the prospects and uses of CATV in the local schools. His company has agreed to allow the school system free use of the local service channel (channel 7, in all probability), has built at their own cost a coaxial cable from the

head end to the audotium at Parkland High School (so that studios could be set up at any time for transmission via the CATV system), and has sent its installers to instruct the county electricians in methods of wiring schools for CATV. (Upon being questioned on this last, he explained that his company would charge around $35.00 for each installation, and that the county electricians, who were quite capable of wiring the buildings, could do it for less. John Shore, Director of Educational Media for the schools, confirmed this, adding that the schools were in favor of the idea to the extent that they were using the electricians now for wiring the schools for cable whenever time permitted.

This decision to go ahead with wiring the schools now with the use of personnel already employed by the system has led to the exclusion of wiring costs for master distribution systems in the schools from the cost estimates. For general information purposes, wiring schools for CATV costs about $35.00 to $50.00 per classroom. Designing the distribution systems for each school, which often adds to the projected cost figures, has been done for the schools presently capable of being connected to the cable by Mr. William McIver, Jr., receiver systems engineer for WUNC-TV. Both Mr. McMurray and Mr. Shore, incidentally, are most interested in the future possibilities for education of using the mid-band channels; these are the channels usually meant when talking of twenty-channel

capacity receivers. They require special converters at present for reception of mid-band frequencies.

Cost Approximation for Various Cable Systems

In estimating approximate costs for setting up CATV systems of various capacities for the Winston-Salem/Forsyth County Schools, the study has taken several factors into consideration. It was decided, as mentioned above, not to include the cost of wiring the schools. Nor has the study included the salaries of the studio teachers in the budget for operating costs, although it is probable that the system will consider having them; indeed, the study recommends the use of three for the elementary programs - in art, science and music. It is assumed that these studio teachers will be chosen from personnel already teaching in the public school system, and that therefore their salaries will have been allotted from the personnel budget even though they may receive slightly higher salaries than some other teachers. (State TV Curriculum Specialists in North Carolina are in Salary Grade 71, which ranges from salaries of $10,824 through $13,728. It would be assumed that local system would pay their studio teaching personnel accordingly.)

It was decided for reasons of compatibility and durability to limit consideration to equipment meeting EIAJ standards.[62] In instructional technology, often the more "expensive" equipment may be

more economical in the long run; it is more effective, more efficient, and less wasteful. Hardware, moreover, can be amortized over a five year period at least, thus minimizing its costs.

Since the CATV company had already laid a cable from the head end to Parkland High School, it was assumed that any production facilities the system might construct would be located there. Upon consideration of the probable cost of constructing a building specifically to serve as a production studio, however, and consideration of items such as architect's fees and wiring, it was decided to convert existing space at the high school itself into the proposed studio space. This would require much less extensive remodeling, concerning itself chiefly with soundproofing materials, draperies, grids for light fixtures and sufficient wiring. A basic design of two studios was used, so that one could be used for rehearsal while the other was in production; this idea is used in Anaheim, where one control serves both studios.[63] Amounts spent on the production equipment vary with the elaboration desired in the studios, as will the amounts spent by the system on VTR's and receivers for the individual schools, depending on the funds available and the purpose intended for the CATV system in the schools. Ther personnel and operating expenses are less flexible, and constitute more or less a basic minimum for a system originating its own programming.

It was decided to consider only the use of half inch video tape and compatible equipment. This is perhaps not of sufficient quality for network programming, but the use of half inch tape and equipment as it is employed in the Salisbury schools is proof enough of the transmission quality of half inch tape for educational purposes. For reasons of economy, only vidicon cameras and black-and-white equipment were considered for the system.

It would be highly recommended for a system employing ITV for the first time in any magnitude in its system to plan for a series of teacher workshops on the idea and use of instructional television in the classroom. Salisbury had Saturday workshop sessions for thirty-five of its teachers to assist in preparing tape lessons for its programs, for which the teachers were paid fifteen dollars a day for six days. They also had consultants attending the conference, and these were paid fifty dollars a day for five days. The North Carolina Department of Public Instruction has a statewide teacher utilization workshop for ITV, held for four days every summer and worth one credit toward recertification for teachers. There is no remuneration, and no travel allotment. Since it seemed likely that any such expense as this would be allocated in the personnel budget, it was not included in the cost estimates.

The final step for any system considering investing in ITV equipment to any extent would be to obtain an objective appraisal and

minimum standards for the proposed system from a consulting engineer.

Cost estimates given in the study will appear in the form of total expenditures for the first year of operation; exceptions in the form of costs not mentioned have been noted above. For a complete listing of capital and operating expense estimates for the first year, see Appendix.

Estimates for the first CATV system proposed in the study amount to a total expenditure of $168,260.00 the first year of operation. This breaks down into $71,760.00 for capital expense and $96,500.00 for operating expense, and gives a per pupil cost of $3.58. This first system would encorporate two completely equipped studios with full production facilities and a full-time professional staff, and would enable the city/county school system to originate and transmit on the cable its own programming as well as retransmitting off-the-air ETV programs and other desired material. This cost estimate also allows for new receivers to be purchased from school funds for each school, as well as a VTR for recording and distributing programs for each school. The study considers this an optimum design for dealing with the system's needs in the present and immediate future.

The second system proposed would cost an estimated $140,260.00, and is the plan recommended most strongly by the study for the school

system's use. Capital expenditures in this system would amount to $43,760.00, and operating expenditures to $96,500.00. Per pupil costs for this system are estimated at $2.98. This system is also designed for full production and transmission facilities for two studios and allows for new receivers for each school in the system. There are, however, only 10 VTR's recommended for purchase for the first year, to be used at various schools as they are needed at the discretion of the administration. This allows for considerable savings in cost. Additional VTR's can be added with succeeding years as they prove necessary and practicable.

A system capable of expansion to the capacities of the first two is the basis for the third plan for a CATV system for the schools. It consists of one basic production studio, capable of production and transmission, and has a smaller full-time professional staff. In considering this plan, the study estimated that a purchase of five VTR's and twenty-five receivers would be sufficient for the schools the first year. Total cost for this system is estimated at $66,035. Capital expense is estimated at $12,535. and operating expense at $53,500. Per pupil figures for this system are $1.41.

It should be noted here (and this is also mentioned in the lists for equipment and personnel in the Appendix) that prices quoted are list prices; it is quite probable that school system operating on a local or statewide contractual equipment basis would be able to

effect considerable savings by purchasing their equipment under contract or in large lots.

Alternative possibilities to the systems noted above include the use of a point-to-point cable system interconnecting the public schools not only with each other but also with the administration building or some other central source, and with the universities in town (Wake Forest University, Salem College, Winston-Salem State University, and North Carolina School of the Arts) as has been proposed in Washington, D. C.[64] This proposal, made by the MITRE Corporation, suggests linking each of these points on the cable with the others by use of fourteen channel, two-way capacity video transmission. The universities it proposes to link in are American University, Howard University, Catholic University, Georgetown University, George Washington University and Federal City College. This proposal might sound a bit ambitious for Winston-Salem, but the idea of linking up the resources available with the universities and the School of the Arts deserves consideration by the school system.

The possibility of using non-standard, mid-band channels for educational purposes has been mentioned briefly, and it seems that both educators and CATV people in Winston-Salem are interested in the prospect. New head end equipment and converters would be needed for this innovation, and it appears that the considered opinion is that it would be best to wait for a period of time until the equipment is

perfected sufficiently to allow for compatibility and quality equipment. This is a definite possibility for the future in the school system.

The third possible alternative to having a full CATV system in the schools is by using a partial microwave system for transmission to the county schools not being served by CATV. The study suggests that this is not really a very economical alternative. Microwave equipment will really transmit reliably for a total of about thirty-five miles in any one direction. The costs involve in its tranmission concern not only the capital costs on the transmission tower and equipment, but also the upkeep. Upkeep costs on any kind of transmission equipment are likely to run considerably higher than on CATV equipment, and there will be no CATV company to help with the installation costs or the upkeep. Costs quoted in a recent book on ITV put the price tag on a single channel transmitter at a minimum of $15,000. Each receiving antenna (and there must be one on each school) costs $1,500; for four-channel reception in ten schools, that amounts to capital costs of $160,000. Adding maintenance costs brings the total to $250,000, or around $6.38 per pupil for four thousand students.[65]

Problems

This study will concern itself with three problems which conceivably might result with the implementation of ITV via CATV in the Winston-Salem/Forsyth County schools. The first two result from a lack of careful long-range planning and formation of ITV project goals, and can therefore be greatly minimized or prevented altogether by the use of a careful and detailed implementation plan by informed and committed administrators. These problems are, first, the lack of integration of the ITV programs and courses within the curriculum, resulting from the failure of the planning committee to realize that the use of ITV requires a restructuring of the entire curriculum and schedule agendas. The second problem is one that both Murphy and Gross and Marshall McLuhan note as being a problem with a great deal of ITV, inferior programming. Murphy and Gross note that to date television has largely put current teaching modes on the screen, with a result of mediocre instruction and widespread disenchantment with ITV.[66] McLuhan, of course, is somewhat more dramatic. He remarks that, in the name of progress, our official culture is trying to make the new media do the work of the old, that we impose the form of the old on the content of the new, that "the malady lingers on."[67] These complaints about the quality of ITV programming are all too often justified, and together with the first problem, the lack of a coherent system of curriculum revision and planning, they result

in the third problem - the failure of teachers to use ITV properly (or, indeed, to use it at all) in the classroom.

