THE RELATIONSHIPS OF SELECTED SCHOOL DISTRICT CHARACTERISTICS TO THE USE OF EDUCATIONAL TELEVISION IN MICHIGAN HIGH SCHOOL DISTRICTS

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Stuart Kenneth Bergsma

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To Debby

Who was so interested and
who helped so much

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ABSTRACT

THE RELATIONSHIPS OF SELECTED SCHOOL DISTRICT CHARACTERISTICS TO THE USE OF EDUCATIONAL TELEVISION IN MICHIGAN HIGH SCHOOL DISTRICTS

by Stuart Kenneth Bergsma

A review of social research reveals that the rationale which proposes that schools unable to provide high quality instruction in specialized areas such as science, language or mathematics because of their small size, distant location or financial stress, stand to gain more from the use of television and would, therefore, tend to make use of it more readily, runs counter to findings described in studies of the adoption of innovations. To compare these patterns outlined in diffusion literature with the growth of educational television in Michigan, a questionnaire was sent to administrators of high school districts located within the range of a broadcast television station. Analysis of the responses made by 176 educators revealed that educational television enjoys a phenomenally high adoption rate in Michigan.

Although some major problems of high cost of television participation, scheduling of subject matter presentations in class to coincide with the telecasts and the blending of televised materials into the local curriculum continue to militate against television use in the schools, the prognosis for a rapid expansion of educational television is well founded. When the criteria expounded by sociological

research are applied to this educational innovation one finds that:

(1) Although costs of television are high, rapid returns for amounts invested favor rapid acceptance.

(2) Television is not excessively complex for the consumer.

(3) Educational television is a very visible innovation, open to examination and subject to discussion which would tend to favor its rapid acceptance.

(4) This new medium lends itself to limited trial and experimentation, a very important factor in the adoption of any innovation.

(5) Television teaching is compatible to values of educational efficiency and economy and therefore is entertained as an instructional alternative. However, the device is incompatible with values of independence, local control over educational content and scheduling.

(6) A predisposition towards technological aids seems to temper earlier or increased use of newer inventions in schools. Schools using television tended to use all types of audio visual aids to a greater extent than non-television schools.

To further verify earlier research findings and to ascertain the nature of factors influencing the adoption rate of television eight administrative characteristics of school districts were selected for analysis:

(1) Quality

(2) Location

(3) Size

(4) Level of Personal Income

(5) Ratio of Pupils Per Teacher

(6) Median School Years Completed

(7) Effort

(8) Wealth

It was hypothesized that large, accredited school districts, located in urban areas, with a greater number of pupils per teacher, enjoying the benefits of greater wealth both in real estate and personal income, showing a higher degree of effort in tax assessment rates and a higher average level of education would tend to use educational television to a greater extent. A chi square measure of statistical independence was used to determine whether relationships between the characteristics existed. All of the characteristics related significantly to television use except one. There was no significant difference between the characteristic of wealth and that of television use. Furthermore the characteristic of pupil teacher ratio had a strong inverse relationship to television use. In other words, schools having fewer pupils per teacher tends to use television to a greater extent.

In conclusion it was found that school districts using television tended to be: (1) accredited to a greater extent, (2) located in urban areas, (3) larger in population of membership pupils, (4) those having a higher level of personal income, (5) districts having fewer pupils per teacher, (6) those areas in which the adult population had completed a larger median numbers of years in school and (7) communities which supported education by means of a higher tax millage rate.

CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

During recent years there has been a tremendous surge of interest on the part of educators, as well as critics of the schools, in the possibilities for the improvement of instruction through the use of technological processes. However, the introduction of change into the life of any society may generate emotions of anxiety and insecurity. As Foster indicates:

> Sociotechnological development...is a cultural, social and psychological process as well. Associated with every technical and material change there is a corresponding change in the attitudes, the thoughts, the values, the beliefs, and the behavior of the people who are affected by the material change. These non-material changes are more subtle. Often they are overlooked or their significance is underestimated. Yet the eventual effect of a material or social improvement is determined by the extent to which the other aspects of culture affected by it can alter their forms with a minimum of disruption.[1]

I. THE PROBLEM

Background

Few educational innovations have caused a greater degree of controversy than television. Some have feared that it might replace the teacher in the classroom,

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[1]George M. Foster, Traditional Cultures: and the Impact of Technological Change (New York: Harper and Brothers, Publishers, 1962) p. 2.

perhaps with some justification, as the Very Reverend Laurence V. Britt, S.J., President of the University of Detroit indicated in a speech before the Economic Club of Detroit:

> At the present time, when we are terribly conscious of the need for more trained scientists, engineers and mathematicians, for example, it is estimated that something like 40 per cent of the mathematics teachers in our high schools and elementary schools have themselves never taken a truly college-level mathematics course! Educational television is here to stay and poor teachers may wonder whether they are: but frankly, I think the time has come when we just cannot afford the luxury of poor teaching.[2]

Many people are concerned about the limitations of educational television. The learner is passive and telecasts cannot cater to his individuality. Because of its capabilities of use as a supervisory tool which might lay bare the teacher's weaknesses and open him to unusual criticism there is a danger that intensive use of television might destroy academic freedom. Educational television is difficult to schedule. The decline of local autonomy and control over curriculum is disturbing both to teachers and administrators.

However, proponents of instructional television see its great potential as a mass educational communication

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[2]Laurence V. Britt, "Educational TV-The Sky's the Limit", (address given before the Economic Club of Detroit, Michigan, January 23, 1961).

device. A growing body of evidence indicates its economy when used on a large scale. "At Penn State and Miami Universities cost analyses have shown that when course enrollments exceed 200 to 220 students, television instruction becomes cheaper than regular classroom instruction."[3] There are many far-reaching qualities of educational television in the up-grading of curriculum and intensifying the impact of instruction.

> Television simply makes it possible for the better and more experienced teachers to give lectures and demonstrations to an unlimited number of students, each of whom has the advantage of having a front seat. In direct or open-circuit telecasts, in addition, we have found that an individual teacher may at times have an interested audience of upwards of 100,000 people. And if you stop to think of it, this means that this will be more than he might ever expect to contact or influence even in an entire lifetime in an ordinary classroom approach.[4]

It has been reported that greater efficiencies in the use of school plant and space and facilities can be achieved through television instruction.[5] Multiple experiental situations reported by C. R. Carpenter have shown that

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[3]C. R. Carpenter, "Research in Television", New Media in Education (Washington: Health, Education and Welfare, April 20, 1960), p. 48.

[4]Britt, op. cit., p. 12.

[5]Joe Hall, "ETV, A Major Resource," Educational Television, The Next Ten Years (Stanford: The Institute for Communication Research, 1962), pp. 40-51.

students in a wide variety of courses can learn as well or better by television than in control groups taught in conventional ways by the teacher in the classroom. Guba stated, "There is no doubt from the evidence that learning can be provided by television and that television is as effective a medium as any conventional teaching method."[6] More than two hundred distinguished educators have participated in the planning and production of a program which is reaching out over six states to a potential student audience of approximately five million people. The personnel of this endeavor, the Midwest Program of Airborne Television Instruction, are demonstrating that high altitude transmission of educational television signals over a wide area, bringing high quality instruction in language, science, mathematics and social studies is possible.

The Advantages of Educational Television

The literature advocating a greater use of television for instructional purposes has included the theme that the medium of television communication has provided the profession with the possibility of projecting the talents of teachers with high ability into many classrooms simultaneously.

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[6]Egon Guba, "Ten Years of Research in Instructional Television", North Central Association Quarterly, XXXV:4, April, 1961, p. 303.

> More than 25,000 of the 125,000 public schools in the United States are still one-teacher schools. One of every six high schools has less than 100 students. Even the best teachers in these schools cannot teach all subjects well; often some subjects are not taught at all. Reaching into the most isolated school, ETV insures that thousands of students are not deprived of essential subjects.[7]

School districts in outlying areas, too small and poor to afford the salaries of language and science specialists, can enrich their program merely by turning on the television set, thereby receiving instruction given by a master teacher who has received more time and material with which to prepare his presentations than it is possible to give most teachers. Furthermore, it is believed that such schools can have the assurance that their pupils are receiving the same high quality instruction and content that students in more affluent areas are obtaining.

On the basis of such arguments, then, one would expect that instructional television would have its greatest appeal and most widespread use in those school districts that are too small and poor to afford high quality, specialist teachers.

> Small schools - - especially at secondary level - - find it difficult to provide the physical facilities and/or teacher skills necessary to offer a well-rounded curriculum. Thousands of rural communities, for example, cannot offer a high school course in physicis or chemistry - - no teacher for the subject; no equipment; not a

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[7]Ford Foundation, ETV A Ford Foundation Pictorial Report (new York: Office of Reports, 477 Madison Avenue, March, 1961), p. 34.

> large enough enrollment to make the course economically feasible without raising instructional costs out of reason . . . Large-area television broadcasts of courses that require specialist teachers and facilities can bring courses to small schools that might not otherwise be available to the students.[8]

Carpenter focuses on the problem even more sharply when he asserts:

> Furthermore it should be observed that poor schools may benefit more than good or superior schools by the test pattern of televised instruction. The poor schools have more possibilities for gain . . . Also it should be observed that in school systems using instructional television, courses can be made available where they do not now exist. The alternatives here are not instructional television versus conventional instruction but television versus no instruction.[9]

Social Resistance to Technological Innovation

One can expect that television's usefulness as an educational tool may be increased as it is technically refined. Production of equipment which will provide the kind of programming flexibility essential for maximum utility in all schools, might create a system of storage and retrieval of information which may have as great an impact on education as the book has had. If schools are to obtain the benefits which televised instruction can presently offer them and begin a process of intelligent experimentation with a communication medium which offers great benefits for

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[8]Ford Foundation, Design for ETV - - Planning for Schools with Television (New York: Prepared by Dave Chapman, Inc., Industrial Design for Educational Facilities Laboratories, 1960) p. 11.

[9]Carpenter, loc. cit.

the future, it is imperative that educational leaders at all levels recognize some of the problems which confront them in their contact with this technological innovation. These problems may be difficult to recognize in that they are a part of the very social and psychological climate in which the educators themselves live and work. For example, casual observation of the schools in Michigan leads one to suspect that the theoretical advantages inherent in instructional television have not been capitalized upon by the small, poor school districts. Perhaps this is to be expected, in that the whole idea that the administrators of underdeveloped school districts will jump at the chance to improve the variety and quality of their instructional program by the use of television runs counter to much of the research of social analysts. Foster raises the question:

> What is the socioeconomic position of people who seem to adopt new practices most easily? Well-to-do people, obviously, have the means to acquire many innovations inaccessible to their less-well-off neighbors. When it is a question of items of material culture, this group is often the most receptive. But frequently these people are basically conservative. They are content with their position and if major changes in the way of life of their community occur, there is no certainty that they will continue to enjoy this advantage. Further, such people often have a deeper commitment to the dominant local values than do less fortunate people.[10]

Social research has provided us with a wealth of this kind of insight about diffusion patterns and the forces of resistance which influence the degree to which an innovation is

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[10]Foster, op. cit., p. 170

accepted. When one is seeking ways in which to meet the challenges thrust upon education of our day -- (1) a rapidly expanding population needing to be educated, (2) the proliferation of new information that has to be learned as knowledge in all disciplines accumulates at an ever more rapid pace, (3) a smaller proportion of teachers available to instruct our youth -- the potentials of instructional television must not be ignored. Rather, educators should be making a concerted effort to achieve a more rapid integration of the positive values of this and other educational innovations that are becoming available than has been possible in the past because of our ignorance concerning social dynamics.

Educational Television in Michigan

Has any progress towards achieving such integration of valuable instructional techniques into Michigan school programs been made? Investigation into this problem began in 1960. To determine the exact status of educational television the Michigan Department of Public Instruction instigated an extensive study involving every private and public school district as well as colleges and universities in the state. The research was carried out in 1960-61 and the results were published in the booklet Instructor in Michigan.[11] Among other things, the data collected by interview

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[11]James B. Tintera, Instructor in Michigan (Lansing: Michigan State University. September 15, 1961.)

and questionnaire indicated that out of 613 responding public school districts, there were 165 using educational television in some way. However, only fifty-four public school districts were actually participating in the administrative operation of some educational television enterprise.

The Need for Research

At the time these pages are being written, it is possible to look back on an interim period of time in which an intensive focus of interest on educational television has occurred. The Midwest Program on Airborne Television Instruction enlarged the scope of their field work and improved the volume and quality of their telecasts. There was interest in educational television on the part of the Federal Government out of which legislation may be enacted which will provide monetary aid to develop broadcast facilities for education in every state. The Superintendent of Public Instruction of the State of Michigan has had working committees on educational television in operation to aid him in the assessment of need and in the determination of the direction to be taken in this state.

This kind of interest and publicity of television has served to make the public more aware of the existence of the possibilities inherent in this teaching technique. Its utility and feasibility have been confirmed. Educators have had their knowledge increased and reinforced by new information in the form of demonstrations, discussions

at conventions, and publications, activities which, as we shall see in the next chapter, are powerful determinants of attitude towards a new system of operation.

In spite of the publicity television has received there is still some confusion and lack of information about the numbers of schools using it. Very little is known about the nature of the schools that are making the greatest use of instructional television. There are very few reports of research in which the activities of school districts as discreet social environments have been analyzed.

There is little precedent for studying a school district in a way which ascribes traits or personality to the administrative unit as an organization having boundaries and characteristics peculiar to itself. This may be a result of the fact that such a research design has the limitation of making it difficult for the investigator to isolate many influences at work in the organization which have a profound effect on how it functions in a given situation. An organization is made up of individuals, each having his impact upon the affairs of the group. To ascertain the cause of a given organizational effect it might be necessary to study the individuals in the organization, their drives, motivations, status and other psychological and social forces at work within them.

However, even though this is true, in an official organization such as a school district, individuals operate within certain boundaries imposed by factors and

influences beyond their immediate control. For example, a school district has a certain wealth. Individuals may press to have tax rates raised, to attract industry and other sources of wealth to the district, but at a stated point in time they have to function with what they have. Again, the district has a specific number of children to be educated among whom the wealth must be distributed equitably in the form of educational opportunity. Or, for example, the district has a recorded tax rate which represents the group's attitude towards paying for their schools and as such is indicative of their interest in education and is an index of their efforts to support it. The district has a reputation. Other organizations such as universities and the North Central Association of Colleges and Secondary Schools, evaluate their programs and facilities and make judgments about their quality. A school district has a geographic location which to a great extent is a determining factor of the attitudes, needs and actions of the people in it. The values of a community near an urban complex are frequently very different from those of rural populations. These kinds of characteristics undoubtedly have an influence upon activities that go on within the school district, and will be the concern of this thesis.

II. DEFINITION OF TERMS

In subsequent portions of the dissertation it will be necessary to mention terms which are being given specific

meaning. To avoid confusion and misinterpretation the words and phrases are defined below and will be used in this sense in the balance of the discussion. The meaning of words used in the text infrequently and which are open to misinterpretation will be defined in situ.

Selected School District Characteristics refers to factors of:

Size as determined by resident pupil membership. For purposes of this thesis the schools in the sample will be divided into three size categories of large, medium and small, having respective memberships of 5,000 students or more, 4,999 to 2,000 students and 1,999 students or less.

Location as determined by: (1) Size in total population of the community. (2) Distance from an urban complex. Urban values are often operative in communities of 5,000 residents or more and even in smaller towns if they lie very close to a large urban industrialized center. To provide some distinction in this study between rural and urban school districts, an urban district will be considered to be either a town of 5,000 residents or more or any town that is physically located within five miles of a city of 25,000 residents or more.

Wealth as determined by the State Equalized Valuation per resident member in the school district, that is to say, per resident child of school age in the district. Three wealth categories will be used; (1) $15,000 or more, (2) $10,000 to $14,999, (3) $9,999 or less.

Effort as determined by the total millage approved by the voters of the district as the tax assessment rate for the support of the educational program in the district. Four millage categories will be used: (1) More than twenty mills, (2) Sixteen to twenty mills, (3) Twelve to sixteen mills, (4) Below twelve mills.

Quality as determined by the accreditation status of the district as awarded by the North Central Association of Colleges and Secondary Schools. Two categories will be used: (1) the accredited schools and (2) the non-accredited school districts.

Pupil Teacher Ratio as determined by the average number of resident membership pupils per professional staff member in the district. Three categories will be used: (1) twenty-four or less pupils per teacher, (2) twenty-four to twenty-eight pupils per teacher and (3) twenty-eight or more pupils per teacher.

Educational Level as determined by the median number of school years completed by all individuals twenty-five years old or more in the community. Three categories will be used: (1) ten years or less, (2) eleven years, (3) twelve years or more.

Level of Personal Income as determined by the median salary of the people in a community. Three levels of income will be used: (1) Below $5,000, (2) $5,000 to $6,000, (3) Above $6,000.

Broadcast Educational Television refers to those television programs used specifically by teachers for in-school, instructional purposes, transmitted through the air by means of video and audio impulses which can be translated into picture and sound by television receivers located within the signal range of the originating stations. The term will be used synonymously in this paper with Instructional Television for purposes of variety even though this term is coming to be recognized as referring to actual teaching performed over television as contrasted to any type of program which is informative and therefore educational. The broader definition is used in this investigation in that it encompasses both dimensions of television's educational application. The pertinent factor here is the deliberate use of some television program by a teacher in the classroom.

Michigan Public Schools refers to public school districts in the State of Michigan that are operating a Kindergarten through High School program within the geographic signal area of a commercial or educational television station.

III. PURPOSE OF THE STUDY

This study will provide a means of determining whether there has been any increase in the use of broadcast educational television in the State of Michigan during the time that has passed since the State TV Study was conducted and the time of this writing. Furthermore, although the

extent of the use of television in schools has been indicated there has been no formal attempt to determine the characteristics of those school districts that have found television useful nor of those that have made no use of the medium in their instructional programs. Analysis of data collected for this dissertation will indicate the relative size and affluence, reputation, effort and quality of districts using the medium and will serve to give some indication of the nature of factors that have prevented its use in other districts.

The results of this investigation should not only provide a better understanding of the issues involved in the use of educational television but should also give administrators and leaders working both in the school districts and in television enterprises a basis for achieving a higher level of communication with each other about their problems, thus opening an avenue for more penetrating attempts to improve the availability of television and its effectiveness as a teaching tool.

IV. HYPOTHESES

The emphasis of the literature on the value of instructional television's capability of providing high quality instruction at low cost, might lead one to generalize that there would be a greater use of this communication device in those school districts that have the most to gain from it, namely, those that are small and isolated,

unable to afford high quality teachers in special subject areas. However, social research has provided a great deal of information about the diffusion process and the ways in which the adoption of innovations takes place. In order to benefit from the insights of prominent social investigators representative literature on this subject, as well as earlier analyses of school districts elsewhere, will be reported in chapter two. At this point it is enough to state that the weight of evidence concerning adoption patterns would lead one to hypothesize that large, wealthy, progressive, urban school districts with a higher level of education and personal income would be more likely to adopt television as an instructional aid than the distant, small, poor schools who actually have more to gain from its use proportionately.

The selected characteristics of the school districts will be examined and statistically evaluated for significant relationships that may exist. It will be the intention to accept or reject the several following null hypotheses after applying a Chi Square statistical assessment of significance to each factor:

A. There is no significant difference between the use of instructional television and the size of school districts.

B. There is no significant difference between the use of instructional television and the location of school districts.

C. There is no significant difference between the use of instructional television and the wealth of school districts.

D. There is no significant difference between the use of instructional television and the financial effort of school districts.

E. There is no significant difference between the use of instructional television and the quality of school districts.

F. There is no significant difference between the use of instructional television and the pupil teacher ratio of school districts.

G. There is no significant difference between the use of instructional television and the educational level in a school district.

H. There is no significant difference between the use of instructional television and the personal income of a community.

V. METHOD

A questionnaire (Appendix A) was sent to all school districts in the state that had reported that they were not making use of television in school. The responses of the administrators of these districts to the questions of the instrument sent to them will be reported as one source of information and insight about the status of television in Michigan schools and the problems concerning its use.

Because a questionnaire has severe limitations in its ability to elicit revealing answers to attitudes and bias, it was believed that interviews with a selected group of people in negative school districts would be advantageous. A small selection of geographically representative districts were visited. Interviews with superintendents and principals provided the opportunity to probe more deeply into these unanswered questions and unexplored attitudes which

the questionnaire left unstated because of its form and brevity. Where these conversations shed additional light upon items in the questionnaire, the insights and opinions of these school administrators will be reported.

From the information provided by the questionnaire as well as analysis of the data collected by the State of Michigan Television Study, it was possible to ascertain which high school districts are presently using, or not using educational television in some form. Analysis of the data also brought out interrelationships which exist between the characteristics. These patterns which became apparent will be summarized and their implications for administrative application and for future research will be explored.

VI. OVERVIEW OF SUBSEQUENT CHAPTERS

Chapter two will be devoted to the development of a summary review of literature which is intended to paint the background of the larger vistas of social research against which the details of this investigation will be drawn in closer perspective. The intention on the one hand, is to outline the findings of research which are representatively descriptive of the influences at work in the process of the adoption of innovations. On the other hand, it is intended to describe earlier educational reserach pertaining to change taking place in school districts, and the influences which brought about that change. It is hoped that against these frames of reference the facts developed by the analysis of data collected for this project will be more revealing.