On the necessity of using a long-range plan for utilizing ITV in any form and thus assuring it a relevant place in the curriculum, John Meany, director of Houston's ETV station, states that it is not sufficient for educational television to help American education solve only its quantitative problems; for this would eventually make ETV an "immense bastion of mediocrity". On the contrary, he says, the most critical and continuing need of ETV will be to ensure that its contribution to American education is one of qualitative leadership.[68]

Earlier in the same work, William Brish of Hagerstown, talks about the effects of using ITV on revamping his school system's curriculum. "As we worked on TV," he says, "it became apparent that we were really working on education. Many changes will come as the result of coordinating many factors of the school programme. These changes may be many and great because of television, but they will be made not to provide better TV but better education for the pupils in the schools."[69]

The importance of this visualization of TV's role in the whole instructional pattern and the need to devise a coordinated new curriculum cannot be overemphasized. Henry Cassirer, author of the book from which I have just quoted Brish and Meany, suggests that television is used in the United States more to compensate for

deficiencies than to provide new resources for education which will make a contribution to the best of schools.[70] It is clearly the easier path to see ITV, or any new technological advance, for that matter, as a way out of present difficulties, a stopgap measure which is much less trouble to implement than a full-scale revision of the whole curriculum, and some investigation into the nature of the learning process as well. It is undoubtedly unrealistic, as Michael Molenda says, to expect cable television to make any big dents in educational patterns in the near future.[71] One problem which he finds in the implementation of CATV in the schools does not apply here, that of geographical boundary limits. (See below, under LEGAL FEASIBILITY.) The major stumbling block to wholesale implementation of CATV in the immediate future in the schools is what he calls "general institutional resistance to major change", and this is the first problem that will need to be overcome in any system contemplating the use of in-school television. A full-scale review of the current curriculum and course content for the system, followed by a logical integration of television into the curriculum for both purposes of improving instruction in specific instances (or providing it where it is totally lacking) and upgrading the educational content on the whole, should provide an effective means of preventing stopgap measures for the use of CATV in the Winston-Salem schools.

Programming at the local level does not need to maintain network quality production to be successful, but it does need clearly defined instructional objectives in order to be effective. In far too many cases where ITV has been tried as the cure-all for handling larger numbers of students with the teaching personnel at hand and without any pre-defined instructional goals, the attributes vested in the medium itself have been ignored and it has served merely as a conduit for inadequate teaching to larger classes. Most of the causes for "failure" with instructional television remarked by Robert Diamond come from programming faults; he notes that entire courses cannot be taught with maximum effectiveness on TV, that the presence of a teacher to implement the TV set is advisable, that commercial formats and procedures won't always work with ITV, that lessons on the television should be limited in length (15 or 20 minutes for elementary children, half an hour for secondary students), that the "star" system with TV teachers won't work. He also speaks to the need for time and organization for ITV projects; to the fact that ITV projects need time to develop and that projects must be given full administrative support because quality television teaching requires time, talent and money.[72]

Much of this programming inadequacy and resultant mediocrity has led to the use by classroom teachers of "enrichment television". This by itself is a thoroughly worthwhile concept; television is a marvelous medium for expanding a child's horizons and enriching his

experience of life. Used as a substitute for planned curriculum, however, it can prove a highly inefficient use of time and money. As George Bair mentioned, as the public increasingly demands accountability of its schools, it will begin to question the use of television solely for "enrichment" purposes. Enrichment TV is far too valuable a tool of learning to be mishandled as a substitute for instruction. It should be used as an adjunct to other learning tools, including instructional television, so that the teacher can have at her disposal the best resources and instructional materials available to set the stage for learning. Otherwise, as the National Association of Educational Broadcasters has noted, the use of ITV as a convenient source of "casual enrichment materials" doesn't contribute appreciably toward giving teachers more time and opportunity for other vitally important adaptive and reinforcement pursuits.[73]

The use of television in the classroom in any form can be a great source of frustration for everyone concerned. Classroom teachers often resent the 'intrusion' of another instructor into their domain; secondary teachers in particular resent having another instructor take over the lecturing or demonstration in a field which they regard as their specialty. Instructional television is usually much more welcome in the elementary school, where teachers are frequently overburdened with a multiplicity of tasks and there is often no specialized staff to handle instruction in the subjects of

science, art or languages. Cable television can be most helpful in dealing with two of the problems incurred in dealing with ITV at the secondary level, scheduling and curriculum content. The use of multiple simultaneous channels for programming and the employment of VTR's at both studio and school for recording and replaying video tapes can deal with the scheduling problem in great measure most effectively. The use of small group programming possible with cable, and the future possibility of two-way communication, make participation and feedback in programming much more feasible in large systems.

False expectations of ITV's results, and related to that, teacher attitude toward the use of in-school television, can be minimized or overcome through the use of ITV utilization kits and the long-range planning discussed above. Rogers, in his book on resistance to innovation in education, lists five characteristics which, when viewed from the standpoint of individual or group perceptions, have been shown to affect the rate of adoption of the innovation. They are:

1. Relative advantage of innovation.
2. Compatibility with present values and past experiences.
3. Complexity and need for training.
4. Divisibility available for limited adoption.
5. Communicability of effects perceived.

Note that the fifth characteristic deals with effects perceived, not necessarily actuality. In his same discussion of the characteristics involved in affecting adoption rate, Rogers further notes that the

actual characteristics of an innovation are of little importance to its adoption. What does seem to matter, he says, is the way in which the individual perceives the relative values of the innovation.[74]

It is most important that school systems preparing to introduce the use of in-school television into their systems be made aware of these observations on perceived values so that teacher concerns about the role of ITV can be dealt with in a manner advantageous to all concerned. The classroom teacher must be considered as the final and most influential factor involved in determining the effectiveness of television in teaching. Television of itself will not revolutionize the style and quality of our education, nor will a technically efficient method of distribution necessarily provide us with a willing audience. As Clarence H. Faust remarks, there will always be the need for "the teacher who serves, to use Socrates' phrase, the function of the midwife bringing knowledge to birth in individual minds."[75]

The North Carolina State Department of Public Instruction realizes the importance of the classroom teacher in affecting the adoption of ITV, and have stated that their first goal in educational television is to help teachers realize how television can help them achieve their own goals. Further, the Department works to provide assistance and support for teachers in their utilization of ITV. It prepares teacher's guides for its in-school series and distributes them to ITV coordinators, principals and teachers. It plans and

conducts teacher utilization workshops and "hand-on" VTR workshops for administrators and teachers. And it visits schools and school systems to help groups of teachers plan for the use of television series and guides within their systems.

It would be advisable at this point in the study, having considered the problems most likely to cause concern with the implementation of a CATV system in the Winston-Salem/Forsyth County schools, to include the recommendations of the Commission on In-School Television Broadcasting of the Second International Conference of Broadcasting Organizations. Meeting in Tokyo in April of 1964, the Commission stressed the importance of the following needs.

1. The need to bring new content and new methods, conforming with modern developments, into the curriculum of younger pupils through the medium of television.
2. The need to run television courses for teachers on new teaching methods parallel with courses on television for students.
3. The importance of using television to stimulate children's activities to lead them to discover for themselves properties and relationships, to go from the concrete to the general and abstract.
4. The need to create a framework which invites the child along a series of stepping stones corresponding with his thinking processes.
5. The need to train the child in methods of scientific thought so that he will be able to make his own deductions. [76]

These needs, in a more general sense, are the concern of all educators who intend to employ television in their schools.

Economies

The use of television in the schools as a learning tool is bound to cost money; like any other form of instructional technology it is likely to be suspect of both parents and educators as an expensive toy calling for additional strains on local school budgets already overtaxed to meet educational needs. Concern over this question of whether the new learning aids were really worth the money being spent on them inspired the formation of a President's Commission on Instructional Technology. In a report to the President's Commission on School Finance, Sidney G. Tickton made a number of interesting statements on the subject of cost effectiveness in instructional technology.

Before the formation of the Commission, it seemed, there had been no real interest in the subject of cost effectiveness among practitioners of instructional technology. The Commission staff reported that the attitudes toward instructional technologies in general tended to regard them as tools of learning, much as a library is a tool of learning. No one asks if libraries are cost effective, ran the argument, so why ask this about films, tapes, and television programs?[77] Despite a general dearth of information available from institutions using the instructional technologies and a general lack of interest in considering the cost effectiveness of these technologies at work, the Tickton report did come up with some findings that should be of interest to any school administration contemplating the use of

instructional television, or indeed, any of the new instructional technologies. The Commission found that:

> 1. The cost of instructional technology as it is used in the United States today is a drop in the bucket compared with the total educational costs.
> 2. At present, instructional technology is nearly always an educational "add-on", i. e., it is practically never a substitute for the teacher or teaching. Therefore, it is nearly always an added cost in the educational budget.
> 3. On expenditures and measurable results, there are no significant answers as to whether instructional technology is worth the cost. No one knows.
> 4. The only way to reduce unit cost substantially is to increase the pupil-teacher ratio dramatically. Sesame Street is relatively cheap (about 65¢ per viewer) because the ratio here is something like 7,000 to 1.[78]

It is obvious that there is need for further study in this area, if only to determine which methods used in instructional technology can produce the most cost-effective results and still achieve quality in promoting learning. There were some further conclusions in the Tickton study relevant to the employment of television in the schools:

> 1. Instructional media can be cost effective in certain areas in which objectives can be clearly defined, such as reading and arithmetic, but only under near-ideal conditions of creative programming, accurate record-keeping, and thorough, continuous evaluation.
> 2. The costs of instructional media, spread over a reasonable period — say five years — are no greater than those of traditional educational agents.
> 3. Instructional technology, adopted as a cost-effective instrument for individualizing and humanizing learning, is likely to be employed increasingly in the public schools in future.
> 4. Instructional technology, properly applied, cannot help but alleviate the current urban educational crisis, primarily because it requires an emphasis on learning rather than on teaching; on the individual rather than on the group.[79]

The last two points made above are of particular interest to the study, since they emphasize the contributions instructional technology, and more particularly television, can make to learning. The "is ITV worth the money?" school of thought assumes that the goals of instruction coincide with a system of measurement and that efficiency can be measured only in terms of money. The instructor may well choose as his goals constructs such as critical thinking, diagnostic excellence, and scientific reasoning, in addition to specific information which can be more easily measured. In dealing with the means to enhance learning in its students, a school system needs to consider those goals as well as the exigencies of cost and effectiveness for that cost. Richard Speagle is quoted at some length in the Tickton study on the subject of cost-benefit decisions in education; while the material is too lengthy for inclusion into the body of this study, it may well be of benefit to administrators concerned with the employment of instructional television in their system and so has been included in the Appendix.

It was stated at the beginning of this section on eceonomies that the use of television in the schools is bound to cost money; that is most certainly true. Moreover, taking into account the experience of the Miami-Dade County schools in installing ITV in hopes of effecting substantial savings in buildings and personnel while maintaining quality instruction, it is unlikely that the use of television in the

schoolroom is going to accomplish a great deal in the way of saving money while providing the same instructional services presently being offered by the system. Despite the use of the Stoddard plan for larger classes using television for instruction and smaller classes receiving individual attention and thus freeing classrooms for other uses, the emphasis on savings made with the use of ITV should be on the quality of instruction it permits the system to offer. The use of televised instruction to handle the increasingly larger number of students who need to be taught is no excuse for putting the whole burden on the TV set and ignoring the quality of the teaching that is coming through, as Miami discovered.

The idea in economies with the use of ITV is not one of getting the same education for the same number of students at less cost. Research has shown that when there is no basic reorganization in the instructional program, when ITV is used to teach the same subjects to normal-size classes, there will be no expected difference in the cost of staff. What <u>is</u> possible with the use of televised instruction is the transmission of simultaneous quality instruction to an increasing number of students (thus insuring that they are all given equal exposure to minimum instructional standards at least), and perhaps more importantly, the ability of the school system to offer courses never before possible to large number of students through the employment of master teachers who had previously been in impossibly short

supply. The whole idea in using ITV is not to save money per se; it's to get more for money spent. More instruction, better instruction, instruction in new subject areas - these are the possibilities offered with in-school television today. In addition, the redeployment of teaching personnel possible with ITV use allows the teacher to carry out individualized instructional objectives to a much larger extent.

Anaheim, California has found that its use of ITV has allowed them to redeploy teachers so that they have effected a small pupil-teacher ratio for teaching the communications skills without greatly increasing the per pupil cost and without creating a need for more classrooms. They teach these skills in rooms with a ratio of 25 to 1; audio-visual resource rooms manned by two teachers and holding 75 students take over instruction of subjects such as social science, art, science, mathematics and Spanish. (The last subject, incidentally, was only possible as a course offering through the use of television. The school system needed 20 Spanish teachers to handle the instructional load. Only 3 teachers were available, but through the use of ITV they were able to handle all the instruction. Not only did the city save the cost of employing seventeen additional teachers; the teachers did not exist and the subject could not have been taught without ITV!)

When considering the issue of personnel redeployment, it is advisable for the administration to allay teacher fears by stressing

that ITV is not going to put anyone out of a job. The idea of a system's utilizing ITV is to provide more instruction with the staff employed; to re-place teachers, not to replace them. Teachers can now have more time to plan their class time, more time to work with individual students, more time to encourage inquiry and learning.

Instructional television can effect greater instructional quality for the money spent in a variety of additional ways. The use of teacher aides can be encouraged with televised instruction; this will also serve to give the classroom teachers needed free time at less expense while the students are spending their time in productive learning. Since one teacher may no longer be confined to one classroom with the use of TV master teachers, the administration can hire a wider range of teachers with different skills without raising the budget. The use of VTR's allows the studio teacher to review her lessons, revising and editing them for corrections and up-to-date material. Utilization of regional and national tape libraries give access to a greater range of talent at less production cost, time and teaching resources. Lastly, the best teaching available can be given to the students for a smaller cost per pupil (with five year amortization figures) than live instruction by a poor or average teacher. Reporting in the Tickton study on the cost-effectiveness of its ITV system, Anaheim noted that the savings due to increased efficiency in their personnel and resources amounted to approximately $152,000 a year. Therefore, the district estimates

that its investment in the ITV system will liquidate itself in about seven years. Generally speaking, the Anaheim schools say that the television system handles about twelve per cent of the curriculum for less than three per cent of the instructional dollar.[80]

Hagerstown, Maryland also experienced the financial advantages of quality instruction through the use of television. Pressed for staff with an influx of students in the junior high school, they found that with ITV they were able to provide quality instruction for 1,500 pupils in the junior high school without paying the salaries of seven additional teachers they would have been obliged to hire. Moreover, the system was able to offer additional courses in science (see above, p. 52) and to upgrade the quality of instruction in mathematics sufficiently to account for a rise in achievement test scores of nearly two full grade years by the students using ITV after one year.

In its report on the project, the Washington County Board of Education states that the advantages of television were apparent and the cost low enough so that when outside financing came to an end in 1961 the county could continue and even expand its use of television in the classroom.[81] It also listed the following conclusions which it had reached:

1. Pupil achievement can improve significantly when television is used consistently as a teaching aid.
2. Television accelerates the teacher's professional growth.
3. Television makes it possible to upgrade curriculum and enrich the educational program more easily and economically.

4. It is especially useful in adding new learning experiences to the program.
5. Its operational costs can be met without increasing normal school budgets. Redeployment of personnel, change of intra-school organization, altered personnel scheduling can effect this. The system may even save enough through the use of television to increase teachers' salaries.
6. The problem of finding and keeping good teachers is eased.
7. Television changes the role of the classroom teacher, makes him part of a teaching team.
8. There is greater equal opportunity for all pupils.
9. There is increased vocational training opportunity.
10. School television facilities can serve the public for adult education, community projects, information.[82]

The availability of the resources possible through the use of in-school television make it clear to educators that they now have options never before open to them. They must make choices: is it better to have elementary science and art via television in Winston-Salem or no elementary science and art courses? Is it preferable to hear a lecture on literary criticism from Edmund Wilson or from a graduate student? Could the students learn more from a peek at an electron microscope along with sixty other students in the laboratory or from a clear view from above with no intervening heads? The same paucity of resources and teachers that faced Anaheim in Spanish and music and Hagerstown in science are facing Winston-Salem. Instructional television in the schools via CATV could provide some of these resources: in elementary art, science, music; in remedial reading and arithmetic; in testing and counseling; perhaps even in an increased program of teaching languages in the elementary schools.

In the final analysis, it is essential for the system to determine precisely what they expect to gain from television in order to decide whether or not they should instigate a full-fledged system of television in the schools. Their concern must encompass the larger picture of all the students' needs because as a unitary school system they must consider all the students equally; what is made available to one must be made available to all. They are obligated to weigh the questions of cost and economy.

It makes a difference in these appraisals whether one thinks of economy

. . . as involving an absolute decrease in costs

. . . as a smaller increase in proportion to student population than might otherwise be expected

. . . as a relatively modest increase as educational programs are expanded

. . . as more effective education at a higher price. Schools initially feel as a rule that they have to spend more money rather than less with ITV. But, since it is spent in order to do a better job, they get more for their money, which is one way of saying it is cheaper.