Chapter three will include a report of the opinions written by school administrators in response to the questions about television use. Chapter four will contain the statistical analysis of the relationships between the selected school district characteristics and the use of television in school, as well as the relationships between the various characteristics and each other. Chapter five will provide a summary of the findings and will give the opportunity for deriving some conclusions and to point to problems requiring further investigation.

CHAPTER II

HISTORICAL AND THEORETICAL ANTECEDENTS TO THE STUDY

The concern of this dissertation is to focus upon the role of institutional characteristics in the process of diffusion of a particular technological innovation in education. In this chapter representative literature concerned with cultural adoption theory and general research in the field of educational innovation will be reviewed in order to place this study in perspective.

Barnett defines innovation "as any thought, behavior, or thing that is new because it is qualitatively different from existing forms."[1] He argues that this process, where novelty and creativity bring about a revision of some original object or practice, is a universal phenomenon. It is a complex process which generates crisis that requires the inventiveness of some people to be used and accepted by others. For this to occur necessitates advocates of the change to relate the innovation to experiences with which the acceptor is familiar making the new technique more desireable than the old. Over a period of time all individuals act both as acceptors and rejectors of innovation, their amenability to change depending on one or another criteria of whether (1) it satisfies their needs more acceptably than previous means, (2) fits their psychological and

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[1]H. G. Barnett, Innovation: The Basis of Cultural Change (New York: McGraw-Hill Book Co., 1953) pp. 6-9.

biographical patterns more closely, (3) that it appeals to those dissatisfied with the status quo, the frustrated, the resentful, the non-conformist, the indifferent.

Brameld suggests that education, in light of its important role as a culture carrier, should not be a passive evaluator of world crisis. It should not be a pawn of other overpowering material or spiritual forces beyond control and resolution. In a word it should seek to occupy not the role of acceptor or rejector but rather the function of innovator. He argues:

> But whether the international or the local level is being considered, educators should not forget the admonition of experts that a crisis situation can be settled in more than one way. If schools remain largely so indifferent to the symptoms of crisis that now prevail, they will, in fact, continue to have their part in its resolution. As has often been pointed out, indifference to controversy is itself a choice among alternative choices. It means that education has chosen to allow other agencies - economic pressure groups are one - to shape courses of action that it should itself be helping to shape. Resolution by default is neither the most responsible nor the most in accord with what the culture - theorists are helping us to learn about education as a tool of culture.[2]

There is evidence to indicate that education lags behind other social institutions in the adoption of new practices or technology. In an extensive and comprehensive study of Pennsylvania schools Mort and Cornell[3] were able

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[2]Theodore Brameld, Cultural Foundation of Education, An Interdisciplinary Exploration (New York: Harper and Brothers, Publishers. 1957) pp. 154, 155.

[3]Paul R. Mort and Francis G. Cornell, American Schools in Transition (New York: Bureau of Publications, Teachers College, Columbia University, 1941) p. 53.

to describe a time scale of the rate of introduction of educational practices. Their findings indicated that an average period of fifteen years elapsed between the time of initial introduction of a practice and that of its diffusion into three per cent of the schools. From their charts they were able to infer "that it will take a half-century for the average adaptation to diffuse completely."

Studies of diffusion have provided many insights into (1) the patterns whereby the adoption of innovations takes place and (2) the characteristics of the people involved in various phases of the process. Ross states:

> In reference to the diffusion of valid inventions two generalizations may be drawn:
> 1. The distribution of a specific invention, with time as the horizontal axis, forms an ogive curve.
> 2. Certain definite patterns or modes of diffusion can be identified and are useable classifications for the ways in which almost all adaptations spread.[4]

I. TIME FACTORS

Studies by Farnsworth, Bateman, Rogers and Beal as well as Mort and Cornell indicate that the adoption of an innovation generally goes through two long periods of slow change. The first period is that of the time between the first recognition of a need and that of the actual invention and introduction of some means whereby the need is met.

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[4]Donald H. Ross, ed., Administration for Adaptability, Volume II, The Agencies and Processes of Change in Schools. (New York: Metropolitan School Study Council, Teachers College, Columbia University, 1951) p. 24.

The second period is the time between the first introduction of the innovation and its complete diffusion.

Period of Introduction and Experimentation

Farnsworth traced the development of five educational practices which had become accepted procedure of the schools, mandated by law. He found that during the nineteenth century the initial period involving the invention, introduction and sporadic trial of the innovation took longer than the subsequent period of complete diffusion, in some cases more than a hundred years.[5] In the study of Pennsylvania schools by Mort and Cornell,[6] they indicated that this period lasted until about three per cent of the schools had adopted the innovation, an average time span of fifteen years. Bateman's[7] observations of the rate of adoption of county-unit organization of schools in Utah showed that this preparatory period lasted three times as long as the subsequent period of more rapid diffusion. A

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[5]Philo T. Farnsworth, Adaptation Processes in Public School Systems as Illustrated by a Study of Five Selected Innovations in Educational Service in New York, Connecticut, and Massachusetts (New York: Bureau of Publications, Teachers College, Columbia University, 1940) pp. 22-121.

[6]Mort, op. cit., p. 33.

[7]Edward A. Bateman, Development of the County-Unit School District in Utah: A Study in Adaptability. (New York: Bureau of Publications, Teachers College, Columbia University, 1940) p. 27.

more recent investigation by Cocking,[8] involving a nation-wide sampling of school districts, developed a composite curve representing the average rate of diffusion of an educational practice in the United States. He found no significant difference in the rate of diffusion among the six regions of the country during the first five per cent diffusion period, and indicated that from the first reported introduction of a practice to the three per cent level involved a mean number of 20.3 years, as compared to approximately seven years for diffusion to the ten per cent level.

Period of Rapid Diffusion

Cocking's composite curve representing educational diffusion rates, Farnsworth's projections for early and late diffusion periods and the Pennsylvania studies all indicate that adoption rates, after the three per cent level has been reached, make a sharp rise. Acceptance of the new practice is achieved in a majority of schools in a much shorter period of time.

Lionberger[9] describes the research of Rogers and Beal which approaches the analysis of the various adoption time periods of agricultural technology as a means of

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[8]Walter Cocking, Regional Introduction of Educational Practices in Urban School Systems of the United States. (New York: Institute of Administrative Research - Study #6, Bureau of Publications, Teachers College, Columbia University, 1951) pp. 40-42.

[9]Herbert F. Lionberger, Adoption of New Ideas and Practices. (Ames: The Iowa State University Press, 1960) p. 37.

developing a classification system of the people involved. They found that "adoption of specific changes tends to conform to the normal, or bell-shaped, curve" and that it was therefore possible to "classify adoptors in terms of standard units and to compare an individual's position in the adoption pattern for one change to the relative position of the same individual in another." Over a given time continuum innovators constituted two and one half per cent of the population at the lower edge of the curve, early adoptors thirteen per cent, majority group of sixty-eight per cent and laggards approximately sixteen per cent.

Mort summarizes their findings of the time required for adoption of nine adaptations in schools by saying, "On the average it takes seven times as long for the first ten per cent of diffusion as for the second, third, fourth or fifth ten per cent."[10]

II. SEQUENCE

Not only does the adoptive process go through a sequence of time periods but it also involves a series of stages through which the individual adoptor passes. A publication issued by the North Central Rural Sociology Committee[11] summarizes a large number of agricultural

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[10]Mort and Cornell, op. cit., p. 53.

[11]Joe M. Bohlen, et. al., Adoptors of New Farm Ideas. (East Lansing: Cooperative Extension Service, Michigan State University, October, 1961).

research projects. They describe a system, developed by Wilkening[12] and others, of dividing the mental process through which an individual passes from first hearing about a new idea to its final adoption.

Awareness

In this stage the individual first learns about a new practice, usually through the mass media, particularly farm magazines, though other farmers, extension services and commercial sources of information may be involved.

Interest

During this period the individual's curiosity is aroused and he actively seeks more information about the innovation. Research studies indicate that mass media and other farmers are most frequently named as information sources. Extension and vocational agriculture agencies also are frequently consulted.

Evaluation

There comes a time when the individual must decide to apply the new idea to his own situation. At this point other farmers are the most important source of advice and counsel. Agricultural agencies rate second in degree of influence as well as commercial sources. The mass media

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[12]E. A. Wilkening, Adoption of Improved Farm Practices as Related to Family Factors. (Madison: Wisconsin Agricultural Experiment Station Research Bulletin 183, December 1953).

play a minor role at this stage.

Trial

The individual finally uses the innovation on his own farm on a limited, trial basis to determine its usefulness to him. At this point the advice of friends and neighbors is most heavily depended upon.

Adoption

Taking this final step involves the development of conviction that the new technique is demonstrably superior to previous practice. The individual's own experience with the innovation and the actual experiences of others are of greatest influence in the decision to adopt. At this stage the mass media and agencies reinforce attitudes positively. Commercial sources have little impact.

III. INFLUENCES

A decision to adopt or reject an innovation, whether as a result of conscious evaluation and trial or as a result of an unconscious process involving attitudes or bias, ultimately rests at the level of the individual personality as he interacts with his social and physical environment within the context of his cultural heritage. These influences are profound in that they really determine the status and progress of an individual, or the organization which he represents within the adoption continuum.

Personal Factors

Those characteristics of an individual which influence his behavior, can be divided into the two categories of biographical and psychological determinants. Factors of age, education, experience and location are biographical influences which have a definite impact upon an individual's decisions. Similarly, elements which are more closely related to personality such as degree of curiosity, mental acumen, self concept and dependency upon others play a powerful role in an individual's approach to the problems of daily life.

Biographical Determinants. (1) Age. Gross,[13] Hess,[14] Marsh,[15] and others have shown that there are some relationships between receptiveness to innovation and age. Elderly farmers seem to adopt new practices less readily than younger ones. However, a study by Wilson and Gallup[16] which sough

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[13]N. Gross and M. J. Taves, "Characteristics Associated with Acceptance of Recommended Farm Practices," Rural Sociology, 17 (December, 1952) pp. 321-27.

[14]C. Hess and L. F. Miller, Some Personal, Economic, and Sociological Factors Influencing Dairymen's Actions and Success. (State College: Pennsylvania Agricultural Experiment State Bulletin 577, June, 1954).

[15]C. P. Marsh and A. L. Coleman, "The Relationship of Farmer Characteristics to the Adaption of Recommended Farm Practices," Rural Sociology20 (September-December, 1955) pp. 289-96.

[16]M. C. Wilson and G. Gallup, Extension Teaching Methods and Other Factors That Influence Adoption of Agricultural and Home Economics Practices. (Washington: U.S. Dept. of Agriculture Federal Extension Service Circular 495, August, 1955).

to determine more effective extension teaching methods found that differences in receptivity of new ideas between elderly and young farmers were not great enough to warrant programming to meet their specific requirements. Lionberger[17] points out that differences in receptivity may result from very practical considerations of declining energies and scope of operation as the elderly farmer approaches retirement. The middle age farmer is at his peak in strength and drive and because of the fact that he is established in the work and is seeking maximum income he is more likely to be able to entertain change in methods. The young farmer may be prevented by the fact that he is newly established, in debt and perhaps unsure of himself. (2) Education and Experience. The level of formal schooling attained by a person is closely linked to the whole interacting universe or traits which make the individual what he is. However, reports on the functions of information sources[18] and the personal and social factors[19] in the adoptive process indicate that there is

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[17]Lionberger, op. cit., pp. 96-97.

[18]J. H. Copp, M. L. Sill, E. J. Brown, "The Function of Information Sources in the Farm Practice Adoption Process," Rural Sociology, 23, June 1958, pp. 146-57.

[19]J. H. Copp, Personal and Social Factors Associated with Adoption of Recommended Farm Practices Among Cattlemen. (Manhattan: Kansas Agricultural Experiment Station Technical Bulletin 83, Sept. 1956).

some association between higher adoption rates and education of more than eight years. It is difficult to assess whether the more favorable attitudes towards the acceptance of new practices were engendered in school or as a result of the many casual learning situations a person encountered in daily life in his environment. Follow-up studies of high school and college graduates tracing the degree to which they utilize techniques taught in school which are innovations in their professional areas might shed some light upon this problem. Copp's[20] study of Kansas cattlemen gave some indication of the fact that a higher level of education, reflected in a more favorable orientation to the value of specialized reading, made an impact upon rate of adoption. Cattlemen with high adoption scores were more likely to be readers of media that were more difficult to obtain, necessitating greater effort. Subscribers to specialized farm periodicals had adoption scores forty per cent higher than those subscribing to general magazines. Also, subscribers to weekly newspapers had lower adoption scores than non-subscribers. Young[21] found that farmers

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[20] Ibid.

[21] J. N. Young, The Influence of Neighborhood Norms on The Diffusion of Recommended Farm Practices. (Lexington: University of Kentucky, 1959).

with higher adoption scores used all media sources of information more than those with lower scores.

Emery and Oeser[22] studied a wide variety of influences upon rate of adoption. They found a positive association between adoption rate and what they termed an "index of urbanization." This index constituted a scale of whether the farmer had more than a primary education, came from a family with non-farm background, had urban work experience and military service. They theorize that:

> The attitude to knowledge of members of an agrarian culture differs in important aspects from that displayed by members of an urban, industrialized culture. Among the farmer, knowledge must be achieved and tested by personal experience, and is handed on from father to son and between contemporaries by means of the traditional rules, by face to face communication. In an urbanized culture, however, knowledge is accepted as being instrumental rather than traditional; as generally or publicly holdable; and as testable by means other than personal practice and experience...problems tend to be solved theoretically before they are tackled in production.

Psychological Determinants. It is impossible to make clear cut distinctions between factors of personality and the elements in the biographical environment which mold the individual. As a result attitudes reflecting professional orientation, flexibility, conceptual skills, orientation patterns and dependencies may spring out of education and

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[22]L. E. Emery and O. A. Oeser, Information, Decision and Action. (New York: Cambridge University Press, 1958).

general life experience. (1) Professional orientation and conceptual skills. In a study of the rate of adoption of a new drug by physicians,[23] it was found that early adopters were more professionally oriented in that they were more conscientious about attending conferences and medical specialty meetings and read a greater volume of professional literature. Many similar studies in the field of agriculture have pointed out that a higher degree of professionalism, indicated by greater contact with extension services[24] and knowledge of their role and function,[25] membership in farm organizations,[26] use of professional literature[27] have a positive association with

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[23]J. Coleman, et al. "The Diffusion of an Innovation Among Physicians," Sociometry, 20, (December, 1957) pp. 253-270.

[24]W. L. Slocum, O. L. Brough, M. A. Straus. Extension Contacts, Selected Characteristics, Practices and Attitudes of Washington Farm Families. (Pullman: Washington Agricultural Experiment Station Bulletin 584, April, 1958).

[25]E. M. Rogers and G. M. Beal, Reference Group Influence in the Adoption of Agricultural Technology. (Ames: Iowa Agricultural Experiment Station Journal Paper 3373, 1958).

[26]Copp, op. cit.

[27]G. M. Beal and J. M. Bohlen, The Diffusion Process. (Ames: Iowa Agricultural Service Special Report Number 18, March, 1957).

rate of adoption. Emery and Oeser[28] found direct association between exposure to mass media and agricultural extension agents and conceptual skills. Rogers and Beal[29] also found that ability to deal with abstract stimulus pictures was highly correlated with adoption. (2) Flexibility. Rogers[30] reported a mild association between adoption and responses given to a truncated version of Rokeach's dogmatism scale.[31] Copp[32] categorized cattle farmers in a "rigidity-flexibility" continuum. He indicated that farmers at the rigid end of the scale regarded farming in a more traditional light of operating by set formulas. Flexible farmers, on the other hand, were more progressive and considered their work to be a challenge in problem-solving. This reinforces Spaulding's[33] findings that

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[28]Emery and Oeser, op. cit.

[29]Rogers and Beal, op. cit.

[30]E. M. Rogers. "Personality Correlates of the Adaption of Technological Practices," Rural Sociology, 22:3 (March 1957) p. 3.

[31]M. Rokeach, The Open and Closed Mind. (New York: Basic Books, 1960).

[32]Copp, op. cit.

[33]I. A. Spaulding, Farm Operator Time-Space Orientations and the Adoption of Recommended Farm Practices. (Kingston: Rhode Island Agricultural Experiment Station Bulletin 330, July 1955).

rigid involvement with the field system of an individual's farm work was highly related to non-adoption of conservation practices that required changing that system. (3) Orientation and dependency patterns. Wilkening[34] showed a positive influence upon adoption to be familial values of (a) a desire for high educational achievement indicated by giving priority to expenses for education over those for farm operation, (b) high value placed on social status and participation in formal social groups, (c) high desire for home improvements and conveniences. Factors having negative influence were (a) high degree of family labor, (b) father domination in family decisions, (c) high emphasis on familism, (d) high degree of participation in informal social groups, and (e) great value placed on owning a debt-free farm. In a later study, Rogers and Beal[35] noted that high adoptors were less dependent on family ties, associated less with friends and neighbors and were less likely to consider neighbors as having normative reference value.

Classification of Individuals by Time of Adoption. Lionberger's[36] comprehensive summary of the adoption literature classifies individuals by their place in the

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[34]E. A. Wilkening, Adoption of Improved Farm Practices as Related to Family Factors. (Madison: Wisconsin Agricultural Experiment Station Research Bulletin 183, December, 1953).

[35]Rogers and Beal, op. cit.

[36]Lionberger, op. cit., pp. 36-41.

time span of the adoptive process. (1) Early Adoptors. Characteristics of early adoptors are: (a) they have larger farms and larger incomes than the average farmers in their area, (b) they are willing to take risks, (c) they are likely to be middle-aged or younger, (d) they are inclined to use many new farm practices and are among the first to try them, (e) they have many outside contacts, and participate in agricultural and informational organizations such as central extension and commercial agencies, (f) they seek information with discretion and travel further to obtain it. (2) Late Adoptors. Characteristics of late adoptors are: (a) they have smaller farms and incomes, (b) they tend to be middle-aged or older, (c) they are security oriented and are hesitant to take risks, (d) they participate less in formal organizations excepting church, (e) they seek information primarily from nearby farmers and are not selective of them with respect to technological competence, (f) they subscribe to general farm papers and magazines as sources of information as well as media such as radio and almanac and are unfavorable towards extension services and county agents. (3) The Majority. Characteristics of the majority group are: (a) they have average size farms and incomes, (b) participation in formal groups is largely confined to local organizations such as church and P.T.A., (c) they are generally receptive to new ideas, though they may not actively

seek them, (d) their information contacts are nearby farmers, (e) they read, but not usually technical papers and magazines, (f) they listen to radio and TV but avoid extension services, preferring commercial sources of information and advice.

Classification of Individuals by Their Attitudes. There is evidence to indicate that there seems to be a generalized trait of adoption proneness, in that "late adoption of one practice is likely to be associated with late adoption of others."[37] Barnett[38] indicated that dissatisfaction may play a powerful role in the attitude development which fosters adoption proneness in a person. He classified adoptors in four groups. (1) The Dissident. There are individuals who consistently oppose the conventions of their membership-reference groups. Some are active in their opposition, some are passive and merely withdraw from as much contact as possible. In that an innovation within this context represents a means of expressing opposition, the dissident is more likely to be an acceptor of change than those who are content with their status quo. (2) The Indifferent. Some individuals participate in their membership-reference groups and receive satisfaction from

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[37]Lionberger, op. cit., p. 41.

[38]H. G. Barnett, Innovation: The Basis of Cultural Change. (New York: McGraw Hill, 1953).

doing so. However, they are not totally dedicated to the conventions of the group. They are not enthusiastic in their identification with the ideas and behavior expected of them. In their indifference they find no contradiction in adopting innovations or in abandoning what their peers value highly. (3) The Disaffected. Some active and enthusiastic participants in a social group can experience a gradual, or even sudden, change of attitude as a result of an event, or series of events, affecting them directly. As a result an individual participant comes to experience the same kind of aversion for group norms as does the dissident. This finds expression in taking advantage of every propitious opportunity to accept an innovation as an alternative to his previous convictions and practices. (4) The Resentful. The fact that some group goals are very difficult to attain makes them highly valued. Only the exceptional person in the group reaches these goals. The majority of the group accord such an individual the praise and admiration and rank he has earned. But some feel that they have been unjustly treated. They are resentful at having been denied the achievement. In his resentment of the group, such an individual is more susceptible to innovation and change because he has less to lose by adoption. In cases that have become extreme, group sanctions may have begun to operate upon the individual and he finds that by adopting an innovation he may have nothing to lose

and everything to gain.

The difficulty with a primarily negative categorization such as this is that it does not include individuals who may accept an innovation within the context of group approval. Many groups include those who are admired for their wise utility of novel methods. Some groups are dedicated as organizations to bringing about change, though not necessarily within their own ranks and value system to be sure. Nevertheless, a classification of this kind gives many insights into the reasons some accept and others reject a new idea.