In the study reported by Lester Asheim in Educational Television - The Next Ten Years, all those consulted agreed with Jack McBride that money saving is not the real justification for using television in

the classroom. The criterion should be the improvement of education.[83] The National Education Association fully appreciates the valuable contributions which television can make to education, but it feels that an approach which aims primarily to overcome material shortages and to compensate for inadequate qualifications of teachers is to take too limited a view of television's real potential.

The need in the schools today is for quality education economically achieved, not cheaper education. Cable television can offer the Winston-Salem/Forsyth County schools the means to fill that need.

CHAPTER III

FEASIBILITY

Since the purpose of the study was to determine the feasibility of employing cable television in the Winston-Salem/Forsyth County Public Schools, it was felt that the concept of feasibility would need to be thoroughly defined in order to reach tenable conclusions. Accordingly, the concept of feasibility was investigated from the physical, legal, pedagogical, administrative, technical, economic, and political aspects involved in the employment of cable television in the Winston-Salem/ Forsyth County schools.

PHYSICAL

The question of physical feasibility revolved around the possibility of insurmountable physical barriers of any kind existing so as to prevent the installation or subsequent use of CATV by the public schools in Forsyth County. It was determined that no such barriers exist, either to the installation of CATV in the Forsyth County schools or to their subsequent use of CATV. It was determined, therefore, physically feasible to employ cable television in the Winston-Salem/Forsyth County Public Schools.

LEGAL

Legal feasibility concerned itself with the possible existence of legal obstructions to the installation or subsequent use of CATV by the public schools in Forsyth County. Investigation of the enabling ordinance and franchise, as well as interviews with the local CATV management and members of the school administrative staff found no legal obstructions to the installation or subsequent use of CATV by the Forsyth County schools. It was determined that the franchise was drawn up solely between the City of Winston-Salem and Tele-Cable because the state of North Carolina forbids county governments to issue franchises. The lack of a franchise to operate in Forsyth County does not bar Tele-Cable from operating there, as it does not require a franchise of any kind to do so. The installation of a cable from the CATV head end to Parkland High School has in fact located a portion of Tele-Cable's installations in Forsyth County, since the high school is located outside the city limits. Nor are there any regulations barring the use of cable television in the public schools of Forsyth County. It was determined that the employment of cable television in the Winston-Salem/Forsyth County Public Schools is legally feasible.

PEDAGOGICAL

The pedagogical feasibility of employing CATV was defined as the ability of in-school television via cable to perform its intended function, to teach. As Edwin P. Adkins said, "The important consideration is whether or not education is improved. If education can be improved through television, then the cost of it is justified. But neither a saving nor an increased cost can be justified if education suffers."[84]

Research conducted by numerous parties concerned with the ability of the medium of television to instruct various groups of people under various conditions has tended to prove that students do indeed learn with television. Summaries by Kamata (1956), MacLennan and Read (1963), Kelly (1964), and Schramm (1962) and Schramm and Chu (1967) have by and large come up with the same conclusions, that students given instruction by means of television do as well as, and sometimes better than, students given "traditional" instruction.

Kelly, for example, cites more than 300 test score comparisons, and concludes that the students generally did well in class with ITV as a regular resource and that 25 per cent of them achieved significantly higher scores with ITV as a regular resource.[85] Schramm and Chu cite 421 comparisons; in 308 of them there were no significant differences in achievement test scores, in 63 of them, the students with ITV scored significantly higher, and in 50 of them the students

receiving traditional instruction made higher scores.

Schramm's summary of research in educational television for Educational Television - The Next Ten Years is worthy of note in more detail as being typical of results generally in the field. He notes that in the vast majority of studies comparing televised instruction with direct instruction there is no significant difference. A few students do better in achievement tests with ITV, a few do better with direct instruction. In this work he notes that instructional television is generally more successful pedagogically with elementary students, and particularly in teaching mathematics and science. He notes also that, as Carpenter and Greenhill found at Pennsylvania State University, the attitudes of both students and teachers change and become more favorable toward the use of ITV with time and acquaintance with the benefits of televised instruction. Further, he remarks that there is no significant difference in the effects with ITV of class size (children learn as much in larger classes as in smaller ones), retention of subject matter, and in the novelty effect of television (children apparently get used to the set quickly and cease to view it as entertainment).

Other studies focusing on the instructional capabilities of instructional television by class size include those of Caprano (1957), Driscoll (1959), Neale (1961) and Carpenter and Greenhill (1958). The study conducted by Carpenter and Greenhill at Penn State focused on the CCTV system in use there, which has so proven its ability to handle

larger classes of students while maintaining quality of instruction that it has been accepted as a continuing part of the University's instructional program, according to the Ford Foundation report on ETV.[88] The use of televised instruction for large classes received another favorable mention from the Fund for the Advancement of Education, which reported that "Despite the newness of TV as a medium of instruction, despite all sorts of technical difficulties . . . the results clearly showed that students who received part of their instruction over television in large classes did as well as, and in many cases significantly better than, students who were taught by conventional methods in small classes."[89]

Hagerstown, Maryland was not included in Schramm's summary of research, and it deserves mention here. The project experimented with large group instruction also, and found that it worked well in both elementary and high school levels. As mentioned above, the fifth grade arithmetic classes which combined television with their classroom instruction achieved nearly two grade years progress in nine months of schooling.[90] And in a survey of community attitudes in Hagerstown, it was found that nearly all the students liked the instructional television, as well as 78 per cent of the parents and 83 per cent of the teachers (who said they would prefer having ITV in their classrooms and thought it improved instruction.)[91]

Further evidence for the effectiveness of television in teaching comes from the Anaheim school district in California. Their report, updating their results states that the groups receiving instruction by means of related classroom and televised teaching had been found to be consistently superior to conventionally taught groups.[92] Reid and MacLennan report that research showed television instruction in the North Carolina experiment (1958-1959) was, on balance, more effective than conventional (face-to-face) instruction.[93]

The message for administrators from this research is that, since students do learn at least as well from television as from direct instruction, and sometimes better, several alternative methods of instruction are now available for their use. They can choose on the basis of other factors than relative instructional merit.

It is, after all, hardly surprising that students learn from television, since they also learn from books, audio recordings and films. An evaluation of pedagogical effectiveness should include one more ingredient, the role of the teacher, since any evaluation of the effectiveness of instructional television, as Chester Babcock notes, must be in terms of the total teaching and learning tasks involved.[94] The Denver-Stanford project reported that the interest, experience and preparation of the classroom teacher influences student learning,[95] and the proceedings of the conference of the National Association of Educational Broadcasters in 1964 noted that a well-trained and highly

motivated classroom teacher is "the most effective single 'learning aid' that a school can combine with instructional television."[96] None of these conclusions can come as a surprise to anyone who has watched a good classroom teacher with her class; there is no doubt of the extent of her influence over their learning.

Investigation of research on the various learning aspects of televised instruction produced the conclusion that television transmitted through the means of cable is pedagogically feasible for the Winston-Salem/Forsyth County School System.

ADMINISTRATIVE

Administrative feasibility is concerned with the ease of incorporating a system of instructional television by CATV in the schools into existing administrative structure. Review of the various school systems effectively using large-scale ITV such as Anaheim, Hagerstown, Denver, Los Angeles, Tulsa and the state of South Carolina prove conclusively that television can fit into existing administrative setupts without disruption.

It has been found, however, that television is more likely to be an efficient part of the educational system when it is applied to an educational problem of sufficient magnitude to call forth broad support. Since administrators are more likely on the whole than teachers to favor the use of instructional television, care must be taken by the system wishing to employ ITV for the first time to include the

classroom teachers in the whole scheme. The idea of using in-school television is best not imposed from the top; rather, it should be presented as a proposal to be investigated by all.

Moreover, care must be taken to plan careful integration of the ITV project into the whole administrative setup, using as a goal the utilization of the television programs in the classroom for the most effective instruction. This ensures relevance on the part of the ITV program staff and acceptance by the teaching staff. The best approach desirable is to have television considered as everyone's tool and not as something done by a separate branch of the school system to be utilized or not as one wishes.

Since administrative feasibility can also be enhanced by parental cooperation, it is advisable to inform the community at all stages of the planning and implementation of the program. Parents should be sent letters of information about ITV in general and the system's goals for it in particular. They should be invited to the schools to watch it in operation, and share in any special instruction given their children on techniques of note taking and student responsibility for learning with instructional television. It is certainly possible that they can prove to be of great value in augmenting student cooperation and commitment to the program, which is necessary to a successful program.

Ensuring the cooperation of system personnel along with students and parents will certainly promote the success of an ITV program.

Employment of CATV in the Winston-Salem/Forsyth County Public Schools at this time is quite feasible from an administrative standpoint.

TECHNICAL

Technical feasibility regarding the installation and subsequent use of CATV in the Winston-Salem/Forsyth County Public Schools was investigated in the areas of installing, maintaining, and operating the necessary cable equipment and production facilities. It was established through interviews with Bryan McMurray of Tele-Cable and John Shore, Director of Media Services for the school system, that county electricians with the requisite experience in electronic equipment were quite capable of installing all the necessary equipment to receive cable transmission in the schools, and were in fact engaged in doing so whenever their schedule permitted. Additional training in specific cable installation techniques had been given them when the cable system was installed in Parkland High School in 1971.