Social Factors

Man is a social creature. Whatever his feelings towards others may be, he operates within the milieu of some kind of group, subject to its values, pressures and expectations. The fact of birth thrusts a person into the social context of family. As life progresses this field of contact expands to include friends, teachers, employers and all of the complex interrelationships which constitute the structure of community. The threads of love, friendship, obligation, distrust or hatred pull with different degrees of tension upon the individual and form the mental set which determines the direction of his decisions to act in a specific way. These decisions may or may not be conscious, understood by the individual making them.

Familial Influences. The research dealing with the

impact of one's family upon attitudes towards adoption has been mentioned in earlier pages. Members of one's family usually have a profound influence upon the attitudes, decisions and conduct of a person. Research conducted by Wilson and Moe[39] include a finding that presence of children in the home made an impact upon attitudes of women. A higher proportion of women with small children enrolled in and completed a sewing course over television than older women and those without children. Wilcox and Lloyd[40] reported that the help and stimulation received from wives had a distinct impact upon variations in labor income. Wilkening[41] showed that unanimity of a families attitudes towards the childrens' participation in 4-H Club work was positively associated with adoption of more improved farm practices.

Informal Group Influences. Lionberger[42] summarized

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[39]M. C. Wilson and E. O. Moe, Effectiveness of Television in Teaching Sewing Practices. (Washington: U.S. Department of Agriculture Federal Extension Service Circular 466, June 1951).

[40]W. W. Wilcox and O. G. Lloyd, The Human Factor in the Management of Indiana Farms. (Lafayette: Indiana Agricultural Experiment Station Bulletin 369, August 1932).

[41]E. A. Wilkening, Adoption of Improved Farm Practices As Related to Family Factors, (Madison: Wisconsin Agricultural Experiment Station Research Bulletin 183, December 1953).

[42]Lionberger, op. cit., pp. 75-82.

the extensive research on the influence of social cliques and reference groups. "Social cliques," he stated, "are composed of a small number of persons who accept each other as social equals and associate as close friends, largely to the exclusion of others near at hand. Basically they are nonkindred groups which, like neighborhoods, satisfy the need for intimate association with other people." They... "are important social structures in the diffusion of farm information since as social systems they involve both active and passive mechanisms of social control."[43]

In addition to family contacts as significant referents in individual behavior, Rogers and Beal[44] also showed that neighborhoods were most important reference groups in the determination of the behavior of farmers, especially those falling into the category of late adoptors.

Formal Group Influences. The influence of formal group contacts upon the individual is great in that they enlarge the scope and variety of information available to him. It is interesting to note that persons looked upon as reliable sources of information are more likely to have been exposed to formal group influence than those people seeking the advice from them.[45] Menzel and Katz[46] indicated

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[43]Ibid., p. 82.

[44]Rogers and Beal, op. cit.

[45]Lionberger, op. cit., p. 83.

[46]Menzel and Katz, op. cit.

that the contacts made by physicians as a result of membership in a formal group had a positive influence upon the rate of adoption of a new drug.

Cultural Factors

Culture contains the total accumulation of man's inventiveness represented in the many physical, concrete tools and the methods for using them that he has developed in the process of adapting to his environment as well as the many rules he has established for interaction with other people and the value systems that govern his attitudes and aspirations. Although many of his activities are motivated by physiological considerations and drives, nevertheless, the manner in which he works and interacts with others in satisfying those needs are determined by the abstract components of culture, the complex and often devious pressures of group approval or disapproval. These sanctions are expressions of the value systems developed through time by that society.

The degree to which members of a social group are able to depart from mere conformity in the sense of being able to contribute to the growing edge of their cultural patterns depends upon many factors. As mentioned earlier, Barnett[47] states that an innovation must meet physical,

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[47]H. G. Barnett, Innovation: The Basis of Cultural Change (New York: McGraw-Hill Book Co., 1953) p. 6-9.

biographical and psychological needs better than established techniques. Brozen,[48] analyzing the economic implications of social change states:

> Primarily we are concerned here with the problem of raising the technological level of backward areas. A rise in the level means only a movement towards the use of that set of techniques which will yield the most of what the indigenous population wants from the use of available resources.

Homo sapiens has been able to build upon the progressive benefits of the total previous experience of his kind because of the ability to communicate. The degree to which man is able to obtain information about better means of meeting the rigors of environment influences the rapidity of his progress. Lacking sources of new information he tends to cling to techniques with which he is familiar, to methods of proven effectiveness. Lionberger observes:

> The more isolated a people in terms of communicative exposure or contact with the outside world, the more resistant to change they are likely to be. This seems to apply to both areas and to people. Where people have had almost no contact with the outside world, life may remain much the same for centuries. However, when contacts are many and varied, changes seem to occur at an increasing rate.[49]

A study of the adoption of approved practices in celery growing among farmers of Dutch descent in Michigan is an interesting illustration of this point. The investigation

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[48] Yale Brozen, Social Implications of Technological Change (Chicago: North Western University Press, 1950) p. 145.

[49] Lionberger, op. cit., p. 92.

conducted by Charles R. Hoffer showed that the reading of a circular developed by the extension service had a mildly positive influence upon adoption of the improved practices. The investigator reported that it appeared that five circumstances seemed to have prevented a higher percentage of adoption:

> (1) Conditions that may exist on any particular farm,
> (2) Expense involved in following a recommended practice,
> (3) Attitude of the farmer,
> (4) Relative effectiveness of printed matter in comparison to other influences that affect human behavior,
> (5) The factor of time.[50]

Hoffer concluded that:

> Attitudes of the farmer, therefore, as they are developed by cultural heritage and experience appear to be the chief influence in determining the immediate acceptance of a recommended practice...Particularly is this true if the culture he is identified with and the community influences which surround him are favorable to such a change. If they are unfavorable, then he may still fail to follow a recommended practice, even though he cannot logically question its value.[51]

Situational Factors

The characteristics of the individual as well as the psychological and social considerations which condition the adoption process have been described. Little has been mentioned about characteristics of the innovation itself.

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[50]Charles R. Hoffer, Acceptance of Approved Farming Practices Among Farmers of Dutch Descent. (East Lansing: Michigan State College Agricultural Experiment Station Special Bulletin 316, June 1942). p. 31-32.

[51]Ibid., p. 32-33.

The North Central Rural Sociology Committee[52] have indicated that some characteristics affecting the rate of adoption are:

Cost. New practices of high cost are generally adopted more slowly. However, those practices that produce high, rapid return for money invested tend to be adopted more rapidly than those yielding lower returns over a longer period of time.

Complexity. New ideas that are easily understood and simply used tend to be adopted more rapidly than complex innovations.

Visibility. Practices which are readily demonstrated and visible in their operation seem to enjoy a more rapid adoption rate.

Divisibility. A technique which lends itself to divisibility or use on a limited trial basis will generally be adopted more rapidly than one which cannot be used on a small scale.

Compatibility. An idea which is consistent with existing values or beliefs of the adoptor will be accepted more rapidly than one which is not.

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[52] J. M. Bohlen, C. M. Coughenour, H. F. Lionberger, E. O. Moe and E. M. Rogers, Subcommittee for the Study of Diffusion of Farm Practices, Adoptors of New Farm Ideas, (East Lansing: North Central Regional Extension Publication 13, Michigan State University, October 1961). p. 4.

IV. IMPLICATIONS OF DIFFUSION RESEARCH FOR THE ADOPTION OF EDUCATIONAL INNOVATIONS

The driving motivation for conducting research is to discover both conditions that may exist and the reasons for their existence. In the concern to say only what his data indicates and no more, an investigator is careful to define the limits of his research and in many instances adds the thought that the findings are applicable only to the universe of his study or populations that are similar. On the other hand there is the necessity to predict outcomes of given circumstances. In order to do this with any facility it is imperative that one be able to generalize about the unknown on the basis of knowledge obtained through research.

The present study deals with organizational characteristics. The largest part of the literature reviewed has had to do with characteristics of individuals and the environmental and psychological influences brought to bear upon them. At this point the problem of the pertinence and validity of research about the individual for application to a unit of government arises. Is it possible to generalize and make predictions about the reception of future innovations on the basis of the information provided by these many studies?

Because it is impossible to study something until it is in existence, research into human behavior is frequently ex post facto. Once a person has demonstrated a behavior

pattern he is studied and described. However, the same kind of study of individuals must take place when the research is applied by the practitioner, except in this instance it must be done in advance to find out the nature of the population before any action is taken about introducing a new practice or idea. Presumeably it becomes necessary to isolate the dissident and the broad minded before knowing how to proceed. But the problem is complicated by the fact that different individuals have different potentials for adoption at different times and under different circumstances. There are too many var iables at play beyond one's control.

Furthermore, many individual characteristics simply do not apply to organizations even though they may apply to persons making up the organization. But when dealing with a corporation, which individual's age does one consider when developing tactics? Whose kinship patterns or wife's influence should be determined? Whose knowledge and broad mindedness is important? In what ways does the broad cosmopolitan experience of one cancel out the provincialism and ethnocentrism of another member of the group?

On the other hand there may be some parallels between individual characteristics and those of organizations. It would appear to be possible to categorize a group as being liberal or conservative. A group has

characteristics of size of operation, it has measurable wealth, its efficiency can be assessed, it has a history of previous adoptions, average group attitudes about an event or practice can be determined.

The model developed by Wilkening and other sociologists, dividing the adoption process into its time sequence may have real value for the practitioner. For him to know that the adoption of new practices involves the steps of awareness, interest, evaluation, trial and finally adoption will give him many clues about how to proceed under given circumstances. The descriptive model described by the North Central Rural Sociology Committee may also have great merit and practical utility for the educator. It should be very revealing to assess a new educational practice in terms of its cost, complexity, visibility, divisibility and compatibility.

V. EARLIER STUDIES OF THE DIFFUSION OF EDUCATIONAL INNOVATIONS

Adaptability in Pennsylvania Schools

Precis. Paul R. Mort and Francis G. Cornell[53] conducted a comprehensive investigation of the adaptability of Pennsylvania schools. They traced the extent of the

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[53]Paul R. Mort and Francis G. Cornell, American Schools in Transition (New York: Bureau of Publications, Teachers College, Columbia University, 1941). p. 546.

diffusion of 183 adaptations in the school systems of that state and chose nine of them for special consideration: (1) The public kindergarten. (2) Reorganized high schools. (3) Special classes for the mentally handicapped. (4) Homemaking for boys. (5) Adult leisure activities (6) The integration of extracurricular activities. (7) Elimination of elementary final examinations. (8) Integrated curricula. (9) Supplementary reading.

They concluded that the diffusion of these nine adaptations is a slow process, particularly in the early introductory period. They reported that some parts of the state were more receptive to adaptation than others, indicating that in the case of some adaptations requiring marked policy changes a clustering effect was apparant in the diffusion patterns and that many adaptations were first introduced in large metropolitan centers or in communities lying in highly urbanized regions. The general measure of cultural level of a community was shown to be significantly related to adaptability: (1) Communities on a high level are early adaptors, part of the influence of size and tax leeway being explained by accidental or causal relationships with cultural level, and adaptability being shown to relate more to the percentage of the population relatively high in cultural level rather than to the average of the whole population. (2) Age of population (percent over 21) within the ranges studied bore no significant relationship to adaptability. (3) Home ownership

was related to adaptability but adds nothing to what is obtained from size and wealth. (4) Educational level relates to cultural level, having significant relationship to adaptability. (5) Population increase was more closely related to adaptability than local nativity. (6) Occupational type, specifically reflected in the percentage of white collar occupations, yielded the highest relationship to adaptability. (7) The percentage of children in private and parochial schools did not appear to be statistically significant in the sample studied but was marked and negative in its impact upon adaptability.

In summary, the authors indicated that adaptability is conditioned by: (1) The impingement of certain cultural and economic characteristics upon the schools and the interplay between them. (2) The characteristics of the "super-community" of which the school district is a part. (3) The nature of the part which a community plays in the super-community.

Of particular interest to the concern of this dissertation were the chapters pertaining to the effects of size, wealth and expenditure upon the adaptability of school systems.

Size. (1) The early adoptors are relatively large in the case of all the eight adaptations studied...Adaptation remains a large-district phenomenon through...the diffusion up to twenty per cent of saturation. (2) Large

communities score significantly higher on the general measure of adaptability. (3) The large districts have higher tax rates for non-educational purposes, better trained teachers, a higher combined index of community life, better administrative services and leadership, and more ideas from the outside reported by teachers. (4) There is no necessary identity between the "urbanness" factor and the size factor as studied. The explanation of the influence of size lies elsewhere. The implications are that large districts, regardless of urbanness, favor adaptability. (5) From the analysis... it becomes apparent that the factor which as much as any other explains the effect of size on adaptability is the clustering of elements which make up the cultural pattern...The larger the district, the greater the variety of such factors. This tendency becomes particularly important when we find that in a number of these factors it is not the average level of the community that counts so much as the presence in the community of persons ranking high in social intelligence and responsibility.[54]

Tax Leeway and Wealth. (1) Wealth is an important factor in the first stages (of diffusion) and a continuing, though less important, factor as the diffusion process unfolds. It is clear also that it seems to be a more important factor for some adaptations (e.g. kindergarten)

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[54] Ibid., pp. 137-138.

than for others...[55] (2) It is clear from these studies that communities of greater taxable valuation per classroom unit or per pupil are much more likely to be early introducers of new adaptations, but that no wealth group is entirely ruled out. It is clear also that these communities make more adaptations and make them sooner than those with limited resources.[56] (3) Wealth does not appear to be predictive of adaptability. (4) Tax leeway is not as predictive of adaptability as valuation per classroom unit. The difference is small and unreliable statistically.[57] (5) The effects of tax leeway upon adaptability are to be explained not by economic concomitants alone but also by local professional and community cultural elements which are associated with it.[58]

Development of County-Unit Districts in Utah

Bateman[59] traced the development of the county-unit school district in Utah. He found that early adoptors were districts that were smaller in area, located nearer larger cities and colleges, and had had a higher percentage of increase in population. He reported that the time

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[55]Ibid., p. 144.

[56]Ibid., p. 147.

[57]Ibid., p. 165.

[58]Ibid., p. 166.

[59]Edward A. Bateman, Development of the County-Unit District in Utah: A Study in Adaptability. (New York: Bureau of Publications, Teachers College, Columbia University, 1940).

lapse from indication of need to first adoption of the system was twenty-four years and the period of rapid diffusion lasted from 1905 to 1915, ten years. Bateman pointed out the difficulty involved in isolating causal influences operating upon a process of diffusion.

> The causes of social change are so complex and the possibility of studying single factors which cause change, independent of the influence of other factors, is so remote that it is seldom possible to state with accuracy the extent to which any single factor influences a particular adaptation. However, it is desirable to identify the factors which are associated with a particular process of change and to analyze probable relationships existing between these factors and change which has occurred. The completion of many studies of individual adaptations may then reveal common factors associated with these adaptations and permit a valid formulation of principles and procedures that control certain types of change in education.[60]

Influences Upon Adaptability

Volume II of the series Administration for Adaptability organized research material of a twelve year period under the two categories of (1) the adaptation process itself and (2) agencies in the process of bringing about change. In part one they report:

> One of the most significant of the facts that have been established by adaptability research is that the diffusion of defensible ideas in education takes fifty years. Furthermore, the pattern of spread of such inventions consistently follows an ogive curve. Such change is much slower than would seem tolerable, agencies have been set up

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[60] Ibid., p. 68.

to deliberately speed up the process.[61]

In section two they describe the role which various people and organizations play, reporting extensively from the research of Mort and Cornell.[62] Administrators are the most potent influences in adaptation. Teachers have small impact upon adoption, though they possess greater potential than has been utilized. Pupils exert neglible influence. Lay groups hold promise as agencies influencing change, though where community understanding is correlated with rate of adoption its specific role is vague. The influence of state departments and teacher training institutions is generally ineffective.

Ross et. al. conclude that certain administrative efforts must be made: (1) A systematic attempt to identify educational needs. (2) A wider understanding of technological findings must be achieved. (3) There should be widespread attempts to apply technology and empirically established knowledge of the processes of education to identified needs in education. (4) There should be publication of likely inventions for quick and wide testing. (5) Every method of communication to spread use should be utilized.

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[61]Donald H. Ross et. al., Administration for Adaptability, Volume II. (New York: Metropolitan School Study Council, Teachers College, Columbia University, 1951). pp. 1, 85-190.

[62]Mort and Cornell, op. cit., American Schools, pp. 199-356.

Diffusion of Educational Practices

In a nationwide study of the introduction of educational practices, Cocking[63] traced the diffusion of eight educational practices through the six regions of the country. He found no significant differences among the six regions in the introduction of educational practices during the early periods of diffusion. Furthermore, practices were diffusing throughout the regions at about the same rate. He reported that school systems in the metropolitan districts were significantly more alert than isolated cities in the early periods of introduction of an educational practice. A greater proportion of these schools were early introducers of a practice, whereas there was a significant lag in introduction among school systems in rural areas.

Educational Change in New York State

Studying New York City and thirty other school systems, Brickell[64] described the problem of change in New York state and made recommendations to organize in a way which would improve the situation. He felt that, "The

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[63]Walter Cocking, The Regional Introduction of Educational Practices in Urban School Systems of the United States. (New York: Institute of Administrative Research Study Number Six, Teachers College, Columbia University, 1951).

[64]Henry M. Brickell, Organizing New York State for Educational Change, (Albany: State Education Department, University of the State of New York, December, 1961).

process of local educational change is determined by the relationships of these two groups: the public and the board of education as external, the administrators and the teachers as internal."[65] Reiterating that teachers are not strong agents for change but rather that administrators take much greater initiative in introducing new programs into the schools, the author described factors which contribute to the reception of a new practice.

Professional suspicion is a strong inhibitor. The most persuasive means to overcome such suspicion is to visit and observe the new practice in operation. Here the reaction of students to the innovation is the single most highly relied upon measure of effectiveness. The attention, encouragement and interest given to a teacher involved is a powerful stimulus for success.

Brickell pointed out that the freedom needed to stimulate the design of educational innovation is completely irreconcilable with the controlled environment required for its evaluation as well as the normality which is imperative if the new idea is to be demonstrated effectively. He suggested an organization of the state system which would provide for an autonomous Research Agency free to improvise and invent, a coordinated regional school development unit which would demonstrate the proven program and disseminate information about it and a realignment

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[65] Ibid., p. 19.

of the functions of colleges and universities which would assume the responsibility for training teachers to perform in the context of the changed schools.

Resistance to Educational Television

A study of resistance to educational television is being conducted by the Institute for Community Studies of the University of Oregon.[66] The intent of the research project, sponsored by a grant from the U.S. Office of Education,

> rests on the basic hypothesis that it is possible to enlarge an existing educational television audience by elimination of the factors which generate resistance to this means of instruction. The purposes of this inquiry are: to discover what these factors are; to ascertain their relative importance; and to experiment with their elimination.

Some of the initial findings of the inquiry indicate that there is a more positive attitude towards and greater use of educational television by (1) the more highly educated (post graduate level) professional people and (2) people belonging to the blue-collar occupation category. Where there is a general increase in positive attitude towards educational television as scholastic achievement of people increases, it seems to skip the "white-collar" occupational group which indicate a rather negative attitude towards it. The data seems to indicate that

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[66]Marshall N. Goldstein et. al., Educational Television Project Preliminary Report Number One. (Eugene: The Institute for Community Studies, Studies in Resistances to Cultural Innovations, The University of Oregon, 1961).

educational television has less appeal in large families where greater conflict over program selection exists. There is further indication that this medium meets greater resistance from authoritarian personality types than from more flexible people. The authors conclude:

> Conclusion. It is the person who is both flexible and capable not only of making up his own mind but of influencing others, who is fairly well educated and has a respected occupation who is the least resistant to educational television as well as the most receptive to other forms of culture and education. But this form of composite portrait, which accumulates a number of characteristics that so far as we know from the descriptive investigation might well be unrelated to one another provides only the first glimpse or introduction to resistance and television.[67]

A subsequent report approaches educational television behavior as a political act within the microcosmic political system of the family and indicates "that mass media, (in this case the newspaper) can have a direct effect on individual behavior...by legitimizing the discussion of new alternatives."[68]

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[67] Ibid., p. 42.

[68] Robert J. Mertz, Educational Television Project Preliminary Report Number Six. (Eugene: The Institute for Community Studies, Studies in Resistance to Cultural Innovations, the University of Oregon, 1962).

CHAPTER III

THE STATUS OF EDUCATIONAL TELEVISION IN MICHIGAN SCHOOLS

Earlier research studies reported in chapter two constitute the theoretical framework upon which subsequent portions of this dissertation will be built. This chapter will begin with an application to television of the temporal patterns, already described, through which an innovation passes on its way to becoming a commonly accepted practice. An elaboration of the responses to a questionnaire will further develop the sequence of television adoption process as a means of providing both an outline for the discussion as well as insight into the ways in which the development of instructional television compares to the progress made by earlier innovations.