When necessary for reasons of geography, the school system has agreed to lay the cable; some situations, such as the location of Central School in Old Salem, will necessitate laying the cable underground, and this will require a probable period of waiting before CATV services are available at Central School.

Some of the necessary resources for CATV are already present in the school system; John Shore has suggested that the audio-visual repair service can deal with at least some repairs and servicing, and some of the studio equipment can be constructed in the school shops (such as boom mike stands, multiplexer equipment, and studio props). Hagerstown uses students from the local junior college to operate production and transmission, and Salisbury uses local high school students. In both cases, the students receive credit for work done during the school day at the studios and salaries for night work.

Given the existing resources and technical knowledge present in the school system personnel, it was determined that employment of CATV in the Winston-Salem/Forsyth County Public Schools was technically feasible.

ECONOMIC

Economic feasibility was determined by computing the estimated total and per pupil costs of the suggested CATV systems and comparing them with the total amount of the present school budget in Winston-Salem/Forsyth County as well as costs in comparable school districts where ITV has been established as a successful venture.

Only a small fraction of the school budget is ever available for any form of instructional material. Most of the education dollar, as the Commission on Instructional Technology reported to the President, is earmarked for staff salaries and for new construction and

maintenance.[97] This is also true in Winston-Salem/Forsyth County, whose school system had a budget for the 1971-1972 school year of $37,100,000.00, or approximately $789.36 per pupil.

Addition of a completed CATV system to the Winston-Salem/Forsyth County schools would cost an estimated total of $168,260.00 or approximately $3.38 per pupil. This amounts to less than half of one per cent of the total budget. The actual plan for a CATV system suggested by this study has an estimated cost of $140,260 or $2.98 per pupil, slightly less than .4 of one per cent of the total budget for the 1971-1972 school year.

Winston-Salem ranks moderately high in per pupil expenditures in North Carolina, but there are systems with much higher expenditures and smaller systems which could not take advantage of the administrative contributions available with CATV when used by a large system like Forsyth County's. In 1969-1970, for example, Hyde County was spending $681.00 per pupil to educate its students and Hendersonville was spending $732.00; the per pupil cost that year in Winston-Salem/Forsyth County was $609.00.

Anaheim, California has an admirable in-school television program. For the first three fiscal years the program was in operation, they reported expenditures of $586,069.00, or about $4\frac{1}{2}$ per cent of all total expenditures for the three years. Less the Ford Foundation funds, the district itself spent $442,069 of its own money,

or approximately 3½ per cent of the general fund expenditures.[98] Anaheim's school district assessed per pupil valuation is roughly median for California; since the project began in 1959, the per pupil cost there has remained below the similar per pupil cost for all the other elementary districts in Orange County, where Anaheim is located. Moreover, Anaheim's per pupil cost is now substantially below the California state per pupil average cost. In 1960-1961, for example, per pupil cost in Anaheim amounted to $306.00. Per pupil cost in Orange County was $327.00 and the average per pupil cost in California was $359.00.[99]

Hagerstown, Maryland regarded its ITV program as having effected a much higher quality education as a great savings over what they would have had to pay, assuming the amounts of teaching talent would have been available and they would have been able to afford the cost. In 1961-1962, Hagerstown reported per pupil cost figures of $368.00. That same year, per pupil costs in Mississippi and New York were $207.32 and $683.28 respectively.[100] Obviously, Hagerstown was not outspending the nation to get quality education. In 1971, the Tickton Commission reported that Hagerstown's conclusions on savings with ITV were confirmed as still valid. Moreover, per pupil cost in Washington County (Hagerstown) in 1969-1970 amounted to $772.51; per pupil cost in Maryland that same year averaged $816.30.[101]

The costs of ITV programs vary widely, of course, with the nature of the facilities used and the resources available. South Carolina's statewide ETV network (a CCTV system, by the way) was offering thirty-six high school courses on television for around $12.00 to $14.00 per pupil.[102] Los Angeles County, California, on the other hand, reported an ITV program cost of 75¢ per pupil per year, and Oklahoma City reported a per pupil cost for its ITV series of 19¢ per week. These are both from the Tickton report, which quotes an average per pupil cost for ITV of 43¢ per year.[103] A great number of the systems reporting had large numbers of school schildren, which tends to lower the per pupil cost figures.

The Winston-Salem/Forsyth County Schools are requesting an expense item of $600.00 for each school to be wired to CATV in the coming year, $300.00 for the cost of wiring and $300.00 for electrician time and possible VTR purchases. Marvin Ward, Superintendent of Schools, has said that the funds for a CATV system would come from the school budget as expenses were necessitated and could be justified, some of the funds coming from the audio-visual budget and some from the personnel budget. He also sees no fault with staging the installation of cable in the school system over a period of two to three years, as funds and facilities permit.

Considering the relative total and per pupil cost of suggested CATV plans for the Forsyth County schools and the administrative

interest in furthering CATV in the schools whenever possible, it was determined economically feasible to employ CATV in the Winston-Salem/ Forsyth County Public Schools.

POLITICAL

Determination of the political feasibility of installing and subsequently using CATV in the Winston-Salem/Forsyth County Public School system involved ascertaining as far as was possible at the present time the attitudes toward the use of CATV in the Winston-Salem/ Forsyth County Public Schools of four local groups of people: the school administration, the classroom teachers, the parents (as represented by the PTA Council), and the local CATV management. The presence of overt hostility as well as overt enthusiasm and support was investigated.

Determination of school administrative attitude and policy toward the use of CATV in the schools was deemed essential because it is most likely that decisions concerning any new proposals for the system would originate there. The dominant point of view for in-school television remains that of the administrator who sees in television a way to improve the overall performance of the school system rather than a means of enriching the individual classroom lesson.

The school administration in Winston-Salem/Forsyth County is no exception to this idea. Raymond Sarbaugh, Associate Superintendent

for Instruction, is most enthusiastic about the possibilities latent in CATV for the schools, primarily as a tool for in-service and administrative use. A school system the size of Forsyth County's could make good use of CATV for meetings, consultations, presentations, demonstrations, he feels. CATV's capability in handling these and school programs in elementary art and music as well as system-wide distribution of 16 mm. films should produce results which would please the community and thus get more money for larger and more ambitious programs for the schools. He would very much like to see CATV in use in the schools, and says that the school administration has been distressed by its inability to increase its capability in the field of television (largely due, of course, to the problem of reception with WUNC-TV programs). Like Superintendent of Schools Marvin Ward, Mr. Sarbaugh thinks in-school television is a good idea and that CATV may well provide the answer to economical quality school programming, as well as serving as an excellent means of system-wide communication for the administration.

John Shore, Director of Media Services for the Forsyth County Schools, is both enthusiastic and hopeful about the future of CATV in the school system. He favors the use of CATV to further enrichment programs in elementary art and science, and to promote in-service programs for changing textbooss and curricula, and to improve human relations through better communication. He wants to have CATV, as

he says, to let teachers do the things human beings do best, since there are lots of means of giving out information that are often capable of doing a better job than the teacher.

Teacher support of a proposed CATV plan in the schools would be an invaluable aid to making the whole idea work. When ITV is instituted in a school system from the top down, the classroom teacher can be almost the last to know. Too often she is told to use ITV; she does not choose to do so herself. The result is resentment and indifference, adding up to ineffectiveness in the ITV program. When teachers are included in the planning and implementation of an ITV project, however, they feel that they are participating in something they have a personal stake in, something that they want to succeed.

Teacher attitude toward in-school television in general in Winston-Salem seems to be rather favorable. Both the presidents of the Classroom Teachers Association and the local chapter of the North Carolina Association of Educators were in favor of employing CATV in the public schools here, and Mrs. Nancy Braswell, the NCAE president, was quite enthusiastic about its possibilities. She had taught in Florida where they had had in-school television and was definitely in favor of its use as instructional television. She says it's a very good means of school communications, and would very much like to see it used in Winston-Salem and Forsyth County for programs of remedial and enrichment lessons, as well as in-service programs.

Parental and community opinion, particularly as expressed by the PTA Council, was deemed important for any consideration of the feasibility of a CATV plan affecting the entire school system. The use of television in the school system is predicated upon full cooperation and understanding by all concerned with education, which means the entire community.

Community support can prove to be an actual financial asset to educational television; subscribers in Boston and San Francisco contribute in no small measure to the operating funds for WGBH and KQED. In Winston-Salem, a possible source of funds for present or future CATV programs might well be the Arts Council or the Enrichment Committee of the PTA Council.

Parents can constitute a valuable educational resource in the community, as the Denver-Stanford project showed.[104] The PTA Council was considered by its president, Mr. H. B. Goodson, to be favorable to the idea of CATV in the schools.