I. PERIOD OF INTRODUCTION AND EXPERIMENTATION

The Genesis of Educational Television in Michigan

June 3, 1947 saw the establishment of WWJ-TV, Channel four, as the first television station in the Detroit metropolitan area. A year later, two additional stations joined the ranks of commercial broadcasters with the establishment of WXYZ-TV, Channel seven, on October 9, and WJBK-TV, Channel two, on October 24, 1948.[1]

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[1]Bettelou Peterson, Detroit Free Press, October 19, 1958.

The educational uses of television were explored remarkably soon after the medium was available as a communication device in the Detroit area. WWJ-TV approached the University of Michigan with the request for a weekly one hour educational television series. The first programs meeting this request were "Conceived, written, cast and rehearsed in Ann Arbor. All concerned were loaded into cars and driven to Detroit. There the programs were staged in WWJ studios."[2] In the years following, this educational endeavor grew to become the University Television Center in Ann Arbor. Their uses of television now include color facilities at the University Medical Center, studio facilities for the Department of Speech and the English Language Institute as well as other expanding activities.

A significant advance in the education utilization of television came in 1954 with the establishment of Channel sixty, WKAR-TV, operated by Michigan State College of East Lansing, Michigan's first educational station and among the first in the United States. This ultra high frequency station went off the air in 1958. The University resumed its broadcasting in 1959 under the call letters of WMSB on channel ten, an unreserved very high frequency channel in Onondaga, sharing time with a commercial broadcaster with

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[2]Orin W. Kaye, Jr., "University Television Starts Eleventh Year", The Michigan Alumnus, December 10, 1960, pp. 116-118.

a separate license. The state's second educational station, WTVS, Channel fifty-six, was established in 1955. It is a cooperative enterprise of the Detroit public schools and other agencies with educational responsibilities. The teaching performed over these pioneer television stations has well demonstrated the benefits to be gained by schools who make the effort to participate. Several institutions of higher learning as well as a few public school systems are using closed circuit television. Independently, many schools are making casual or occasional use of television programs which they are able to receive.

The Midwest Program on Airborne Television Instruction, a two channel, ultra high frequenty telecast of instructional programs broadcast from airplanes flying at high altitude over Indiana, have contributed tremendously to the volume of experimentation with television instruction in Michigan schools. The numbers of schools reporting that they use the MPATI signals far exceed the numbers of schools that are officially members of the program. Although this may represent some loss in revenue for Midwest Airborne, this kind of experimentation is very valuable in creating an appetite for and in breaking down resistance to the novel technique of teaching by means of television. When the Midwest Program on Airborne Television Instruction signals came on the air the number of school districts using television increased substantially,

partly because of the availability of free signals with which to experiment and partly because of the contribution to variety in programs which these additional channels provided.

In order to assess this increase in the use of television in schools the State Superintendent of Public Instruction instigated a study of educational television in Michigan in 1960. Institutions of higher learning and major school districts were visited. In addition, questionnairs were mailed to all public and private schools districts in the state. Results of this research indicated a generally positive attitude towards educational television, a "real and increasing interest in the use of instructional television in schools and colleges in Michigan."[3] In fact, out of 613 public school districts, 165 reported current use of television broadcasts in their school systems, 105 of which used programs originating from the two educational stations in the state. An additional thirty-eight systems indicated that they received programs from WNEM, Channel five, in Bay City. This evidence appears to indicate a rather high involvement of schools with a relatively new teaching device. The question might be asked

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[3]James B. Tintera, Instructor in Michigan (Lansing: Michigan State University, September 15, 1961.) p. 12.

as to whether this acceptance of television is not atypical.

The Diffusion Level

The studies by Mort and Cornell, Cocking and others, described earlier[4], indicated that in many instances a hundred years elapses between the time of the invention of a device and its educational application. Adoption to the three per cent level requires an additional twenty years, with a lapse of seven years for subsequent ten per cents. Has this been the case with the educational application of the invention of television?

Paul Nipkow invented his image scanning disc in Germany in 1884, signalling the beginning of the age of television. A period of fifty-five years passed, during which the process was refined by the Zworykin iconoscope and the Farnsworth image dissector tube, until the New York World's Fair in 1939 heralded the first regularly scheduled television broadcasts. The earliest educational stations did not appear until the decade of the 1950's, although there had been some educational applications of commercial television in the few years before that time. The introductory period of the invention of television, then, covered a time of fifty-five years instead of one hundred years. The period of initial educational application involved a fifteen year span of time which is a bit shorter than the twenty

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[4] Supra, pp. 47 ff.

years required by many earlier innovations. Subsequent adoption to a diffusion level of approximately 26.9 per cent (165 out of 613 using television in school) in 1961 took an additional seven years as contrasted to the twenty-one years it might have been expected to take.

Actually, such rapid acceptance is difficult to understand in that many characteristics of television militated against its use in the classroom. Its complexities were beyond the pale of experience of most school people. Early equipment was of such marginal quality and small size that its application as a visual aid was difficult to justify in light of cost and inconvenience. And yet its pattern of rapid acceptance resembles that of an earlier innovation which revolutionized teaching methods, the blackboard.

> The blackboard was rather slowly introduced in America. Earliest reference to one was in an arithmetic publication in 1809 in Philadelphia. A footnote explained that "the blackboard should be about three feet square, painted or stained with ink, and hung against the wall in a convenient place for a class to assemble around it..."
> In the 1830's educators stopped regarding the blackboard as a curious innovation and began to look upon it as essential to teaching. A lecturer in 1830 listed it as one of the four essential apparatuses every school should have.[5]

The blackboard was such a simple, inexpensive invention that a very little effort made it readily available

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[5]Charnel Anderson, Occasional Paper Number One, History of Instructional Technology, I: Technology in American Education, 1650-1900. (Los Angeles, NEA Tech. Dev. Project, July 1961) p. 21.

to all. It is not difficult to visualize its general acceptance within a twenty-five year period of time. But television, though easily used by the teacher, is a complex, expensive, electronic system. The acceptance of television in the face of opposition and the complications involved in its use must be explained in its contribution to the art of communication upon which teaching depends.

II. THE SEQUENCE OF THE ACCEPTANCE OF TELEVISION AS AN EDUCATIONAL DEVICE

Television has not been without opposition. Although the preponderance of literature in the field is representative of proponents of the medium, nevertheless reactions range from positive to the extremely negative. Pollock, for example, has enthusiastically stated, "...television offers the greatest opportunity for the advancement of education since the introduction of printing by movable type."[6] Besvinick, on the other hand, declared, "Direct TV teaching - - a terrible evil stealing insidiously into our schools, goes counter to many of our most cherished philosophical tenets and research tested psychological concepts."[7] However, television does offer one kind of solution to many problems which educators are facing

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[6]Thomas C. Pollock, quoted in Alexander J. Stoddard, Schools for Tomorrow: An Educator's Blueprint. (New York: Fund for the Advancement of Education, 1957) p. 27.

[7]Sidney L. Besvinick, "TV Teaching: Some Assumptions and Conclusions," School and Society, 88:30-32 (January 16, 1960).

whatever their beliefs about the medium may be. An early critic of the textbook stated, "The temptation to manufacture school books is just now very strong, but it must be manfully encountered, like any other temptation." Anderson reacted to this comment by saying, "This is reminiscent of some modern day educators who vigorously oppose new technological innovations in education without offering any realistic alternative solution to the problem involved."[8]

But, if the rapid rate of acceptance of instructional television is any indication, school administrators in Michigan have demonstrated genuine interest in the progress of the device as an educational aid. The information obtained from the interviews as well as the comments made in the questionnaires of the State Television Study showed clearly that information about educational television was being sought. The high percentage of returned questionnaires also reflected the interest shown in the topic of the research. Much valuable information was reported about participation in instructional television activities, sources of programming, opinions concerning preferred ways of utilizing television, attitudes of staff, administration and community towards it and the kind and amount of equipment in use across the state. In reading the report of the

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[8]Anderson, Ibid., quoting from "School and College Textbooks," The Christian Examiner, Boston, LIII:426 (November 1852).

State Study one senses that educators have been exhibiting caution in their approach to instructional television, early attempts to use it in schools being on an exploratory and limited basis.

But many unanswered questions about the acceptance of educational television remain. Little is known about the ways in which the educators in the school districts learn about television or how they evaluate it before considering its use in their schools. Even less information is available about the degree of utilization of television or what is considered to be objectional or problematic about its use. For these reasons a questionnaire was prepared and sent to the 354 administrators of the school districts able to receive television signals in the state of Michigan. The replies to that instrument are reported in the remaining pages of the chapter. One hundred and seventy-six or 74.5 per cent of the group returned the questionnaires sent to them.

The Model

In the review of antecedent research it was pointed out that individuals responsible for accepting or rejecting a new method of operation, go through a series of stages. In the case of school administrators, this process may be a cumulative one, each new superintendent or principal building upon the accomplishments of his predecessors. Though one may emphasize equipment and another building

expansion, generally speaking a newcomer begins with the equipment, procedures and staff attitudes that he finds on arrival and builds his activities upon them. Thus although earlier research had to do with the attitudes of farmers towards technological developments, and individuals at that, and though it is difficult to know to what extent it may be possible to generalize, there is nevertheless some merit in examining the opinions and statements of these administrators in terms of that research in that these men wield a great influence upon the acceptance or rejection of television as an instructional aid and may be classed as adopting agents for that reason.

The text of pages 26 and 27 pointed out that an individual adoptor passes through stages of (1) awareness, (2) interest, (3) evaluation, (4) trial and (5) adoption. The questions in the instrument sent to the schools were intended to elicit information which would indicate where Michigan educators stood in regard to these stages as they apply to the innovation of broadcast television instruction.

The Analysis of Responses to Items on the Questionnaire

Interest. Question number seven was the only attempt in the questionnaire to find out the degree of interest among community and educators in educational television. And replies to that question were disappointing in that none of the respondents gave any explanation for their "yes" or "no" replies. This was no doubt due to the

unfortunately blunt wording of the question and the inclusion of the leading word "increased" which weighted any answers that might have been given. However, one hundred and fifteen or 65.3 per cent of the respondents wrote that information brought to the public in magazine articles, newspapers and special publications had increased the interest in the possibilities of instructional television but failed to elaborate on why they thought so. Thirty-nine districts, 22.1 per cent, thought that such information had brought about no change in interest.

Evaluation. Questions one to three of the instrument sought to determine whether educators in the district had thought about using television as an instructional aid, how that thinking or evaluation was done and by whom. Question three, though indicating results of the thinking, elicited a substantial amount of spontaneous comment which was more descriptive of the problems inherent in broadcast utilization and will be reported with the responses to question ten.

The administrative personnel of school districts, by virtue of their office and responsibility, exert tremendous influence upon the affairs of the schools. The citizens of the community appear to be involved in the consideration of use of new educational techniques only to a small degree. Sixty-nine per cent of responding districts indicated that the contemplation of use of television for instructional

purposes, or the evaluation of it, was performed by administrative staff. Almost half of the responding districts indicated that such consideration or study of television involved teaching staff, whereas members of the school board were participants in only one-third of the districts.

The replies to question two bear out the strong administrative leadership involved. The basis upon which the greatest number of school districts, 44.9 per cent, evaluated instructional television was to have recourse to the body of professional literature available to administrators. An almost equally strong source of information to which the educators turned, 43.7 per cent, was the opinion and advice of administrators from neighboring schools. In many instances this investigation of instructional television was conducted by means of administrative study teams, 34.0 per cent, or through actual use of television programs in school, 34.1 per cent. This sequence of orientation to the possibilities inherent in a new technique is in harmony with research reported earlier[9] which indicated that in the "awareness, interest, evaluation and trial" stages of the adoption process, individuals learn about a new practice through mass media and publications and rely heavily upon the counsel and advice of friends and neighbors.

It is interesting to observe that a relatively large

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[9]Supra., p. 26.

percentage of administrators were making decisions about the use of educational television on the basis of casual opinion about the medium, 22.1 per cent. Consultants were brought in by 19.9 per cent of the districts. Although, in answer to question one, over fifty-one per cent of the respondents indicated that teaching staff had been involved in the consideration and evaluation of television, only fourteen per cent reported that their staff had been involved in formal study committees. Similarly, almost forty-four per cent of the respondents said that board members had evaluated television but apparently this was not done in a formal context in that only a tenth, 10.8 per cent, of the districts wrote that the evaluation had involved actual research as an official act of the board. Citizens' study groups had been organized in only a few, 5.7 per cent, of the districts that returned their written documents.

Trial. Questions four, five, six, and eight were directed at determining the degree to which educational television was being used by school districts in Michigan. Of the 176 districts that returned their questionnaires, districts that were not using television in 1961, sixty-two, 35.2 per cent, of them had started to use this instructional technique since that time. Although every television station in Michigan and several from neighboring states were mentioned at least once as a source of

instructional programming, only four were cited by more than three districts as a signal source. Thirty-seven superintendents reported that they were using the instruction provided by the Midwest Program on Airborne Television Instruction. This figure represents only those districts that were not using television previously, in that the Educational Services Division of Midwest Program Airborne Television Instruction, Inc., reports that sixty-two communities in Michigan have one or more schools that are members of the program, making regular use of the airborne telecasts.[10] Many districts to whom questionnaires were not sent because of the fact that they were using educational television between the Airborne signals were available, may have welcomed the new source of programs.

The second, most frequently cited source of programming used in school was WWJ-TV (4), Detroit, followed closely by WMSB (10), East Lansing, and WTVS (56), Detroit.

Over twice as many school districts in the sample under consideration use television on a casual, incidental basis then use it for regular instruction. The orbital flights of astronauts, documentaries and public service programs have been viewed in 129 of the reporting school districts. Comments proferred showed that in many

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[10]Letter from Ben A. Bohnhorst, Purdue University, Lafayette, Indiana, November 1, 1962.

instances teachers brought their personal receivers into the classroom so that their students could observe the event being reported. One hundred and twenty-seven districts, in many cases the same ones that had used television, visualized an increase in their involvement with the medium. Forty-six anticipated no change and three districts had become disenchanted and were going to discontinue using television in their schools.

Predisposition. Lionberger observed that where adoption of one farm practice among cattlemen and dairy farmers was a rather poor predictor of the adoption of another, it was possible, nevertheless, to classify farmers on an adoption continuum. He stated:

> Also, occasional findings of scalability of adoption suggest the existence of such a generalized (adoption) trait. To the extent that this is true, late adoption of one practice is likely to be associated with late adoption of others...and conversely, the higher his adoption score, the more likely he is to be rated among those early to adopt new practices.[11]

Question nine of the instrument sent to the schools was designed to elicit some indication of the school district's bias towards educational technology in general in order to find whether this attitude might have meaning for the adoption of the innovation of instructional television.

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[11]Herbert F. Lionberger, Adoption of New Ideas and Practices. (Ames: The Iowa State University Press, 1960) p. 41.

One fact became apparent as the tabulations were converted to percentages, namely, that although no visual device is used universally, those inventions which have the greater tenure are used by greater numbers of schools.

Still pictures requiring a device for projection, either in the form of slides or film strips, have been used by educators for many years. "A general survey of all schools and colleges by the United States Office of Education and the American Council on Education in 1936 indicated that of the 8,806 schools reporting, 7,671 owned equipment for the projection of pictures."[12] Similarly, the motion picture had been applied to in-school uses as early as 1930. The accompanying graphs (Figures 1 and 2) show that slides, filmstrips, still-films and motion pictures were being used by fifteen to thirty-five per cent of schools in the study. There is evidence that 3½ inch by 4 inch slides were used as early as the turn of the century.[13] At the time of this writing, evidence from the questionnaire indicates that over 95 per cent of the schools polled use motion pictures frequently. The balance of the districts stated that they use films occasionally. Again, over 91 per cent of the one hundred and seventy-six

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[12]Ellsworth C. Dent, The Audio-Visual Handbook. (Chicago: Society for Visual Education, Inc., 1949) p. 15.

[13]Dent, loc. cit.

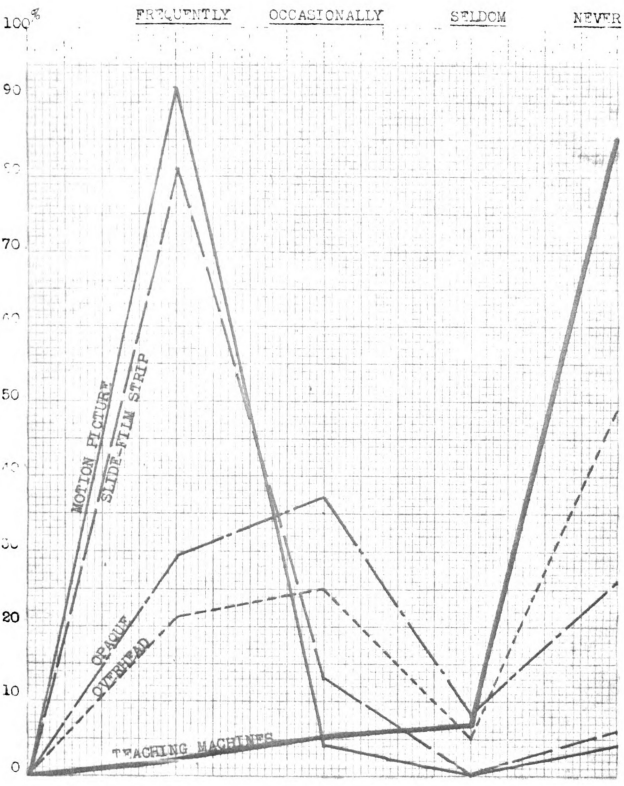

FIGURE 1

USE OF VISUAL DEVICES IN 114 MICHIGAN SCHOOL DISTRICTS NOT USING ETV

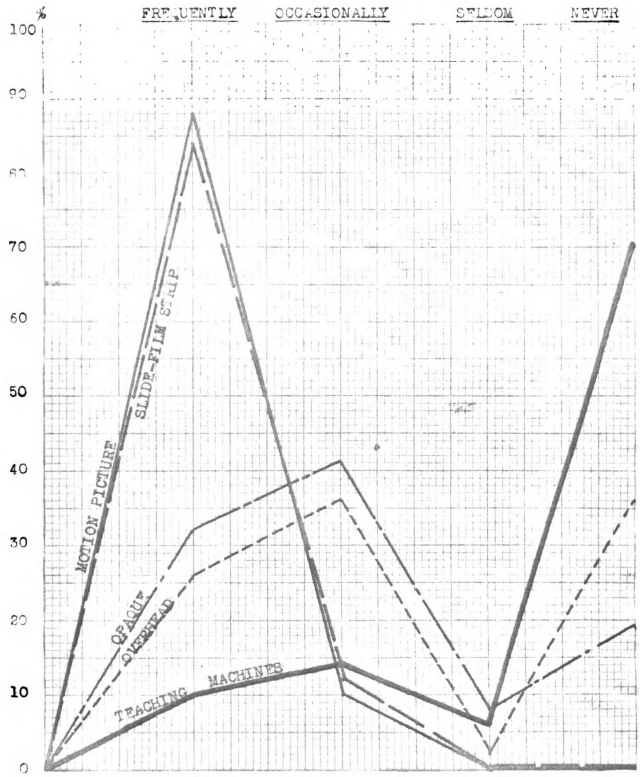

FIGURE 2

USE OF VISUAL DEVICES IN 62 MICHIGAN SCHOOL DISTRICTS USING ETV

schools in the sample are using slides and film strips frequently, with all but one per cent of the balance making occasional use of them.

Another early innovation in education circles is the opaque projector. The patent date on an early "Balopticon" by Bosch and Lomb was June 14, 1910. A survey conducted in 1941 by the United States Department of Commerce ventured to state that in the vicinity of ten thousand opaque projectors were in use in the United States.[14] Out of the group of Michigan schools being studied here, a little over 36 per cent reported frequent use of opaque projectors, and an additional 46 per cent indicated that they use them occasionally. Very infrequent use is made of the opaque projector by approximately 6 per cent of the districts that returned the questionnaire.

The overhead projector is a relatively new device, coming into general use since 1950. Dent's Audio-Visual Handbook, published in 1949, makes no reference to their existence. Response to the questionnaire of this investigation shows that 27 per cent of schools in this Michigan sample use the device frequently, 37 per cent use it occasionally and 7 per cent seldom use it.

Teaching machines have been under scrutiny by educators since 1920 when Dr. Sidney Pressey invented an autolearning device. However, they have not been considered

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[14]Ibid, pp. 20-21.

standard audio-visual equipment until the present decade. Only the more recent publications make any reference to them. In spite of their recent application almost 10 per cent of the school districts in this study use teaching machines frequently. Almost 11 per cent report occasional use and 7 per cent seldom use them. The balance of districts in the sample either did not comment or indicated that they were not using any auto-instructional device.

Adoption. The adoption pattern of instructional television seems to conform very closely to these trends of adoption of other visual teaching techniques. However, some inconsistency seems to become apparent when the use of recent visual aids are compared with the use of broadcast television. In schools not utilizing television (Figure 1) the degree to which overhead projectors are used (21 per cent frequently and 25 per cent occasionally) as well as the degree to which teaching machines are used (2 per cent frequently and 6 per cent occasionally) is distinctly less than among schools using television. Among this latter group (Figure 2) it can be seen that the overhead projector is used frequently by 26 per cent of the schools and occasionally by 36 per cent of them. Similarly, teaching machines are used by 10 per cent of the group frequently, 14 per cent occasionally. It would seem that certain common factors influencing the rate of adoption of novel instructional techniques exist. Furthermore,

the fact that a larger number of schools using newer educational devices also use television, may be indicative of a predisposition or favorable bias towards innovation on the part of the people involved. Other characteristics of the school district may also be having an influence and will be considered in detail in the next chapter.

Administrative Problems Inherent in Television. In addition to information about the status of school districts in relation to television use, questions three and ten were most productive in providing useful data pertaining to problems brought about by using, or attempting to use, television in the schools. Administrators were asked to rank a series of statements in the order they considered to be the most negative influence upon television use. The list was compiled as a summary of the factors preventing schools from using television as they were reported by the administrators that responded to the 1960-61 State Television Study. In addition to that list of factors a special space was provided for the inclusion of any other factor which the respondents may have felt to be important. Only one district named any additional obstacle to its use of television, that they had "too many students."

The data were tabulated on the basis of the rank assigned to each factor by the district administrator. The three factors receiving the greatest number of assignments in all three ranks had to do with money. Thirty-nine

point two per cent of the districts in the sample indicated that the prime reason for not using television was "lack of funds for receivers and other equipment." (Figures 3, 4 and 5) The item receiving the greatest score as a secondary negative influence (25.6 per cent) was "no budget provision for TV enrollment fees," with "lack of funds" trailing slightly (21.6 per cent).

Another troublesome problem for many districts was the difficulty encountered in scheduling local classes to coincide with the times of the telecasts over which they had no control. Although many schools making use of broadcast television have been content to rearrange their program so that instructors could take advantage of televised teaching, nevertheless, such a disruption of local planning poses a distinct obstacle to the use of the medium in the schools of many districts. Others making extensive use of television seem to have less of a problem than those merely using it occasionally, in that the local schedules of classes are built around the times set by the originating television stations, thereby reducing the problem substantially. Many schools are not willing to do this and cope with the difficulties as they arise.

Whether problems in scheduling generate opposition which spills over into the area given next priority in importance is difficult to say. However, in the first and second rankings the factor of "TV lessons do not readily

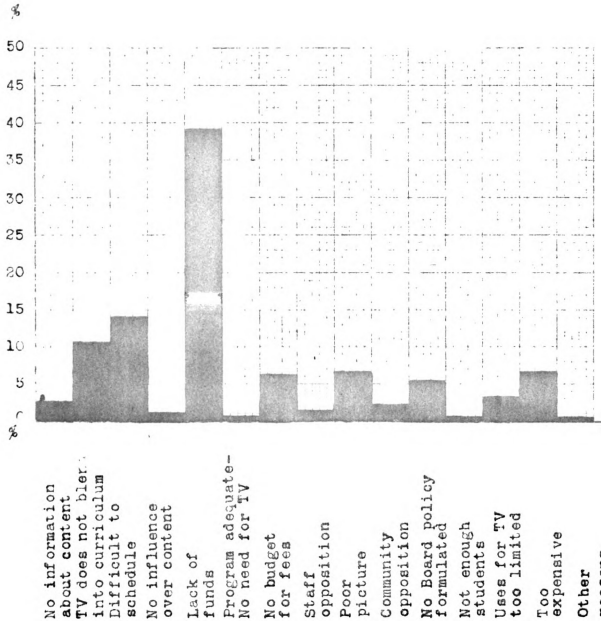

FIGURE 3

FACTORS RANKED FIRST IN NEGATIVE INFLUENCE UPON USE OF INSTRUCTIONAL TELEVISION

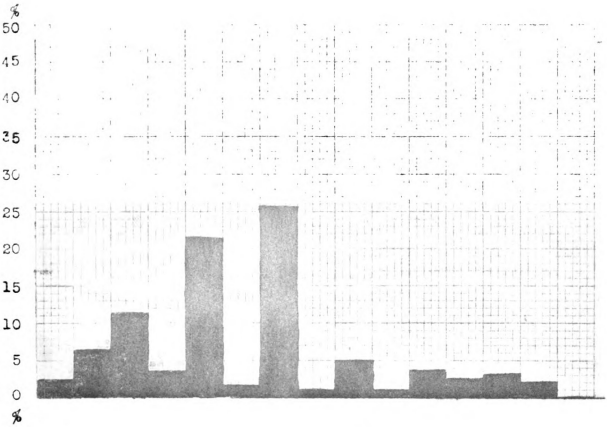

FIGURE 4

FACTORS RANKED SECOND IN NEGATIVE INFLUENCE UPON USE OF INSTRUCTIONAL TELEVISION

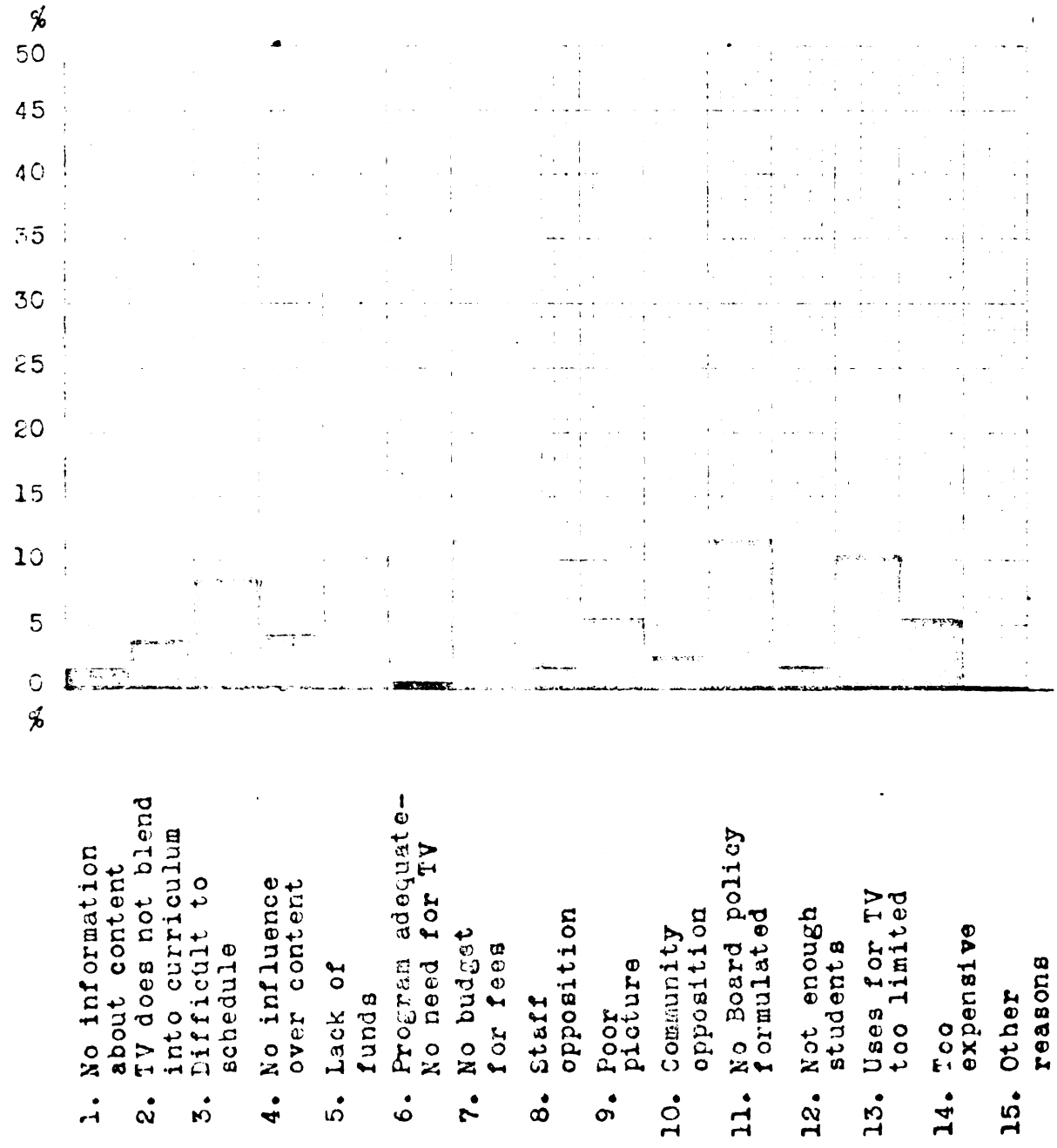

FIGURE 5

FACTORS RANKED THIRD IN NEGATIVE INFLUENCE UPON USE OF INSTRUCTIONAL TELEVISION

blend into our curriculum" merited substantial attention. Interviews with a number of superintendents confirmed this objection. Administrators in "non-using" schools visited were not antagonistic to the use of instructional television, some merely had not thought much about it and others were toying with the idea of using it on a limited basis. But almost without exception they expressed concern about the fact that television was different from other visual aids in that one did not use it as a film within the natural, on-going routine of a given class. Either the teacher built his presentation around the television program or he did without. From their perception, special events on television posed no such problem in that "one-shot" enrichment programs could be seen independently from the class presentations and remain a worthwhile learning experience. But direct television instruction presented at regular times was not usable in this way. And the likelihood of the classroom teacher and television teacher teaching the same subject and content at the same time was remote. Therefore the scheduling not only, but actual subject matter content differences between the local and television instruction existed as a problem for these administrators.

Factors indicative of actual opposition to the innovation were unexpectedly weak. Factors six, eight and ten were assigned either as primary, secondary or tertiary

obstacles to television use by an average of less than three per cent of the districts. There appears to be little absolutely negative opinion concerning the usefulness of television in education. Rather, some of the administrators interviewed believed that the dominating influences are those that require a realignment of financial and curricular arrangements within the district.

Responses to question three of the questionnaire provide some additional insight into the opinions of educators about instructional television. One hundred and sixty-two of the 176 school systems, included some reaction to the question asking for the results of their thinking or evaluation of instructional television. Again, the replies were tabulated into groups making statements similar to each other. However, the statements were sufficiently dissimilar to prevent reporting the results in percentage form. Twenty-three districts stated that they were merely favorably inclined towards the innovation, stating that it was "worthwhile", adequate", "interesting," or "fair". Another group of over fifty indicated that as a result of their evaluation of the medium they were going to begin using it in their schools. Typical comments were, "It is more important for teachers than for children," and "We are proceeding with cautious enthusiasm," or simply, "Pleased." A group of eleven districts felt their study had produced evidence

which was "inconclusive." They were "indifferent" to the possibilities or "not ready" to make use of it. One felt it had not developed adequately in that it had too many "bugs" in it. Twenty-four systems indicated that although they favored its use, lack of funds prevented their participation.

Many schools were negative in regards to participation. Six districts wrote, "Don't like it", or "Too many problems". Three districts had tried to use television and were giving it up. Twelve schools indicated doubt regarding the value of instructional television when compared to regular instruction both on the basis of per unit investment and quality. One of these stated, for example, "We are satisfied with our present teaching methods", and again, "Doubt value related to expense". Two districts preferred other media and audio-visual devices, one saying that for the same cost more was to be gained from using eight millimetre sound film. Five districts had scheduling problems, and fifteen were still considering the medium, saying that more study was needed, that they wanted to observe other districts first. One said, "Not enough schools in our area are using it for us to consider its use". Nine districts indicated marginal reception and poor signals were preventing their use of the device.

III. SUMMARY

Educational television is rapidly gaining a place of prominence among the many technological aids used in the schools to make the teaching process more vital and the learning experience more meaningful and beneficial. It enjoys a rate of adoption comparable to the most quickly accepted inventions put to educational use. It promises great potential for the educational profession in its wide search for more effective means of instruction.

Educators in Michigan schools have encountered many problems in the use of the medium. Although a majority of them indicate that they are using television in their schools in some manner, nevertheless, major problems still remain to be faced. Administrators indicate that the cost of television instruction is a principal difficulty. For many, the high cost militates against their using television, especially when this cost is viewed in the light of the many other needs of the schools as they constantly expand to meet the growing needs of an increasing population.

Another factor complicating the use of broadcast television in teaching is the problem of scheduling subject matter presentations to coincide with the telecasts. It is difficult to blend these televised materials into the local curriculum.

CHAPTER IV

THE RELATIONSHIPS BETWEEN SELECTED SCHOOL DISTRICT CHARACTERISTICS AND THE USE OF EDUCATIONAL TELEVISION IN MICHIGAN

A corporate organization, though made up of individuals, each having his own personal characteristics and motivations, nevertheless does not function as a cluster of "unorganized rabble".[1] Mayo believes that the individuals cooperating within an organization assume a group identification and behave differently than they would as individuals. Group, or organizational goals and sanctions begin to wield an influence upon the membership, as they work towards the common objectives. Over a period of time the association takes on certain characteristics descriptive, not of the individuals within it, but of the organization itself.

In an official entity such as a school district the organized individuals also function within the boundaries imposed by influences and factions beyond their immediate control. For example, the General School Laws of the State of Michigan govern the range of the activities of a school district and spell out the conditions under which the association may exist and the powers it may assume.

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[1]Elton Mayo, The Social Problems of an Industrial Civilization, (Boston: Division of Research, Harvard Graduate School of Business Administration, 1945) pp. 110-112.

The geographic borders of the district are definitely prescribed many times unfortunately, in violation of considerations of true patterns of natural community. Nevertheless, within these territorial limits are contained a population with the physical buildings they inhabit and the land and facilities with which they work to earn their livelihood. Furthermore, in addition to these tangible, measurable physical characteristics are factors having their genesis in social interrelationships. The people incorporated in the association determine the degree to which they wish to support the programs of the school district. This support is reflected in their participation in the activities of the schools and in the kind of school environment which they sponsor. These activities, in turn, are determined by the social context of the groups involved, their ethnic backgrounds, as well as their educational achievement and attitude towards formal schooling. All of these influences serve to produce a school program within the district which can be evaluated and compared with programs elsewhere. The organization, then, has a reputation and character which develops over a period of time.

I. SELECTION OF THE CHARACTERISTICS

This dissertation is concerned with the degree to which school districts in Michigan have begun to make use of a particular educational innovation, that of educational television. The reasons for the acceptance or rejection

of this medium of communication lie within the needs, aspirations, motivations, abilities and resources of each community. Some of these motivations and attitudes have been explored in the opinions of district leaders with regard to the problems inherent in the use of educational television which were reported in the last chapter. However, the environment out of which this body of opinion came has not been explored. This environment has many facets. There are a multitude of sociological influences that require measurement. A whole universe of psychological relationships of attitude and motivation need to be studied within the school as a social organism. However, in this chapter, the focus will be only upon the interrelationships between those administrative characteristics that are descriptive of the school district as a political entity.

These factors fall into the three categories of (1) the physical, (2) the financial and (3) the educational characteristics of school districts. School district size, in terms of population density, and geographic location are classified under the physical characteristics. Resident membership in the schools of the district will be used as a measure of population density. Location, in turn, will be described in terms of urban or rural situation.

In the second place the financial characteristics will be explored. These are district wealth in terms of Equalized Valuation, effort expressed in tax assessment rate

and the factor of personal income level of the community.

Thirdly, the educational characteristics which are indicative of the attitude towards education and its support will be examined. These are the factors of the median level of educational achievement of the population, the pupil teacher ratio and finally the quality of the district as determined by its accreditation status.

II. POPULATION AND SAMPLE

In order to examine the relationships between the characteristics of school districts statistically, it is necessary to isolate a representative number of these districts to form the statistical sample. Ideally one would seek to include every district within the geographical borders of the state of Michigan which were established by definition as the boundaries of this investigation. However, a substantial number of districts were eliminated because they did not fall within the effective signal range of a television station. This process of elimination was conducted by drawing circles on a map of Michigan which represented the broadcast signal area which each station might be expected to cover. School districts not falling within this series of circles were excluded from the investigation on the premise that their failure to use television in school was because they had no television signals available to them. It was found that there were 354 school systems in Michigan which were located within signal range

of at least one television station. Examination of the questionnaires available as a result of the State Television Study showed that 118 of these schools were using television for instructional purposes during school hours.

Questionnaires were sent to the 236 districts that were not using television in school. One hundred and seventy-six of the administrators returned the completed questionnaires. Sixty did not reply. Out of the 176 school districts, sixty-two were reported to have begun making use of television in their schools.

In summary then, the schools represented in the sample to be examined statistically included 118 schools which were using television previously, as well as sixty-two districts which had begun using the device more recently. Adding these two groups of districts together gave a total number of 180 of them which were using television for instructional purposes.

Conversely, subtracting these 180 districts from the total number of 354 districts in the sample gave a figure of 174 districts which presumeably did not use television. However, it should be remembered, that sixty districts did not respond to the questionnaire. It could be assumed that they were negative as far as television use was concerned. But their failure to return to the investigator the documents requested of them, the data for statistical treatment was not available and these sixty districts had

to be dropped from the study, leaving a total of 114 districts not using television in their schools.

The 294 school districts remaining in the study constitute 83.05 per cent of the total number of high school districts capable of receiving signals from a Michigan television station and Midwest Program on Airborne Television Instruction.

III. STATISTICAL HYPOTHESIS AND PROCEDURE

In comparing characteristics of individuals within a given sample of population by means of a chi square statistical procedure, the numerical values indicative of the differences between the individuals are assigned to various arbitrarily defined categories on an ascending scale. "Frequency" or "contingency" tables are then constructed for the sample which show the number of individual characteristics that fall within each category. These observed frequencies are designated f_1 , f_2 , $\ldots f_k$ where

$$\text{Sum of } f_i \text{ equals } N \quad (i = 1 \text{ to } k)$$

Of concern are situations where a certain "theoretical frequency" for each category, F_1 , F_2 , $\ldots F_k$, where

$$\text{Sum of } F_i \text{ equals } N \quad (i = 1 \text{ to } k)$$

disagrees with the observed values recorded for that category. The hypothesis to be tested is that which states

the value of the theoretical frequency in each instance. The statistic used is

$$\text{Chi}^2 \text{ equals } \sum_{i=1}^{k} \frac{f_i^2}{F_i} - N$$

and serves to test the independence of the characteristics being analyzed, in effect indicating that the distribution of one characteristic is unaffected by variations of the other characteristic. The procedure followed is to examine the proportions between frequencies to determine if they are significantly different. If a significant difference exists, the hypothesis that the characteristics are independent will be rejected. If there is no significant difference the observed values in the sample will be said to agree with hypothesis of independence. This chi square procedure, used in comparing the proportions of a population, is applied as follows:

(1) The number of observations that fall into each category are recorded in their respective cells within the table.

(2) The totals for each category are recorded in the margins of the contingency table.

(3) The theoretical frequencies are calculated by multiplying the respective marginal totals and dividing the product by N.

(4) These values are applied to the chi square formula

and the calculation is performed.

(5) The degrees of freedom are obtained by multiplying (r - 1), where r equals the number of rows, by (c - 1), where c equals the number of columns.

(6) The value obtained from the calculation is compared with the value given in a standard Chi Square Table.

(7) For the purposes of this investigation all of the comparisons will be made at the five per cent level of significance which indicates that the relationships under consideration could have been attributable to chance in only five out of a hundred instances. The chi square table value at the five per cent level for the specific degrees of freedom is recorded. If the value obtained from the calculation is greater than the table value recorded, the hypothesis of independence is rejected.

To facilitate analysis of the data, cards were prepared with the name and address of each school district in the sample. The information about each of these administrative units was then recorded around the edges of its card. When all of the data had been obtained, the figures from each card were transcribed as units to tally sheets, their location in the tally depending upon where the value for the particular school system fell within the ranges represented by the various cells of the frequency table under construction by this means. These tallies in turn were summarized and recorded with each cell of the frequency

table from which the statistical analysis was performed.

IV. ANALYSIS OF THE DATA

The principal relationships of concern in this study are those between the various administrative characteristics of school districts and the degree to which those factors influence the use of educational television. As stated earlier the capabilities of the medium make it an instructional tool which should have its greatest appeal among those who stand to benefit the most from its use, the poor and isolated school that does not have access to highly qualified staff in special subject matter areas, and cannot afford to bring a wide range of visual resources into the instructional program. However, standing in opposition to that rationale is a large body of social research which would tend to lend weight to the prediction that the more cosmopolitan, progressive and wealthy schools are in a better position to make earlier use of a technological innovation. Although they have, in some respects, less to gain in the improvement of the quality of education because of their already more advanced status in that regard, their progressive attitudes and stable financial condition would make their flight into the unknown and untried a more comfortable one then would be the case in a poor and very conservative situation. This would logically generate the hypothesis of this investigation to be that which suggests that the large, wealthy, progressive urban school districts

made up of citizens enjoying a higher level of education and personal income would be involved in the use of educational television to a greater degree. In the subsequent sections of this chapter, each of the characteristics of the school districts will be examined separately in its relationship to television use. However, in the interests of interpretation it will become necessary to assess the interrelationships between the characteristics themselves as well. It is hoped that some patterns, descriptive of school district types, will emerge as a result of this process.

The Physical Characteristics

School District Size. School district size has been defined in terms of the resident pupil membership. Examination of the ranges in the spread of population in Michigan school districts showed that the large majority of them were small. The relatively small group of large districts, however, accounted for a majority of the student population. For the purposes of the chi square statistical analysis the range of 2,000 to 5,000 pupils was taken to represent the category of medium sized school districts. Those below 2,000 were considered to be small and those above 5,000 were taken to be large districts.