Tele-Cable, according to its manager, Mr. Bryan McMurray, is all in favor of the employment of CATV in the schools. They have cooperated in giving the county electricians instruction in wiring the schools for CATV, and are in favor of granting the schools programming time on channel 7, the channel reserved for local origination programming. Mr. McMurray is fully alive to the public relations and sales possibilities in writing the schools for

CATV and having local educational programming, and is further enthusiastic about the idea of having students help in the production and transmission of the programs. He favors the concept of a more mobile CATV school system, with mobile VTR's and lightweight production equipment, so that in effect every school room could become a studio. This would be relatively inexpensive and would lend immediacy to the programming.

Having ascertained the attitudes of the four local groups most concerned with the employment of CATV in the Winston-Salem/Forsyth County schools, and agreeing with Machiavelli that, where the willingness is great the difficulties cannot be great, the political feasibility of employing CATV in the Winston-Salem/Forsyth County Public Schools was determined to be of a substantial nature.

CHAPTER IV

SUMMARY AND CONCLUSIONS

SUMMARY

The study concerned itself with the feasibility of employing cable television in the public schools of Winston-Salem/Forsyth County. Given the established status of the medium today in schools and its enormous influence on children's minds, it was felt that such a study would be beneficial.

The nature and influence of the medium, and its relationship and possible contribution to the learning process were considered. Differences between broadcast and cable television were explored, centering on the myriad possibilities for education extant in cable television.

Television's role in education was reviewed, taking up the subjects of educational television in general, then instructional television with its many uses, and continuing to closed circuit television in the public schools, which focused on the system in Washington County, Maryland. Cable television systems and their relation to the schools were considered with reference to several systems in operation today, particularly the one in Salisbury, North Carolina. The chapter concluded with definitions of terms appearing in the body of the text.

Chapter II dealt with the scope of the study, taking into account the potential educational benefits of cable television. Educational benefits of instructional television as a whole were reviewed first, particularly as they can help the classroom teacher deal with the problems generated from the phenomena of an age that is growing increasingly technological in nature: increased leisure time, more technology, more mobility, more urbanization. Modern man faces greater demands on his knowledge as he accumulates this knowledge, and schools must cope with this growing amount of data and growing requirements that students be able to deal with in a competent manner.

Television's contribution to the growth of inquiry and scientific learning methods was considered, as well as its ability as a medium to present factual and visual information. In addition, its contributions in the fields of in-service and teacher education were mentioned.

The peculiar advantages to receiving in-school television via cable television were enumerated, including the capacity for small group and particularized audiences and two-way communication.

Practical considerations to be weighed in employing CATV in the Winston-Salem/Forsyth County Schools were taken up. A survey of the equipment presently in the school system that is used for television and/or cable television was made, and it was concluded that there is at present very little use of television in the Forsyth County

school system. Suggestions were made for three separate CATV plans for the public schools of Forsyth County, and estimates were made of the total and per pupil costs for each plan. They came to per pupil costs of $3.58, $2.98 and $1.41, respectively. Other possibilities to be considered in addition to having the entire school system on CATV were weighed; they included the use of point-to-point cable in the schools and universities, the use of mid-band channels for educational purposes, and the use of a microwave transmitter for sending programs to county schools not yet "on the cable."

Problems to be given thought were the employment of CATV in the schools amounted to three: lack of integration of the ITV program within the existing curriculum, inferior programming, and misuse of ITV in the classroom. Suggestions were made for the prevention of these problems, largely by the use of long-range, careful planning and staff involvement.

While it is best to consider televised instruction from the standpoint of getting better quality instruction for the money spent (and quite possible instruction that would be impossible with conventional means) and not from an idea of saving money per se, certain economies are possible with the use of ITV. Cost effectiveness with ITV, and the possibility of re-deploying personnel and facilities, particularly with regard to the school systems of Anaheim and Hagerstown were taken into consideration as bonuses for in-school

television. It was stressed, however, that the need in the schools today is for quality education economically achieved, not cheaper education.

Chapter III defined and investigated the concept of feasibility as it applied to the employment of CATV in the Winston-Salem/Forsyth County Public Schools. Feasibility was considered from its physical, legal, pedagogical, administrative, technical, economic, and political aspects.

Since there are no insurmountable physical barriers to prevent the installation or subsequent use of CATV in the Public schools of Forsyth County, it was determined physically feasible to employ CATV there.

Despite the existence of a franchise for the operation of Tele-Cable only within the city limits, it was discovered that this did not hinder Tele-Cable from operating in Forsyth County since North Carolina counties are forbidden by law to grant franchises. Tele-Cable has in fact already installed some facilities in Forsyth County, including the one at Parkland High School. It was determined legally feasible to employ CATV in the public schools of Winston-Salem/ Forsyth County.

The pedagogical feasibility of employing CATV in the Forsyth County schools concerned itself with the question of whether or not television can indeed teach. Research from several sources was

cited to the effect that children learn at least as well from televised instruction as they do from traditional methods of instruction, and some learn much better. Summaries by Schramm, Schramm and Chu, Carpenter and Greenhill, and the school systems of Anaheim and Hagerstown were cited for their results on televised instruction and learning.

Administrative feasibility dealt with the ease of incorporating a system of CATV for in-school use into the existing administrative structure. It was found that, since the community as a whole is involved in an educational undertaking of this scope and nature, it would be advisable to incorporate teachers and parents into the planning and utilization of the CATV system from the very beginning.

Technical feasibility referred to the areas of installing, maintaining and operating the necessary cable equipment and production facilities for a CATV system in the Winston-Salem/Forsyth County schools. Investigation of this question disclosed that county electricians are quite capable of installing the cable equipment in the schools, and indeed are at work doing so now when time permits. Further, it was recommended that the system employ student help for its production and transmission facilities whenever possible as the systems in Hagerstown and Salisbury are doing.

Economic feasibility was determined by computing the estimated total and per pupil costs of the suggested CATV systems and comparing

them with the present school budget as well as with per pupil costs of comparable school districts already using ITV successfully. It was found that the maximum suggested system would cost approximately $168,260.00 or less than half of one per cent of the total annual budget for the 1971-1972 school year. The recommended CATV system for the schools in Forsyth County would cost approximately $140,260.00 or slightly less than .4 of one per cent of the total budget. Per pupil cost figures for Anaheim and Hagerstown were given and it was noted that both are substantially lower than the median per pupil educational cost in each state. Considering relative total and per pupil costs of employing CATV in the Winston-Salem/Forsyth County Public Schools and administrative interest in furthering CATV in the schools whenever possible, it was determined economically feasible to employ CATV in the Winston-Salem/Forsyth County Public Schools.

The last consideration was one of political feasibility. It was decided to investigate the attitudes of four groups of people in Winston-Salem/Forsyth County to determine as far as possible at the present time their feelings about the use of CATV in the local schools. The school administration was interviewed in the persons of Marvin Ward, Superintendent of Schools for the system; Raymond Sarbaugh, Associate Superintendent of Schools for Instruction for the system; and John Shore, Director of Educational Media for the system.

Administrative attitude toward the use of CATV in the schools is very favorable. All three men interviewed said that they were enthusiastic about the idea, particularly with a view to its administrative possibilities.

Teacher attitudes in Winston-Salem/Forsyth County were explored through the Classroom Teachers Association and the local branch of the North Carolina Association of Educators. Teacher attitude toward the use of CATV in the schools seems to be generally favorable, and it was recommended that teachers be brought into any plan for using CATV in the schools early in the organization stage to ensure their wholehearted support.

The use of television in the school system is predicated upon full cooperation and understanding by the entire community, so the attitude of the community as represented by the PTA Council was investigated on the subject of using CATV in the public schools. Mr. H. B. Goodson, president of the PTA Council confirmed what seemed to be a general impression, that the community as a whole is favorable to the idea of having CATV in the public schools.

Local CATV management cooperation is essential for a truly feasible CATV system in the schools, so the study investigated the attitude of the local CATV management in the person of Bryan McMurry, the local manager. Mr. McMurry was most enthusiastic about the concept of CATV in the public schools, has offered time on

a local channel for educational purposes and has cooperated with the local schools in building a cable from the head end to Parkland High School and in seeing to it that his personnel gave instructions to the county electricians on installing cable lines in the schools. He also suggested the use of student personnel in the CATV system whenever possible.

From the positive attitude displayed by the four groups of local people most vitally concerned with the use of cable television in the schools, it was determined that the employment of television in the public schools is politically feasible.

CONCLUSIONS

It was concluded from the results of the study that the employment of CATV in the Winston-Salem/Forsyth County Public Schools is feasible.

Further, with the reflection that a new medium such as cable television means opportunity and not inevitability, it is suggested that the Winston-Salem/Forsyth County Public Schools give serious consideration to the possibility of employing cable television in a system of in-school television for purposes of instruction and enrichment throughout the system.

In order to ensure that any contemplated plans for the utilization of CATV in the schools make full allowance for all of the problems which can arise with the lack of a long-range, full-scale design, it is

further suggested that, upon having given consideration to the possibility of employing cable television in the schools, the administration be charged with the responsibility for the formation of committees composed of members of the school administration, classroom teachers, curriculum specialists, and parents to study the needs and resources present in the community for the purpose of making specific recommendations concerning a program for the utilization of cable television in the Winston-Salem/Forsyth County Public Schools. The committees should be at least three in number, dealing with matters of funding, utilization and curriculum planning.