Size and Television Use. Of concern at the outset was the determination of whether or not any relationship existed between the factors of school district size and its use of

educational television. To test the null hypothesis which states that, "There is no significant difference between the characteristic of school district size and the characteristic of in-school television use," the following contingency table was constructed with the size factor on the horizontal axis and the television use on the vertical (Table I). Forty two districts fell into the cell of large schools using television as well as thirty-eight of the medium sized schools and one hundred of the small ones. Conversely, there were six large systems among the districts not using television, 27 medium sized schools and 81 small schools. The marginal totals in each case gave the number of observed frequencies for each respective category.

The hypothesis was concerned, however, with the value of the theoretical frequencies which should occur within each cell of the table if the characteristics were truly independent of each other. To find the theoretical frequency for cell (1) (A), for example, the total observed frequencies for its column (1), in this case 48 school districts, were multiplied by the total observed frequencies for its row (a), in this case 180 school districts, and the product was divided by the N of 294, giving a value of 29.39 which was recorded under the observed value on the frequency table (Table II). The same procedure was followed for each cell in turn. The final frequency table

TABLE I

OBSERVED VALUES FOR FACTORS OF SIZE AND TELEVISION USE

		(1) Large	(2) Medium	(3) Small	Total	
Use Television	Observed	42	38	100	180	(A)
Do Not Use Television	Observed	6	27	81	114	(B)
	Total	48	65	181	294	

TABLE II

FREQUENCY TABLE FOR FACTORS OF SIZE AND TELEVISION USE

		Large (over 5,000)	Medium (2,000-4,999)	Small (0 to 1,999)	Total
Use Television	Observed	42	38	100	180
	Theoretical	29.39	39.80	110.81	
Do Not Use Television	Observed	6	27	81	114
	Theoretical	18.61	25.20	70.19	
	Total	48	65	181	294

provided the data which could then be applied to the statistical formula. The calculation for the frequencies recorded in Table II produced a value of 16.884. This contingency table had two degrees of freedom as indicated by the formula of "(c - 1) (r - 1) equals degrees of freedom".

Reference to the Chi Square Table for the five per cent level of significance and two degrees of freedom showed a value of 5.991. The calculation for this contingency table produced a value of 16.884 indicating a significant difference between the characteristics, causing rejection of the null hypothesis. The characteristics of television use and school district size are not independent.

Examination of Table II indicates the direction of the dependence. Out of the total of 48 large school districts in the sample, a relatively large group, 42, use television as compared to the small group not using it, 6. The trend moves from this "large school - - large use" end of the scale through a gradual reversal in the medium sized group to an obvious "small school - - less use" figure on the other end of the scale. The frequencies seem to bear out the major hypothesis that larger schools would tend to use television more readily than small ones and the chi square verifies the fact that this relationship is statistically significant.

Size and Wealth. A relationship between large student population and the use of television has been

established. But what are the older characteristics of a large school district which may contribute to their earlier involvement with this technological innovation?

Results of earlier research studies would lead one to suspect that the relative wealth of a school district would be related to its size. To determine statistically whether such an interdependence exists a contingency table was prepared for the factors of size on the horizontal axis and wealth on the vertical axis. For purposes of comparison, three categories of wealth were established with $10,000 to $14,999 of State Equalized Valuation as the medium range category, with the other two categories falling above and below those amounts respectively (Table III).

Applying the frequencies given in the table to the chi square formula gave a value of 24.503. Reference to the table of chi square values showed that the value for the statistic of the five per cent level and four degrees of freedom is 9.488. The null hypothesis, that "There is no significant difference between the characteristics of a school district's size and its wealth", is rejected. A high degree of dependence between variations of the characteristics exists. The distribution of the frequencies in the contingency table show a strong relationship between greater wealth and large size. Large schools tend to be wealthier schools. This relationship will be

TABLE III

FREQUENCY TABLE FOR FACTORS OF SIZE AND WEALTH

		Over 5,000	2,000-4,999	0 to 1,999	Total
Over $15,000	Observed	25	16	32	73
	Theoretical	11.92	16.14	44.94	
$10,000 to $14,999	Observed	11	23	63	97
	Theoretical	15.84	21.44	59.72	
$0 to $9,999	Observed	12	26	86	124
	Theoretical	20.24	27.42	76.34	
	Total	48	65	181	294

explored in great depth in the portion of the chapter dealing with financial characteristics. Of concern here is the establishment of understanding concerning a relationship between school district size and wealth.

Size and Median Personal Income. Many things contribute to the greater wealth of large school districts. There appears to be a direct relationship between density of the population and the level of personal income enjoyed by people living in an area. However, some care must be exercised in attributing a causal relationship between these factors in that median income seems to have little relationship to district wealth, as will be seen in the next part of the chapter.

A frequency tally table for the observed incidences of these characteristics of district size and personal income appears in Table IV. Chi square for four degrees of freedom at the five per cent level of significance equals 9.488. The calculation for these observed frequencies gave a value of 95.4168 which indicates some degree of significance. A null hypothesis, "There is no significant difference between the characteristics of school district size and the median personal income in the community", is rejected.

Size and Effort. Large, urban school districts also seem to put forth a greater degree of effort in supporting their educational programs than do small, rural school

TABLE IV

FREQUENCY TABLE FOR FACTORS OF SIZE AND MEDIAN PERSONAL INCOME

		Over 5,000	2,000-4,999	0 to 1,999	Total
Below $5,000	Observed	3	6	85	94
	Theoretical	15.35	20.78	57.87	
$5,000 to $5,999	Observed	4	27	32	94
	Theoretical	15.35	20.78	57.87	
Above $6,000	Observed	41	32	33	106
	Theoretical	17.30	23.44	65.26	
	Total	48	65	181	294

systems. The criteria of effort used here was that of the amount of millage assessed by a school district to provide the level of income by which the people in the district wish to support their educational program. Three categories of effort are used: (1) over twenty mills, (2) sixteen to twenty mills and (3) below sixteen mills. Chi square for four degrees of freedom at the five per cent level is 9.488. The calculated value for the data embodied in Table V is 39.0514. The null hypothesis which states, "There is no significant difference between effort of a school district and its size", is rejected. There is rather high dependency between the factors. Table V shows that the departure from the theoretical values occurs at each corner cell, indicating that a greater number of large districts support education at millage rates in excess of the expected frequency and that the smaller schools fall into the low millage categories more frequently than might be expected.

Another factor pertinent to the characteristic of school district size is that of its quality. The larger school districts have been shown to possess a higher amount of State Equalized Valuation per membership child. But what effect does increased size and wealth have on the quality of a school system? This relationship also will be explored in greater depth under the educational characteristics of school systems but is reported here to

TABLE V

FREQUENCY TABLE FOR FACTORS OF SIZE AND EFFORT

		Over 5,000	2,000-4,999	0 to 1,999	Total
Over 20 Mills	Observed	28	22	39	89
	Theoretical	14.53	19.68	54.79	
16 - 20 Mills	Observed	17	19	46	82
	Theoretical	13.39	18.13	50.48	
15.9 Mills and below	Observed	3	24	96	123
	Theoretical	20.08	27.19	75.73	
	Total	48	65	181	294

indicate its bearing upon the factor of school district size.

Frequency table number VI shows the factor of quality on the vertical axis, defined in terms of whether or not the school district under consideration was accredited or not accredited by the North Central Association of Secondary Schools and Colleges. The accredited schools, for the purpose of this study, were assumed by definition, to be of higher quality than the non-accredited institutions.

The "two by three" frequency table for this calculation (Table VI) has two degrees of freedom with a value of 5.991 in the Table of Chi Squares. The calculation indicated a value of 66.216 for this series of observations causing a strong rejection of the null hypothesis which states, "There is no significant difference between the characteristics of school district size and quality". Examination of Table VI indicates that the trend of the significance is for the large schools to be accredited to a much higher degree than small ones.

Location. The interrelationships between location, size and salaries seem to be consistent with expectation. It would be expected that, by definition, the larger school districts would tend to be located in areas of greater population density. However, this might not necessarily be a universal truth in that district consolidations in rural areas have created very large educational

TABLE VI

FREQUENCY TABLE FOR FACTORS OF SIZE AND QUALITY

		Over 5,000	2,000-4,999	0 to 1,999	Total
Accredited	Observed	39	49	53	141
	Theoretical	23.02	31.17	86.81	
Not Accredited	Observed	9	16	128	153
	Theoretical	24.98	33.83	94.19	
	Total	48	65	181	294

units with high resident membership. Furthermore, the characteristic of size has been defined in terms of resident pupil membership, whereas the characteristic of location is treated in terms of the Bureau of Census figures which are descriptive of the density of general population in political units with boundaries not necessarily conterminous with those of the school district. To eliminate as much error as possible in the rural category, the figures for the municipal populations were compared with data pertaining to the general countryside surrounding them. Where the school district map showed that the school boundaries encompassed a wide portion of the rural area around the town or village in which the school was located, the county data was taken into consideration. In many instances the population center for which the district was named was too small to have been singled out for the personalized attention of the census tabulators and there was no alternative but to use the data descriptive of the rural county area in which the school district was located. In a few instances, two or more counties were involved and the figures had to be averaged.

The factor of location, then, is defined in terms of urban versus rural situation. This was determined by (1) size in total population of the community and (2) distance from an urban complex. Although the census defines an urban community to be one having 2,500 population or

more,[2] other studies have preferred to include only towns of at least 10,000 people.[3] Partly to provide a large enough group within each cell of this sample of Michigan schools for statistical purposes, and to arrive at some point of compromise in the direction of greater population so that the chances of including "urban values" in turn are greater, the figure of 5,000 population or more was taken as the criteria for definition as an urban center. Furthermore, if a district was geographically located within five miles from the limits of a city of 25,000 or more it was considered to be urban.

Location and Size. Our major hypothesis would postulate the likelihood that the greater proportion of large districts would be classified as urban. A frequency table for these characteristics appears in Table VII. The value for chi square at the five per cent level of significance and two degrees of freedom is 5.991. The calculated value for Table VII is 91.1479. The null hypothesis, "There is no significant difference between the characteristics of size and location", is rejected in that they are dependent. It can be said that urban districts tend to have a proportionately greater resident pupil membership than rural

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[2]U.S. Bureau of the Census. U.S. Census of Population: 1960. General and Social and Economic Characteristics, Michigan. Final Report PC (1)-24C. US Govt. Printing Office, Wash. 1962.

[3]Supra., pp. 25 ff., Mort and Cornell.

TABLE VII

FREQUENCY TABLE FOR FACTORS OF LOCATION AND SIZE

		Urban	Rural	Total
Over 5,000 pupils	Observed	37	11	48
	Theoretical	15.67	32.33	
2,000 to 4,999 pupils	Observed	36	29	65
	Theoretical	21.22	43.78	
0 to 1,999 pupils	Observed	23	158	181
	Theoretical	59.11	121.89	
	Total	96	198	294

districts.

Location and Effort. To determine whether urban school districts put forth greater effort to support education a frequency table was prepared showing the observed and theoretical frequencies of the incidence of the factors. The null hypothesis, "There is no significant difference between the characteristics of location and effort", would be rejected as an outcome of the calculation of the data in the table (Table VIII). At two degrees of freedom and the five per cent level of significance chi square equals 5.991. The observed value equals 15.056. The characteristics are not independent. Urban schools put forth a significantly higher degree of effort than do the rural schools.

Location and Quality. The accreditation factor also seems to be closely linked to both size and location. To test the null hypothesis that, "There is no significant difference between a school district's location and its quality", the contingencies in Table IX were constructed from the raw data. This "two by two" contingency table has one degree of freedom. The Chi Square tables at the five per cent level of significance give a value of 3.841. The calculation for the frequencies of this characteristic produces a value of 38.6086 which causes rejection of the null hypothesis. There is a strong dependence between the characteristics, a strong relationship between urban

TABLE VIII

FREQUENCY TABLE FOR FACTORS OF LOCATION AND EFFORT

		Urban	Rural	Total
0 to 16	Observed	25	98	123
Mills	Theoretical	40.16	82.84	
16.1 to	Observed	32	50	82
20 Mills	Theoretical	26.78	55.22	
20.1 Mills	Observed	39	50	89
or more	Theoretical	29.06	59.94	
	Total	96	198	294

TABLE IX

FREQUENCY TABLE FOR FACTORS OF LOCATION AND QUALITY

		Urban	Rural	Total
Accredited	Observed	71	70	141
	Theoretical	46.04	94.96	
Not	Observed	25	128	153
Accredited	Theoretical	49.96	103.04	
	Total	96	198	294

location and accreditation.

Location and Television Use. Interestingly enough, the application of television for instructional purposes also seems to be a phenomenon more characteristic of progressive, urban situations. A series of three contingency tables were constructed from the tabulations to determine the relationships which might exist between the factors of location, quality and the use of educational television.

The calculation for Table X produced a value of 17.1411 which, at one degree of freedom considerably exceeds the table value of 3.841, indicating a high dependence between the characteristics. As a result, the null hypothesis stating that, "There is no significant difference between location and the use of educational television", is rejected. Examination of the percentages indicates that a far larger proportion of urban schools are television users. The figures for the rural schools show that almost as high a percentage are non-users as are users of educational television, 32 to 35 per cent; whereas over three fourths of the urban schools use television as opposed to less than one fourth which do not.

These figures give no indication of the quality characteristics of the respective urban and rural schools concerned. When the total sample was divided into two groups, accredited and non-accredited, and contingency tables again constructed with television on the vertical axis and location

TABLE X

FREQUENCY TABLE FOR FACTORS OF LOCATION AND TELEVISION USE

		Urban	Rural	Total
Use	Observed	75	105	180
Television	Theoretical	58.78	121.22	
Do Not Use	Observed	21	93	114
Television	Theoretical	37.22	76.78	
	Total	96	198	294

on the horizontal axis it was possible to derive two additional null hypotheses:

(1) There is no significant difference between the location of accredited schools and the use of educational television.

(2) There is no significant difference between the location of unaccredited schools and the use of television. By dividing the sample in this way it was possible to determine whether the quality factor is as influential upon television use as is the location factor with all of its implications of geographic separation, effect of rural values upon the adoption of a technological innovation and lower income per resident child.

Location of Accredited Schools and Television. There were 141 accredited schools in the sample. Of these, 71 were urban and 70 were rural districts. The tally sheets produced the data in a contingency table which, when applied to the chi square formula, gave a value of 21.4183 (Table XI). In the face of a Chi Square Table value of 3.841 for one degree of freedom at the five per cent level of significance, it can be said that the characteristics for accredited schools are significantly different and highly dependent, thereby causing rejection of the null hypothesis. In fact, the possibility of this relationship occurring as a result of chance even at the 0.5 per cent level is remote in that the Chi Square Table value

TABLE XI

FREQUENCY TABLE FOR FACTORS OF LOCATION AND TELEVISION USE ACCREDITED SCHOOLS

		Urban	Rural	Total
Use	Observed	62	36	98
Television	Theoretical	49.35	48.65	
Do Not Use	Observed	9	34	43
Television	Theoretical	21.65	21.35	
	Total	71	70	141

to be compared with the calculated value of 21.418 is 7.88 at that level of significance.

Location of Unaccredited Schools and Television Use. Similar examination of the data in Table XII for the unaccredited schools shows that out of 153 of them, 25 were urban and 128 were rural districts. Again, where the Chi Square Table value for one degree of freedom at the five per cent level of significance is 3.84, the observed values for these frequencies is 0.03075. The hypothesis of independence is accepted. Among the group of unaccredited schools there is no difference in the degree of television use between districts located in either rural or urban areas. Our previous consideration of accredited schools, however, indicated that among the proportion of the sample belonging to the higher quality group of districts there was a very strong disparity between urban and rural television adoption rates. The general significance found in the observed value for chi square in Table X, therefore, derived its strength from the extreme relationships in degree of television use of the accredited group of schools. However, it is interesting to note that even among the unaccredited schools over half of both urban and rural schools belong to the group of television users.

The quality factor seems to be an integral aspect of the adoption pattern of this technological innovation. The factors which contribute to this element of quality will be

TABLE XII

FREQUENCY TABLE FOR FACTORS OF LOCATION AND TELEVISION USE UNACCREDITED SCHOOLS

		Urban	Rural	Total
Use	Observed	13	69	82
Television	Theoretical	13.40	68.60	
Do Not Use	Observed	12	59	71
Television	Theoretical	11.6	59.4	
	Total	25	128	153

explored in greater depth later in the chapter. However, in that it has been seen that a higher proportion of television use exists among urban schools and that this pattern is only strongly significant among that portion of the sample belonging to accredited schools, another link that should be examined is whether there is also a direct relationship between the characteristics of quality and television use. Again, a frequency table was prepared from the data embodied in the tally sheets.

The null hypothesis states, "There is no significant difference between the characteristics of school district quality and its use of educational television". The factor of quality is on the horizontal axis and television use is vertical. Casual examination of the percentages attached to the data indicates a higher porportion of television use among the accredited schools, a ratio of 15 per cent to 33 per cent. The numbers are rather close in the unaccredited group and it is difficult to know whether these differences are in any way statistically significant. The chi square table value for one degree of freedom at the five per cent level of significance is 3.841. The calculation of this data within the formula is equal to 7.817. The null hypothesis is rejected. There is a definite tendency for more accredited schools to use educational television than unaccredited schools systems (Table XIII).

TABLE XIII

FREQUENCY TABLE FOR FACTORS OF QUALITY AND TELEVISION USE

		Accredited	Unaccredited	Total
Use	Observed	98 (33%)	82 (28%)	180
Television	Theoretical	86.33	93.67	
Do Not Use	Observed	43 (15%)	71 (24%)	114
Television	Theoretical	54.67	59.33	
	Total	141	153	294

Location and Educational Level. It has been shown that urban schools, partly because of their size and greater effort tend to be proportionately better in quality than the more remote districts. Part of the reason for this may lie in the higher proportion of people with greater educational achievement in the community. Mort and Cornell felt the key to progressive thinking and action lay in "the presence in a community of persons ranking high in social intelligence and responsibility".[4] Although they seemed to be referring to a small, select group of intellectual leaders, people influential in forming public attitude, the influence of greater education seems to be generally beneficial to the establishment and use of novel methodology through experimentation.

The following frequency table (Table XIV) indicates that the median level of education of the people in a school district is definitely one characteristic in the cluster of influences which effect a more positive attitude toward technological innovation. The Chi Square Table value at three degrees of freedom equals 7.815. The null hypothesis states, "there is no difference between the characteristics of median level of education of the people

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[4]Paul P. Mort and Francis G. Cornell, American Schools in Transition (New York: Teachers College, Columbia University 1941) p. 138.

TABLE XIV

FREQUENCY TABLE FOR FACTORS OF LOCATION AND EDUCATIONAL LEVEL

		Urban	Rural	Total
9 Years & below	Observed	7	69	78
	Theoretical	25.47	52.53	
10 Years	Observed	31	74	105
	Theoretical	34.29	70.71	
11 Years	Observed	28	43	71
	Theoretical	23.18	47.82	
12 Years or More	Observed	30	10	40
	Theoretical	13.06	26.94	
	Total	96	198	294

in an area and the location of that area". The observed value equals 49.139 which shows a dependency between the factors causing rejection of the null hypothesis.

In the way of summarizing the impact of urban location upon the use of educational television it can be said that a direct, positive influence of urbanism upon the adoption rate of this technological innovation exists. Although no reliable information was obtained in this study concerning the actual degree of use, it would be interesting to find whether television use was greater both in degree as well as in gross terms of "use" versus "do not use" in urban areas. Our statistics seem to indicate that there is a radiation, or spread, of television use from areas of high population density to those of low density. The map of Michigan School Districts[5] (Figure 6) shows the blocks of greatest involvement with television to be in areas of the state which are most densely populated. The black indicates districts using television, the lined areas represent districts not using television and the white areas on the map are districts which did not respond to the question.

The Financial Characteristics

It has been hypothesized that districts having greater wealth are in a more favorable position to take advantage

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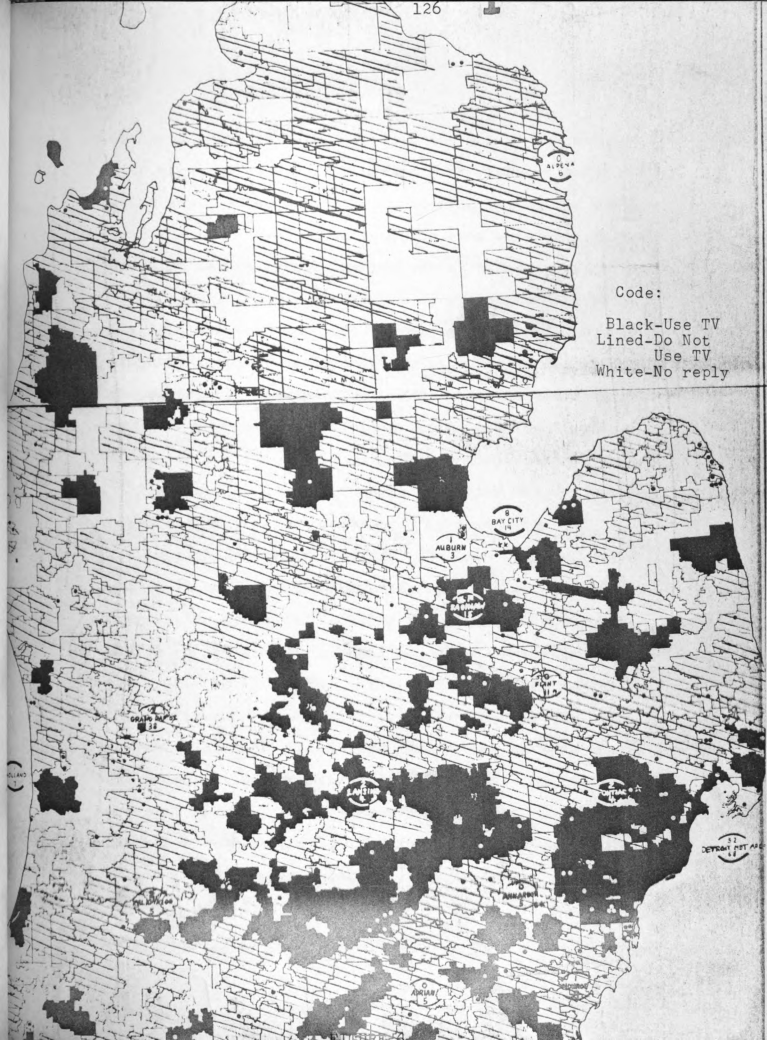
[5]Map used by permission of James B. Tintera, Wayne State University, Detroit, Michigan.


Code:
Black-Use TV
Lined-Do Not
Use TV
White-No reply
BAY CITY
AUBURN
SAGINAW
FLINT
LANSING
PONTIAC
DETROIT
ANN ARBOR
JACKSON

of benefits to be gained through the use of new methods. They might be expected to have a more flexible budget which would allow for the experimental costs of a new teaching technique. This would be even more true in the cases of technological innovations as costly as television.

Wealth. Our of the sample of 294 school districts, 124 fell into the category having up to only $10,000 of State Equalized Valuation behind each membership child in the district. Ninety-seven school districts made up the group of medium wealth systems having equalized valuations of from $10,000 to $14,999 per membership child and 73 districts with valuations in excess of $15,000 per membership child were considered to be wealthy.

Wealth and Television Use. Tallies taken of these groups in conjunction with television use brought out the frequencies described in Table XV, with the factor of wealth on the horizontal axis of the table and television use on the vertical axis. The null hypotheses suggest that, "There is no significant difference between the characteristic of school district wealth and that of the use of educational television". Chi Square at the five per cent level of significance with two degrees of freedom has a table value of 5.991. The observed value for the relationship between these characteristics is 4.05354. It is not significant and therefore verifies the null hypothesis of "no significant difference". Therefore, contrary

TABLE XV

FREQUENCY TABLE FOR FACTORS OF WEALTH AND TELEVISION USE

		$15,000 or more	$10,000-$14,999	$9,999 or less	Total
Use	Observed	50	62	68	180
Television	Theoretical	44.69	59.39	75.92	
Do Not Use	Observed	23	35	56	114
Television	Theoretical	28.31	37.61	48.08	
	Total	73	97	124	294

to what might be expected in this case, there is no significant relationship between television use in the school districts and the amount of taxable wealth behind each membership child. The raw data seems to indicate slightly greater television use among wealthier schools, but this trend is not great enough to attribute a relationship to dependence between the characteristics instead of chance.

Wealth and Quality. The independence of wealth and television use is even more puzzling when the characteristic is compared to other district traits which are individually influential upon television use. For example, it was shown in Table XIII that quality and television use were dependent characteristics. Although wealth and television use do not seem to interact, there is, nevertheless, a very strong dependence between wealth and quality of the school district.

Chi Square at the five per cent level of significance for two degrees of freedom has a table value of 5.991. The observed value for these characteristics is 32.2531, indicating great dependence even at the 0.5 per cent level of significance. The wealthier schools enjoy a much higher degree of accreditation than do the districts belonging to the less affluent categories. (Table XVI)

Wealth and Pupil Teacher Ratio. Wealthier schools seem to be in a position to hire more staff members for a given number of students to be taught. Where the value

TABLE XVI

FREQUENCY TABLE FOR FACTORS OF WEALTH AND QUALITY

		$15,000 or more	$10,000-$14,999	$9,999 or less	Total
Accredited	Observed	49	56	36	141
	Theoretical	35.01	46.52	59.47	
Not Accredited	Observed	24	41	88	153
	Theoretical	37.99	50.48	64.53	
	Total	73	97	124	294

of Chi Square for four degrees of freedom at the five per cent level of significance is 9.488, the observed value in Table XVII is 31.70572. A null hypothesis stating that, "There is no significant difference between the characteristic of wealth and that of pupil teacher ratio", would be rejected. The frequencies within the cells of the contingency table show that there is a strong tendency to have fewer pupils per teacher in wealthier schools than in schools with a lower taxable wealth behind each membership child. In the section pertaining to educational characteristics it will be seen that there is also a higher degree of television use in schools with a low pupil teacher ratio.

Table III demonstrated a relationship between wealthy schools and larger size. It may very well be possible that the size factor is one of the explanations for a higher degree of television use. Though smaller schools would have more to gain proportionately, the large schools think more readily in terms of large group instruction, one of the prime applications of educational television, simply because they have larger numbers of students at each level to teach. Because of this volume of pupils, the factors of efficiency and economy in instruction are vital concerns for the administrator who is seeking the best return for every expenditure. In some instances large group instruction realizes actual economies in reducing the

TABLE XVII

FREQUENCY TABLE FOR FACTORS OF WEALTH AND PUPIL TEACHER RATIO

		$15,000 or more	$10,000-$14,999	$9,999 or less	Total
Below 24 pupils	Observed	35	26	18	79
	Theoretical	19.61	26.06	33.32	
24 - 28 pupils	Observed	32	50	66	148
	Theoretical	36.75	48.83	62.42	
Above 28 pupils	Observed	6	21	40	67
	Theoretical	16.64	22.11	28.26	
	Total	73	97	124	294

number of staff required. But one must be cautious in interpreting these interrelationships in that the data available is not explicit in its description of whether television is used primarily for enrichment or in the instruction of many students simultaneously. In view of the lower numbers of pupils per teachers in the large, wealthier schools, the economies effected may not be felt as much in the reduction in numbers of staff members as in the release of staff to devote time for other functions such as individual or small group instruction and other activities which contribute to the quality of the school program.

Wealth and Location. The weight of the combined influences of the attributes inherent in wealth apply less to the large number of rural school districts than to urban associations. The value for Chi Square at two degrees of freedom equals 5.991. The observed value for this sample was 29.0962. The characteristics are significantly dependent upon each other. There is a strong trend for the urban schools to be wealthier. This is especially significant when the proportionately far greater number of rural schools are seen to fall into the lowest wealth bracket, a number almost as large as the entire group of urban schools represented in the sample (Table XVIII).

Effort. Another concomitant explanation for the lack

TABLE XVIII

FREQUENCY TABLE FOR FACTORS OF WEALTH AND LOCATION

		$15,000 or more	$10,000-$14,999	$9,999 or less	Total
Urban	Observed	40	30	26	96
	Theoretical	23.84	31.60	40.49	
Rural	Observed	33	67	98	198
	Theoretical	49.16	65.33	83.51	
	Total	73	97	124	294

of dependence between television use and wealth may be found in the observed relationships between the characteristics of wealth and effort. The criteria taken to be indicative of effort in a school district is that of the total millage approved by the voters of the district as the tax assessment base for the support of the educational program of the district. Four general millage categories were used, although in at least one instance two of them had to be combined into a single category to provide enough frequency of items within each cell of a contingency table to make statistical analysis possible. The categories used were: (1) More than 20 mills, (2) 16 to 20 mills, (3) 12 to 16 mills, and (4) below 12 mills.

Effort and Television Use. A table showing frequencies of incidence of the characteristics of effort on the one hand and the use of educational television on the other was prepared (Table XIX). The table value for Chi Square at the five per cent level of significance and three degrees of freedom equals 7.815. The calculated value is 9.68818. The null hypothesis stating that, "There is no significant difference between the effort shown by school districts to support education and the use of television in the school districts", is rejected in that a dependency between the characteristics exists. There is a relationship between the financial effort of a school district and its use of television. The direction of the dependence

TABLE XIX

FREQUENCY TABLE FOR FACTORS OF EFFORT AND TELEVISION USE

		Over 20 Mills	16-20 Mills	12-15.9 Mills	Below 12 Mills	Total
Use	Observed	65	51	53	11	180
Television	Theoretical	54.49	50.20	61.84	13.47	
Do Not Use	Observed	24	31	48	11	114
Television	Theoretical	34.5	31.80	39.16	8.53	
	Total	89	82	101	22	294

is "greater effort - - greater use of educational television". However, the relationship between the next factors to be considered, those of effort and wealth, is just the opposite, namely, one of the low effort identified with high wealth.

Effort and Wealth. The curious lack of dependence between district wealth and its use of educational television may be explained in part by the reversal of the direction of dependency between the two characteristics of effort and wealth.

The calculation for frequency table number XX has four degrees of freedom. At the five per cent level of significance the Chi Square Table shows a value of 9.488. In this instance the null hypothesis to be tested is that which states, "There is no significant difference between the theoretical and observed frequencies of the respective characteristics of wealth and effort". The value obtained in the calculation was 20.4011 which is significant, thereby causing rejection of the null hypothesis. There is a demonstrated dependence between the characteristic of wealth and that of effort. This dependence is all the more striking when the direction of the relationship is observed. From the low number of districts ranked in the first cell, of high wealth and high millage, and the high number of wealthy districts in the last cell indicating low effort, as well as the opposite trend among the poorer

TABLE XX

FREQUENCY TABLE FOR FACTORS OF EFFORT AND WEALTH

		Over 20 Mills	16-20 Mills	16- Mills	Total
$15,000	Observed	14	25	34	73
or more	Theoretical	22.10	20.36	30.54	
$10,000 to	Observed	20	30	47	97
$14,999	Theoretical	29.36	27.06	40.58	
$9,999 or	Observed	55	27	42	124
less	Theoretical	37.54	34.58	51.88	
	Total	89	82	123	294

schools of the third column, indicates that this is a strong inverse relationship. Higher wealth is associated with lower effort and lower wealth with higher effort. This may account in part for the lack of statistically significant relationship between wealth and television use discussed earlier.

Effort and Median Personal Income. When this association of effort and wealth is expanded to the wealth represented in the median earnings of the people in a district there seems to be little relationship. The probability of the following frequencies occurring by chance, at the five per cent level of significance and four degrees of freedom, is 9.488 (Table XXI). The calculated value is 6.4359. The null hypothesis stating, "There is no significant difference between the characteristics of income and effort", is accepted. The factors are too independent.

Median Income. The financial backbone of Michigan school systems is the income received from taxes on local property in addition to the regular increments of State Aid. The presence of industry in a district provides a larger base of taxable capital investments, serving to increase substantially the income of the school district over and above amounts realized from taxes on private dwellings. Buildup of industrial activity in an area contributes both to community wealth and growth by providing

TABLE XXI

FREQUENCY TABLE FOR FACTORS OF SALARY AND EFFORT

		Over 20 Mills	16-20 Mills	16- Mills	Total
Below	Observed	13	24	57	94
$5,000	Theoretical	28.46	26.22	39.32	
$5,000 to	Observed	19	30	45	94
$6,000	Theoretical	28.46	26.22	39.32	
Over	Observed	57	28	21	106
$6,000	Theoretical	32.08	29.56	44.36	
	Total	89	82	123	294

occupational opportunity and income, which in turn attracts new people to the growing community.

Personal income is not a direct source of revenue for education. Its impact would be reflected in personal investments in homes and consumer goods which in turn would ultimately come back in the form of school revenue from property and sales taxes. As mentioned earlier, in connection with the analysis of district wealth, it is dangerous to assume a causal relationship between any one specific community characteristic and the progressiveness of the school program. There is a universe of delicately balanced factors exerting their intangible, but nevertheless distinct influence upon community progress. Personal income is one such stellar component in the galaxy of a community's culture, contributing to the system's balance through the pull it exerts on other components in the system.

Personal Income and Television Use. Personal income is significantly related to the degree of television use in the school district in Michigan. The calculated value of 11.0229 exceeds the Chi Square table value of 5.9991 indicating a significant difference between the characteristics. Communities enjoying a higher level of income tend to use television to a greater degree in their schools. Against misinterpretation, it must be reiterated that this is merely one element indicative of community "personality". The deep causal factors operating here would be impossible

to isolate without going into a study in depth over a long period of time. Many influences suggest themselves, one of which might be the fact that urban people view commercial television to a greater degree, or are more oriented to making television an integral part of daily life. These kinds of influences may have some bearing upon television's acceptance in school as an instructional device. Whatever the cause, analysis of observed frequencies in this sample indicate a distinct dependency between the characteristics shown in Table XXII.

Personal Income and Taxable Wealth. Where it has been demonstrated that a relationship exists between median personal income and television use, examination of possible interrelationships between personal income and the other factors being considered in the study may be of value also in shedding some light upon why such an interaction exists. A frequency table was prepared for the factors of income and wealth (Table XXIII). At four degrees of freedom and the five per cent level of significance the Chi Square table gives a value of 9.488. The calculated value for the observed frequencies however, is 7.2122. A null hypothesis stating, "There is no significant difference between the characteristics of personal income and wealth", would be accepted. There is not any interaction between salaries and district wealth which cannot be attributed to chance.

TABLE XXII

FREQUENCY TABLE FOR FACTORS OF SALARY AND TELEVISION USE

		Below $5,000	$5,000-$6,000	Over $6,000	Total
Use	Observed	49	53	78	180
Television	Theoretical	57.55	57.55	64.90	
Do Not Use	Observed	45	41	28	114
Television	Theoretical	36.45	36.45	41.10	
	Total	94	94	106	294

TABLE XXIII

FREQUENCY TABLE FOR FACTORS OF SALARY AND WEALTH

		Below $5,000	$5,000-$6,000	Over $6,000	Total
Over $15,000 Valuation	Observed	15	24	34	73
	Theoretical	23.34	23.34	26.32	
$10,000 to $14,000 Valuation	Observed	33	31	33	97
	Theoretical	31.01	31.01	31.14	
Up to $10,000 Valuation	Observed	46	39	39	124
	Theoretical	39.65	39.65	44.71	
	Total	94	94	106	294

Personal Income and Pupil Teacher Ratio. It might be supposed that people enjoying a higher level of personal income would be disposed to supporting an educational program which was striving towards superiority by having fewer pupils for each teacher. A contingency table for 294 schools in this study (Table XXIV) was prepared. Applying the statistical formula to the observed frequencies for these school districts produced a value of 3.7419 as compared to the Chi Square table statistic of 9.488 for a calculation with four degrees of freedom at the five per cent level of significance. There is no evidence of a statistically significant relationship between the median income of a community and the pupil teacher ratio in its schools.

Median Income and Educational Level. As might be expected, however, there is a very strong dependency between the median number of years of education acquired by the people in a district and their median salary. A null hypothesis which states, "There is no significant difference between the characteristics of median income and educational level of a community", would be rejected as a result of the comparison of the observed and expected frequencies in the contingency table (Table XXV). Chi Square at the five per cent level and four degrees of freedom is 9.488. The calculated value for the observed frequencies is 92.4417 which indicates a strong dependence between the factors.

TABLE XXIV

FREQUENCY TABLE FOR FACTORS OF SALARY AND PUPIL/TEACHER RATIO

		Below $5,000	$5,000-$6,000	Over $6,000	Total
Below 24 Pupils	Observed	21	27	31	79
	Theoretical	25.26	25.26	28.48	
24 to 28 pupils	Observed	54	47	47	148
	Theoretical	47.32	47.32	53.36	
Above 28 Pupils	Observed	19	20	28	67
	Theoretical	21.42	21.42	24.16	
	Total	94	94	106	294

TABLE XXV

FREQUENCY TABLE FOR FACTORS OF SALARY AND EDUCATIONAL LEVEL

		Below $5,000	$5,000-$6,000	Over $6,000	Total
9 Years or less	Observed	56	18	4	78
	Theoretical	24.94	24.94	28.12	
10 Years	Observed	27	38	40	105
	Theoretical	33.57	33.57	37.86	
11 Years or more	Observed	11	38	62	106
	Theoretical	35.49	35.49	40.02	
	Total	94	94	106	294

Higher educational achievement is a powerful contributor to earning power.

Median Income and Location. The relationship between the amount of personal income one could expect to earn and the area of residence is very strong. Table XXVI shows the direction of the relationship to be "urban location - - higher income". The calculation has two degrees of freedom. Chi Square at the five per cent level of significance has a table value of 5.991. The observed value is 101.5716. The null hypothesis, "There is no significant difference between the factors of median community salary and location", is rejected because of the dependence between the factors.

Median Income and School District Quality. Although there is no relationship between salary and the school district quality index of pupil/teacher ratio, there does seem to be a dependency between level of income and quality of the district as determined by accreditation. Obviously, many of the factors contribute to accreditation, as we have already seen in earlier sections of the chapter. Location, wealth and school district size all play their part in providing the many characteristics a school district requires in order to achieve the accredited status. Perhaps all of these factors operate together to bring about the dependence between income and quality. Analysis of the data embodied in Table XXVII

TABLE XXVI

FREQUENCY TABLE FOR THE FACTORS OF SALARY AND LOCATION

		Below $5,000	$5,000-$6,000	Over $6,000	Total
Urban	Observed	3	21	72	96
	Theoretical	30.69	30.69	34.62	
Rural	Observed	91	73	34	198
	Theoretical	63.31	63.31	71.38	
	Total	94	94	106	294

TABLE XXVII

FREQUENCY TABLE FOR FACTORS OF SALARY AND QUALITY

		Below $5,000	$5,000-$6,000	Over $6,000	Total
Accredited	Observed	22	44	75	141
	Theoretical	45.08	45.08	50.84	
Not Accredited	Observed	72	50	31	153
	Theoretical	48.92	48.92	55.16	
	Total	94	94	106	294

requires interpretation with two degrees of freedom at the five per cent level. The Chi Square Table value of 5.991 is compared with observed value of 44.818. It is significant statistically and the null hypothesis of "no significant difference" is rejected.

The Educational Characteristics

In explaining a higher degree of use of educational television among the large, progressive, urban school districts one might turn to an analysis of community attitudes towards various indexes of progress. A curriculum analysis could be undertaken to ascertain whether newer approaches to teaching language, science or mathematics were being used. Or it might be possible to find out whether various kinds of technological innovations are being used in the administration of the school, its physical plant, its library and instructional programs. Many studies need to be made of the complex interworkings of the academic social system and its impact upon the thoughts and attitudes of the people in the community being served.

Median Level of Education. One measure of community sophistication is the level of educational achievement in an area. The Bureau of the Census converts the data obtained in their surveys to "Median School Years Completed". The data is taken from individuals in all age groups but is shown only for the population 25 years old and over,

most of whom had completed their education. Plotting these statistics against the frequency data of the characteristics of the school districts in this sample of Michigan schools under consideration produced the frequency tables of the following section. It was hypothesized that the higher level of educational achievement contributed to the general progress of a community both in the way of creating a more intellectually adequate citizenry, thereby promoting a higher level of economy and culture, and in attracting other progressive people to the area of greater opportunity and wealth. The interrelationships of the characteristics which follow aim at giving some description of the factors which might contribute to the degree of use of a technological innovation such as television in the schools.

Educational Level and Size. Large school districts tend to be classified among those located in urban areas (Table VII). Urban centers provide greater opportunity for employment and enjoy a wider range of resources in the provision of services for the people living in the community. Business, industry and educational institutions attract and in fact, require, individuals with better than average educational achievement. Because of influences such as these, there is an interdependence between the characteristics of median school years completed and district size. When compared with the Chi Square table

value of 9.488 for four degrees of freedom at the five per cent level of significance, the observed value of 29.055 is statistically significant. A null hypothesis stating, "There is no significant difference between the characteristics of educational level and school district size", is rejected. The discrepancy between the theoretical and observed frequencies (Table XXVIII) is greatest in the category of highest education. It can be seen that a far greater number of large schools fall into this group than might be expected. Conversely, a fewer number of small schools fall into the category than one would expect.

Educational Level and Effort. It is not surprising that the dependence between size and educational level is verified by a dependence between the characteristics of educational level and effort. Larger schools districts have been shown to put forth greater effort. So too, a contingency table for the factors of education and effort gives an observed value of 30.0197 as compared to the Chi Square table value of 12.59 for six degrees of freedom. (Table XXIX) There is a statistically significant dependence between the characteristics of median school years completed and effort.