It is the hope of the researcher that the results of this study will provide a base for a program in the Winston-Salem/Forsyth County Public Schools based on George Gordon's "simple notion" that quality education for all children, according to their aspirations is not an impossible dream, just a difficult one, and that classroom TV may help it to come true.[105]

FOOTNOTES

[1]The Institute for Communication Research. Educational Television - The Next Ten Years (Stanford: The Institute for Communication Research, 1962), p. 12.

[2]Ibid., p. 30.

[3]Paul Ryan, "The Raw and the Overcooked," Media and Methods, VI (October, 1969), 50.

[4]Children's Television Workshop, Private Planning Conference. Tentative Approach and Agenda, meeting of April 23-24, 1971, Suffern, New York, p. 14.

[5]Marshall McLuhan and Quentin Fiore, The Medium is the Massage (New York: Bantam Books, 1967), p. 125.

[6]Ibid., p. 141.

[7]Michael H. Molenda, "Half Speed Ahead: A Background and Perspective on Cable Television and Video Cassettes in American Education" (Greensboro, North Carolina: Report prepared for the National Academy of Education, February, 1972), p. 3.

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[10]Richard C. Burke, ed., Instructional Television: Bold New Venture (Bloomington, Indiana: Indiana University Press, 1971), p. 3.

[11]John Walker Powell, Channels of Learning (Washington, D.C.: Public Affairs Press, 1962), p. 6.

[12]Burke, op. cit., p. 23.

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[14]George N. Gordon, Classroom Television: New Frontiers in ITV (New York: Hastings House, 1970), p. 27.

[15]Ibid., p. 15.

[16]Nelson B. Henry, ed., Mass Media and Education (Chicago, Illinois: National Society for the Study of Education, 1954), p. 121.

[17]Fr. John Culkin, "A Schoolman's Guide to Marshall McLuhan," Saturday Review, March 18, 1967, p. 72, quoted by Burke, op. cit., p. 116.

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[19]Ford Foundation, etv: a Ford Foundation Pictorial Report (New York: Ford Foundation, 1961), p. 43.

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[21]Gordon, op. cit., p. 27.

[22]George N. Gordon, Educational Television (New York: The Center for Applied Research in Education, 1965), p. 59.

[23]Ford Foundation, op. cit., p. 38.

[24]Washington County, Maryland Board of Education, Washington County Closed Circuit Television Report (Hagerstown, Md.: Washington County Board of Education, 1963), p. 8.

[25]Ibid., p. 2.

[26]Meany and Carpenter, op. cit., p. 25.

[27]NEA, Div. of Ed. Tech., op. cit., p. 1.

[28]Ibid., p. 9.

[29]Judith Murphy and Ronald Gross, Learning by Television (New York: Fund for the Advancement of Education, 1966), p. 75.

[30]NEA, Div. of Ed. Tech., op. cit., p. 19.

[31]Preston Davis, "CATV - An Educational Resource," Cablecasting and Educational Television, IV (May, 1968), 19, 20.

[32]Fred T. Wilhelms, "Cable TV - Protecting Its Future in Education," Interpretations, November, 1971, p. 2.

[33]Ibid., pp. 1, 2.

[34]Barton L. Griffith and Donald W. MacLennan, ed., Improvement of Teaching by Television. Proceedings of the National Conference of the National Association of Educational Broadcasters at the University of Missouri, March 2-4, 1964 (Columbia, Mo.: University of Missouri Press, 1964), p. 77.

[35]Lee E. Campion and Yvonne Lanagan, ed., And TV, Too! (Washington, D.C.: National Education Association, Division of Audio-Visual Instruction, 1961), p. 7.

[36]Lawrence F. Costello and George N. Gordon, Teach With Television (2nd ed.; New York: Hastings House, 1961), p. 12.

[37]National Education Association, Research Division, Higher Education and National Affairs, September 17, 1971, quoted in Interface, February, 1972, p. 14.

[38]David J. Irvine, "Specifications for an Educational System of the Future," Phi Delta Kappan, LVI (February, 1972), 362-364.

[39]Inst. for Comm. Research, op. cit., p. 22.

[40]See Chapter 2, Costello and Gordon for examples.

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[43]Edwin P. Adkins, ed., Television in Teacher Education. Report of American Association of Colleges of Teacher Education (Washington, D. C.: American Association of Colleges of Teacher Education, 1960), p. 26.

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[45]Wilma McBride, ed., Inquiry: Implications for Televised Instruction (Washington, D. C.: National Education Association, Division of Audio-Visual Instruction, 1966), pp. 55, 56.

[46]Bernadine Moses, "They Dig Big Bird," North Carolina Education, II (November, 1971), 34.

[47]Costello and Gordon, op. cit., p. 70.

[48]Robert M. Diamond, ed., A Guide to Instructional Television (New York: McGraw-Hill, 1964), p. 3.

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[50]Inst. for Comm. Research, op. cit., p. 70.

[51]George Schardt for the University of Southern California, cited in Allen E. Koenig and Ruane B. Hill, The Farther Vision (Madison, Wisc.: The University of Wisconsin Press, 1967), p. 225.

[52]Costello and Gordon, op. cit., p. 13.

[53]Burke, op. cit., p. 30.

[54]Wash. Co. Bd. of Ed., op. cit., p. 1.

[55]Gordon, Classroom Television, p. 95.

[56]Sidney G. Tickton, The New Instructional Technologies: Are They Worth It? Statement to the President's Commission on School Finance (Washington, D. C.: Academy for Educational Development, Inc., 1971), p. 37.

[57]Commission on Instructional Technology, Report of the Commission, To Improve Learning (Washington, D.C.: Government Printing Office, 1970), p. 37.

[58]Harold Wigren, Statement before U.S. House Subcommittee on Communications and Power, May 20, 1969, quoted in Meany and Carpenter, op. cit., p. 157.

[59]Meany and Carpenter, op. cit., p. 24.

[60]MITRE Corporation, Urban Cable Systems (Washington, D.C.: The MITRE Corporation, 1971), p. 92.

[61]Ibid.

[62]Electronic Industries Association of Japan. To meet EIAJ standards, equipment must be compatible with like models from the original manufacturer and with EIAJ standard models from other manufacturers.

[63]Diamond, op. cit., p. 70.

[64]MITRE Corp., op. cit., pp. 105, 108, 109.

[65]Gordon, Classroom Television, p. 64.

[66]Murphy and Gross, op. cit., p. 6.

[67]McLuhan and Fiore, op. cit., p. 81.

[68]Henry H. Cassirer, Television Teaching Today (Paris: UNESCO, 1960), pp. 94, 95.

[69]Ibid., p. 37.

[70]Ibid., p. 61.

[71]Molenda, op. cit., pp. 1, 2.

[72]Robert M. Diamond, "Let's Learn From Our Mistakes: A Hard Look At Instructional Television," Audio Visual Instruction, XII (March, 1967), 233, 234.

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[74]Richard I. Evans, Resistance to Innovation in Higher Education (San Francisco: Jossey-Bass, 1968), p. 16.

[75]Inst. for Comm. Research, op. cit., p. 209.

[76]McBride, op. cit., p. 6.

[77]Tickton, op. cit., p. 2.

[78]Ibid., pp. 6, 7.

[79]Ibid., pp. 24, 25.

[80]Ibid., p. 38.

[81]Wash. Co. Bd. of Ed., op. cit., p. 8.

[82]Ibid., pp. 2, 3.

[83]Inst. for Comm. Research, op. cit., p. 22.

[84]Adkins, op. cit., pp. 61, 62.

[85]Goodwin C. Chu and Wilbur Schramm, Learning From Television: What the Research Says (Washington, D. C.: National Association of Educational Broadcasters, 1967), p. 5.

[86]Ibid., p. 6.

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[88]Ford Foundation, op. cit., p. 22.

[89]Costello and Gordon, op. cit., p. 15.

[90]Wash. Co. Bd. of Ed., op. cit., p. 1.

[91]J. Christopher Reid and Donald W. MacLennan, Research in Instructional Television and Film (Washington, D. C.: Government Printing Office, 1967), pp. 81, 82.

[92]Tickton, op. cit., p. 37.

[93]Reid and MacLennan, op. cit., pp. 141, 142.

[94]McBride, op. cit., p. 59.

[95]Griffith and MacLennan, op. cit., p. 37.

[96]Ibid.

[97]Comm. on Instruct. Tech., op. cit., p. 79.

[98]Diamond, A Guide to Instructional Television, pp. 68, 69.

[99]Ibid., pp. 69, 74.

[100]Wash. Co. Bd. of Ed., op. cit., p. 2.

[101]Tickton, op. cit., p. 39.

[102]Diamond, A Guide to Instructional Television, p. 85.

[103]Tickton, op. cit., pp. 40-42.

[104]Griffith and MacLennan, op. cit., p. 39.

[105]Gordon, Classroom Television, p. 230.

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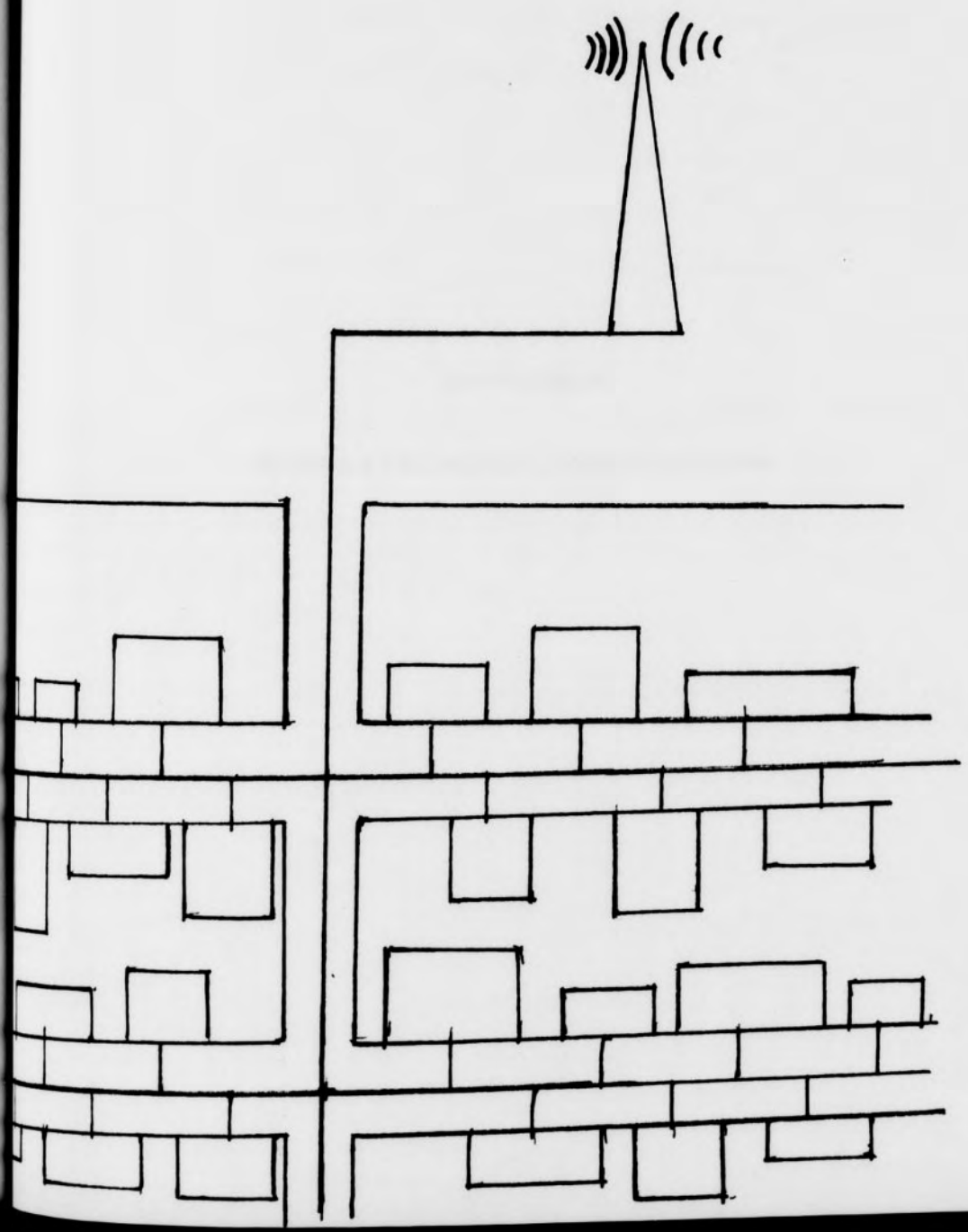
APPENDICES

APPENDIX A

SAMPLE CATV DISTRIBUTION SYSTEM

SAMPLE CATV DISTRIBUTION SYSTEM



APPENDIX B

SCHWAB ON INQUIRY AND TELEVISION

SCHWAB ON INQUIRY AND TELEVISION

"The narrative inquiry, in the receptive pattern, lends itself well to the presentation on television of persons better equipped than the typical teacher in their respective fields.

The participative pattern of inquiry has importance for television in that a dialogue on the screen can evoke in the classroom viewers a sub-vocal participation, to be followed by verbal participation in the classroom.

For the active pattern of inquiry, many provocative situations may be transferred to the student by television; these situations might otherwise be too inaccessible, too large, or too expensive to import into the classroom."

Inquiry: Implications for Televised Instruction, p. 51.

APPENDIX C

COST ESTIMATES FOR CATV SYSTEMS

COST ESTIMATES FOR CATV SYSTEMS

SYSTEM A

Total cost	$168,260.00
Per pupil cost (Approximate)	3.58
Capital expense (2 studios)	71,760.00
studio remodeling	1,000.00
studio equipment	28,510.00
draperies	1,000.00
VTR's	33,000.00
receivers	8,250.00
Operating expense	96,500.00
materials	1,500.00
tapes	1,500.00
salaries	95,500.00

SYSTEM B

Total cost	$140,360.00
Per pupil cost (Approximate)	2.98
Capital expense (2 studios)	43,760.00
studio remodeling	1,000.00
studio equipment	28,510.00
draperies	1,000.00
VTR's	5,000.00
receivers	8,250.00
Operating expense	96,500.00
materials	1,500.00
tapes	1,500.00
salaries	93,500.00

SYSTEM C

Total cost	$66,035.00
Per pupil cost (Approximate)	1.41
Capital expense (1 studio)	12,535.00
studio remodeling	500.00
studio equipment	5,910.00
draperies	500.00
VTR's	2,500.00
receivers	3,125.00
Operating expense	53,500.00
materials	1,000.00
tapes	500.00
salaries	52,000.00

STUDIO EQUIPMENT

PLANS A AND B

Studio 1	
2 Viewfinder vidicon cameras	$4,000.00
2 Tripods with dollies	1,400.00
2 Rear-operated zoom lenses	2,000.00
4 microphones; 2 on stands, 2 lavalier	400.00
1 Camera console	9,000.00
camera monitors	
line monitors	
intercom system	
wave form monitor	
audio mixer	
sync-generator	
switcher fader	
glass partition	
1 Studio VTR	1,500.00
1 Studio monitor	250.00
1 Film chain	5,050.00
16 mm projector	
slide projector	
vidicon camera	
prism multiplexer	
Lighting system	2,000.00
Studio 2	
2 Vidicon cameras	$1,800.00
2 Tripods with dollies	400.00
1 4:1 ratio zoom lens	400.00
1 Fixed 25 mm lens	35.00
1 Switcher fader	500.00
2 Monitors	400.00
1 Industrial sync-generator	500.00
1 Line monitor	225.00
1 VTR	500.00
4 microphones; 2 on stands, 2 lavalier	400.00
Lighting system	750.00

STUDIO EQUIPMENT

PLAN C

2 Viewfinder vidicon cameras	$1,800.00
2 Tripods and dollies	400.00
1 4:1 ratio zoom lens	400.00
1 Fixed 25 mm lens	35.00
1 Switcher fader	500.00
2 Monitors	400.00
1 Industrial sync-generator	500.00
1 Line Monitor	225.00
1 VTR	500.00
4 Microphones; 2 on stands, 2 lavalier	400.00
1 Lighting system	750.00

SALARIES

PLANS A AND B

1 ITV Project Director		$20,000.00
2 Producer/Directors @ 13,000		26,000.00
2 Engineers @ 10,000		20,000.00
1 Graphics Artist		6,500.00
1 Audio-Visual Materials Researcher		10,000.00
2 Secretaries @ 5,000		10,000.00
Student help		5,000.00
	Total	$93,500.00

PLAN C

1 ITV Project Director		$20,000.00
1 Producer/Director		13,000.00
1 Engineer		10,000.00
1 Secretary		5,000.00
Student help		2,500.00
	Total	$52,000.00

APPENDIX D

SPEAGLE ON COST-BENEFIT DECISIONS IN EDUCATION

SPEAGLE ON COST-BENEFIT DECISIONS IN EDUCATION

1) Objectives - the taxonomy of educational objectives is exceedingly complex: measures and goals are difficult to define at all levels of the school - total curriculum, grade, course, lesson and block of study.

2) Costs - costs of instruction are crudely measurable in terms of teachers and materials inputs; the pricing of new media rests either on an experimental scale or on projections whose value is limited by highly restrictive assumptions.

3) Benefits - the pecuniary benefits of education are roughly measurable by future income differences, but non-monetary benefits resist measurement; the learning input of students is only imperfectly quantified by achievement tests.

4) Rate of return - a monetary return on cost, or investment in education at any level is roughly measurable when compared with no education at all; cost-benefit comparisons among instructional alternatives, as offered by the new media, remain feasible in theory only.

from a paper submitted to the Committee on Instructional Technology, cited in the Tickton report.