Educational Level and Quality. Similarly, there is a statistically significant relationship between the characteristics of education and district quality. The null hypothesis states, "There is no significant difference

TABLE XXVIII

FREQUENCY TABLE FOR FACTORS OF EDUCATIONAL LEVEL AND SIZE

		10 years or less	11 years	12 years or more	Total
5,000 pupils or more	Observed	23	10	15	48
	Theoretical	29.88	11.59	6.53	
2,000 to 4,999 pupils	Observed	33	17	15	65
	Theoretical	40.46	15.69	8.85	
0 to 1,999 pupils	Observed	127	44	10	181
	Theoretical	112.66	43.72	24.62	
	Total	183	71	40	294

TABLE XXIX

FREQUENCY TABLE FOR FACTORS OF EDUCATIONAL LEVEL AND EFFORT

		9 yrs.	10 yrs.	11 yrs.	12 yrs.	Total
Over 20	Observed	12	25	26	26	89
Mills	Theoretical	23.61	31.79	21.49	12.11	
16-20	Observed	20	32	23	7	82
Mills	Theoretical	21.76	29.28	19.80	11.16	
Below 16	Observed	46	48	22	7	123
Mills	Theoretical	32.63	43.93	29.71	16.73	
	Total	78	105	71	40	294

between the factors of median level of education and school district quality as measured by accreditation status". The Chi Square table for two degrees of freedom at the five per cent level of significance gives a value of 5.991. The calculated observed value is 41.0098. The null hypothesis is rejected. (Table XXX)

Educational Level and Wealth. The factor is wealth in terms of State Equalized Valuation per membership child, seems to consistently divorce itself from dependency with other characteristics being studied. The distribution of industry, commercial properties, homes and farms apparently interacts with population density in such a way as to produce no measureable patterns of dependency with these other factors being examined. The null statement of independence between the characteristics is accepted as a result of the comparison of the calculated value for the observed frequencies of 5.5043 and the Chi Square table value of 12.592 for six degrees of freedom at the five per cent level of significance. There is no relationship between the level of education of a community in terms of median school years completed and the wealth of the community in terms of taxable real estate (Table XXXI).

Educational Level and Television Use. There is enough interaction between the various community characteristics to bring about a distinctly significant correlation between the median level of education in a community and the degree

TABLE XXX

FREQUENCY TABLE FOR FACTORS OF EDUCATIONAL LEVEL AND QUALITY

		9 Yrs. or less	10 Yrs.	11 Yrs.	12 Yrs. or more	Total
Accred.	Observed	21	46	39	35	141
	Theoretical	37.41	50.36	34.05	19.18	
Not Accred.	Observed	57	59	32	5	153
	Theoretical	40.59	54.64	36.95	20.82	
	Total	78	105	71	40	294

TABLE XXXI

FREQUENCY TABLE FOR FACTORS OF EDUCATIONAL LEVEL AND WEALTH

		9 Yrs. or less	10 Yrs.	11 Yrs.	12 Yrs. or more	Total
Over	Observed	19	29	10	15	73
$15,000	Theoretical	19.37	26.07	17.63	9.93	
$10,000-	Observed	20	35	29	13	97
$14,999	Theoretical	25.73	67.64	23.43	13.20	
Up to	Observed	39	41	32	12	124
$10,000	Theoretical	32.90	44.29	29.94	16.87	
	Total	78	105	71	40	294

of use of educational television in its schools (Table XXXII). Although the larger districts tend to be wealthier in taxable property, they take advantage of the fact by lowering tax rates, as compared to high rates paid by many small districts, at the same time providing an acceptable educational program with less hardship to the individual tax payer. Even at that these districts tend to maintain accredited schools with lower pupil/teacher ratios. Whether their greater use of television reflects a similar effort to improve instruction alone or whether it reflects an attempt to maintain quality at less cost per pupil is difficult to determine. However, the fact that the pupil teacher ratios are lower would seem to show that the concern is not in reducing the number of staff only, but rather in providing greater educational resource and quality.

The null hypothesis for the statistical analysis of the observed frequencies in Table XXXII states, "There is no significant difference between the characteristics of median school years completed in a community and the use of educational television", is rejected in that the calculated value of 16.793 exceeds the table value of 7.815.

Pupil Teacher Ratio. Ratios of numbers of students per teacher have been a concern of educators for a long time. Schools who assigned fewer pupils on an average to members of the faculty were considered to be wealthier schools and were said to be better schools. Educators

TABLE XXXII

FREQUENCY TABLE FOR FACTORS OF EDUCATIONAL LEVEL AND TELEVISION

		9 Yrs. or less	10 Yrs.	11 Yrs.	12 Yrs. or more	Total
Use ETV	Observed	38	64	43	35	180
	Theoretical	47.76	64.29	43.47	24.49	
Do Not	Observed	40	41	28	5	114
Use ETV	Theoretical	30.24	40.71	27.53	15.51	
	Total	78	105	71	40	294

speak of the ideal "one to one" ratio of teacher to pupil, nostalgically recalling the pair sitting side by side on a log in nature's classroom. The pressures of the time, the population explosion, the decay of old school buildings and the need for their replacement and expansion have brought these notions of optimum class size into question. We now profess that some things are learned as well without a teacher, some in large group situations. Still other experiences require the guiding hand, the challenge, motivation and inspiration that only teacher can provide, and that in the setting of a small group or in a face to face situation.

Although somewhat suspect as a measure of institutional quality, a low number of pupils per teacher is considered to be a virtue, indicative of institutional excellence. As such it proved to be a disappointing index of behavior in this sample of 294 Michigan school systems.

Pupil Teacher Ratio and Quality. In attempting to establish basic relationships that may exist, a contingency table of observed frequencies of the characteristics of pupil teacher ratio and quality was prepared (Table XXXIII). The Chi Square table indicates a value of 5.991 for the statistic at two degrees of freedom and the five per cent level of significance. The null hypothesis to be tested states, "There is no significant difference between the characteristics of the ratio of pupils per teacher in

TABLE XXXIII

FREQUENCY TABLE FOR FACTORS OF PUPIL TEACHER RATIO AND QUALITY

		24 or less	24.1 to 28	28.1 or more	Total
Accredited	Observed	38	69	34	141
	Theoretical	37.89	70.98	32.13	
Not Accredited	Observed	41	79	33	153
	Theoretical	41.11	77.02	34.87	
	Total	79	148	67	294

a school district and its accreditation status". The observed value produced by the application of the data to the chi square formula for these frequencies is 0.31584. The null hypothesis is accepted in that this value is not significant. There is no dependence between accreditation and pupil/teacher ratios in this sample.

Pupil Teacher Ratio and Effort. The independence of staff density and district quality carried over into the factor of effort as well. The tax rate assessed by a school district for educational support is not reflected by concomitant changes in pupil teacher ratio. In the one category of "24 pupils or less per teacher" (Table XXXIV) there was a trend for the high effort schools to be included in the category to a greater extent then low effort districts. However, this trend was not acute enough to produce a statistically significant relationship between the factors. The calculated value was 7.51443 as compared with the Chi Square table value of 9.488 for four degrees of freedom at the five per cent level of significance.

Pupil Teacher Ratio and Educational Level. Although one might hypothesize that people with a higher degree of educational attainment might seek to improve the educational opportunity for their children by providing more teachers in proportion to student population, there seems to be no statistically significant relationship between the two characteristics. The calculation for the observed

TABLE XXXIV

FREQUENCY TABLE FOR FACTORS OF PUPIL TEACHER RATIO AND EFFORT

		Below 24 pupils	24-28 pupils	Above 28 pupils	Total
Above 20 Mills	Observed	33	36	20	89
	Theoretical	23.92	44.80	20.28	
16 to 20 Mills	Observed	19	45	18	82
	Theoretical	22.03	41.28	18.69	
Below 16 Mills	Observed	27	67	29	123
	Theoretical	33.05	61.92	28.03	
	Total	79	148	67	294

frequencies in Table XXXV produced a value of 2.9367 as compared to the Chi Square table amount of 12.592 for six degrees of freedom at the five per cent level of significance. The null hypothesis "There is no significant difference between the characteristics of pupil teacher ratio and median school years completed in a community", is accepted.

Pupil Teacher Ratio and Location. The observed values for the characteristics of pupil teacher ratio and wealth were dependent. The more wealthy districts have a lower number of pupils per teacher. But the dependence between characteristics of wealth and urban location does not apply equally to pupil teacher ratio and location. A contingency table (Table XXXVI) for these frequencies produced no significant value indicating dependence between the characteristics. There was no indication that urban schools assigned fewer pupils to their teachers than did the rural school districts. The null, "no significant difference", is accepted in the light of the insignificant value of 4.3529 for the observed frequencies.

Pupil Teacher Ratio and School District Size. In view of the relationship this characteristic has to wealth, and in turn the dependence between wealth and size, it might be expected that there would be a significant relationship between pupil teacher ratio and size. A null hypothesis stating, "There is no significant difference

TABLE XXXV

FREQUENCY TABLE FOR FACTORS OF PUPIL TEACHER RATIO AND THE MEDIAN SCHOOL YEARS COMPLETED

		Below 24 pupils	24-28 pupils	Above 28 pupils	Total
9 Years	Observed	19	39	20	78
or less	Theoretical	20.96	39.26	17.78	
10 Years	Observed	19	55	31	105
	Theoretical	28.21	52.86	23.93	
11 Years	Observed	23	38	10	71
	Theoretical	19.32	51.51	16.18	
12 Years	Observed	18	16	6	40
or more	Theoretical	10.75	20.14	9.12	
	Total	79	148	67	294

TABLE XXXVI

FREQUENCY TABLE FOR FACTORS OF PUPIL TEACHER RATIO & LOCATION

		Below 24 pupils	24-28 pupils	Above 28 pupils	Total
Urban	Observed	31	40	25	96
	Theoretical	25.80	48.33	21.87	
Rural	Observed	48	108	42	198
	Theoretical	53.20	99.67	45.13	
	Total	79	148	67	294

between the characteristics of pupil teacher ratio and school district size", is to be tested by the chi square analysis. The frequencies are given in Table XXXVII. The Chi Square table indicates a value of 9.488 for four degrees of freedom at the five per cent level of significance. The calculated value of the observed frequencies in the sample is 9.684. The null hypothesis is rejected in the light of the demonstrated dependence between the factors. There is a mild tendency for small schools to have a higher number of pupils per teacher. This might be explained in part by the hesitancy of school administrators of smaller districts to divide large classes, thereby creating split level grade groups which are difficult to teach and unpopular among teachers.

Pupil Teacher Ratio and Television Use. In the face of this lack of relationship between pupil teacher ratios and other district characteristics, it is surprising to find a distinctly significant dependence between lower pupil teacher ratio and television use. The null hypothesis stating, "There is no significant difference between the characteristics of pupil teacher ratio and television use", is rejected. The Chi Square table value for two degrees of freedom at the five per cent level of significance is 5.991. The calculated value for the observed frequencies in Table XXXVIII is 14.1908. Examination of the table indicates the direction of the dependence.

TABLE XXXVII

FREQUENCY TABLE FOR FACTORS OF PUPIL TEACHER RATIO AND SIZE

		Below 24 pupils	24-28 pupils	Above 28 pupils	Total
Above 5,000 pupils	Observed	16	18	14	48
	Theoretical	12.90	24.16	10.94	
2,000 to 4,999 pupils	Observed	15	29	21	65
	Theoretical	17.47	32.72	14.81	
0 to 1,999 pupils	Observed	48	101	32	181
	Theoretical	48.63	91.12	41.25	
	Total	79	148	67	294

TABLE XXXVIII

FREQUENCY TABLE FOR FACTORS OF PUPIL TEACHER RATIO AND THE USE OF EDUCATIONAL TELEVISION

		Below 24 pupils	24-28 pupils	Above 28 pupils	Total
Use	Observed	58	93	29	180
Television	Theoretical	48.37	90.61	41.02	
Do Nut Use	Observed	21	55	38	114
Television	Theoretical	30.63	57.39	25.98	
	Total	79	148	67	294

School districts with lower pupil teacher ratios tend to use television to a greater extent. Such schools having fewer pupils per professional staff member are able, presumeably, to give more personal attention to each student. Not having to cope with an overload of students, teachers in these schools might need the instructional aid of television less than their more heavily burdened counterparts in other systems. And yet these are the very schools that use television to a greater extent.

School District Quality. The characteristic of school district quality has been discussed in the context of the analysis of the other factors studied. The accreditation status of the many school systems has been compared to each of the characteristics in turn, including television use. The only factor to which it has not been compared is that of effort. The calculation for the frequencies of those characteristics gave a value of 3.50778 which is not significant for three degrees of freedom at the five per cent level. (Table XXXIX)

V. SUMMARY

Data received from a sample of 294 school districts in Michigan were tabulated for Chi Square analysis. The frequency tables prepared from the tally sheets of raw data were used as the source of information to be applied to the formula. Of primary interest was the determination of interrelationships between school district characteristics

TABLE XXXIX

FREQUENCY TABLE FOR FACTORS OF QUALITY AND EFFORT

		Accredited	Unaccredited	Total
Above 20	Observed	47	42	89
Mills	Theoretical	42.68	46.32	
16-20	Observed	41	41	82
Mills	Theoretical	39.33	42.67	
12-16	Observed	46	55	101
Mills	Theoretical	48.44	52.56	
Below 12	Observed	7	15	22
Mills	Theoretical	10.55	11.45	
	Total	141	153	294

and the use of educational television. In the interests of interpretation statistical evaluation of all of the interrelationships between every combination of the factors was undertaken. The statistical results for each combination are summarized below:

Table Number	Factors	X^2 Table	Observed Value	Signif. Related
II	Size & Television Use	5.991	16.884	Yes
III	Size & Wealth	9.488	24.503	Yes
IV	Size & Personal Income	9.488	95.4166	Yes
V	Size & Effort	9.488	39.0514	Yes
VI	Size & Quality	5.991	66.216	Yes
VII	Location & Size	5.991	91.1479	Yes
VIII	Location & Effort	5.991	15.056	Yes
IX	Location & Quality	3.841	38.6086	Yes
X	Location & Television Use	3.841	17.1411	Yes
XI	Accredited & TV Use	3.841	21.4183	Yes
XII	Unaccredited & TV Use	3.841	0.03075	No
XIII	Quality & Television Use	3.841	7.8199	Yes
XIV	Location & Education	7.815	49.139	Yes
XV	Wealth & Television Use	5.991	4.05354	No
XVI	Wealth & Quality	5.991	32.2531	Yes
XVII	Wealth & Pupil Teacher Ratio	9.488	31.70572	Yes
XVIII	Wealth & Location	5.991	29.0962	Yes
XIX	Effort & Television Use	7.815	9.68818	Yes
XX	Effort & Wealth	9.488	20.4011	Yes

Table Number	Factors	X^2 Table	Observed Value	Signif. Related
XXI	Effort & Personal Income	9.488	6.4359	No
XXII	Personal Income & TV Use	5.991	11.0229	Yes
XXIII	Personal Income & Wealth	9.488	7.2122	No
XXIV	Personal Income & Pupil Teacher Ratio	9.488	3.7419	No
XXV	Personal Income & Educational Level	9.488	92.4417	Yes
XXVI	Personal Income & Location	5.991	101.5716	Yes
XXVII	Personal Income & Quality	5.991	44.818	Yes
XXVIII	Education Level & Size	9.488	29.055	Yes
XXIX	Education Level & Effort	12.592	30.0197	Yes
XXX	Education Level & Quality	5.991	41.0098	Yes
XXXI	Education Level & Wealth	12.592	5.5043	No
XXXII	Education Level & TV Use	7.815	16.793	Yes
XXXIII	Pupil Teacher Ratio & Quality	5.991	0.31584	No
XXXIV	Pupil Teacher Ratio & Effort	9.488	7.51443	No
XXXV	Pupil Teacher Ratio & Educational Level	12.592	2.9367	No
XXXVI	Pupil Teacher Ratio & Location	5.991	4.3529	No
XXXVII	Pupil Teacher Ratio & Size	9.488	9.6844	Yes
XXXVIII	Pupil Teacher Ratio & Television Use	5.991	14.1908	Yes
XXXIX	Quality & Effort	7.815	3.50778	No

CHAPTER V

SUMMARY AND CONCLUSIONS

The major goal of this study has been the analysis of the relationship between the certain select characteristics of school districts and the use of educational television. These characteristics of school districts have been defined, analyzed and assessed for their impact upon the degree of use of television in the schools. The interrelationships between the factors themselves have been examined. The number of schools using television in 1962 was determined and the problems involved in television use in those schools have been described.

Past research and experience have shown that formal education is an expression of conservatism in many cases. Pedagogues have resisted many things that would have made their task more efficient and effective. Textbooks were opposed and the blackboard was ridiculed in the days of their early appearance. Today, television, one of the newer technological innovations to be applied to education, is meeting substantial resistance from people in the profession.

Although it must be true that each era of the past has witnessed the existence of too many people requiring education, we seem to be more acutely aware of the need for universal education in our lifetime. The benefits of culture have increased longevity and the birth rate. Among

the problems facing use are those of the "population explosion" and "teacher shortage". Lack of capital and aging buildings combine to plague us with a shortage of classroom space in which to teach the next generation. Furthermore, the actual volume of information youth has to learn is increasing at compound rates so that teachers, though fewer in numbers proportionately, must somehow accomplish the task of teaching more facts to a greater number of students.

Within the past decade, some educators have sought an answer to problems of over population, teacher shortage, talk of space and facilities in the use of television. In 1963 it is an answer being used in every major country in the world, from Lagos to Tokyo, from Paris to Hagerstown. Educators in the State of Michigan also have been interested in this medium of communication. Many of them have started to use programs that are available to them as a public service. A fewer number of school systems have become involved in an official way with educational television by making a financial investment in this materials and equipment.

There are many factors which influence the use of electronics in Michigan schools. In bringing the information given in this study to bear upon the problem of the acceptance of television as an instructional aid, those characteristics descriptive of the innovation itself as outlined by the North Central Rural Sociology Committee[1] will be used

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[1]Supra., p. 44

as a model for the summary discussion.

> Cost. New practices of high cost are generally adopted more slowly. However, those practices that produce high, rapid returns for the money invested tend to be adopted more rapidly than those yielding lower returns over a longer period of time.
> Complexity. New ideas that are easily understood and simply used tend to be adopted more rapidly than complex innovations.
> Visibility. Practices which are readily demonstrated and visible in their operation seem to enjoy a more rapid adoption rate.
> Divisibility. A technique which lends itself to use on a limited trial basis will generally be adopted more readily than one which cannot be used on a small scale.
> Compatability. An idea which is consistent with existing values or beliefs of the adoptor will be accepted more rapidly than one which is not.

Cost

Instructional television involves substantial cost at whatever educational level it is being applied. At the level of the small, local school, the purchase of one television receiver can be a matter of difficulty. For a school system to establish a central antenna system to receive off-the-air telecasts is a matter of major financial concern. The installation of a closed circuit studio and distribution system is even more complex and costly.

The school systems that pioneered the use of instructional television in Michigan, involving production of programs and procurement of equipment faced even greater cost obstacles than administrators face today. Producing programs for the few school systems that first used the medium was proportionately more costly per pupil viewer. At that early

adoption level the factor of wealth must have been most influential in deterring television use. However, there is no empirical evidence to support that assumption because no analysis of television use in the state is available for that period of time. It does seem logical that only schools with large resources, or those who received outside assistance, could have been involved in the production of telecasts for in-school use. Some relief might have been available to the pioneers as in the case of Channel 56 in Detroit which was supported as a cooperative venture of several agencies, and Channel 10 in East Lansing which was able to lean upon University resources.

The lack of significant interaction between the factors of school district wealth and television use has been reported in this dissertation. At this time costs of television production are being spread over a very large population base. The Midwest Program of Airborne Television Instruction and the several instructional television councils and agencies in the state are bringing tele-lessons to the districts on a membership fee basis. When the volume of instruction provided by these organizations is compared to the per pupil cost, the return to the individual school for the amount of investment is very high. Nevertheless, responses of school administrators participating in this study, support the contention that cost still is a factor of prime important in any consideration of the use of

television in school. The analysis made in this investigation have shown that larger school systems tend to be making earlier and greater use of television in school.

Because of the relatively great educational return inherent in television use and the fact that its cost is being distributed over a wide population base, there is every reason to expect an accelerating adoption rate for this technological innovation at every level of education, including the smaller schools which stand to profit the most from its use.

Complexity

There are at least two levels of complexity which becomes apparent in the use of instructional television. These levels of complexity are (1) those of production and use, and (2) those of personality and attitude.

In the first instance, television production and transmission is an extremely complicated process involving a great variety of people and professional and technical skills. At the present time very few school systems would be able to muster the personnel and physical resources required to produce television programs. This kind of complexity could be a deterrent to school involvement in televised instruction. This would be the case if it were necessary for each school to produce all of its own telelessons. However, the pattern which has evolved is that of the establishment of central production facilities in large

school systems, colleges and universities. Full time courses of instruction, enrichment programs and general, cultural broadcasting materials are available to school systems and individuals all over the state at very little cost and can be obtained with little effort. All that is required is for the teacher to turn on a receiver. In many ways a television set is more easily operated than a motion picture projector, in that the physical complexities involved in television use in the classroom are relatively few. For those who might wish to be passive receivers the process would involve little cost. For others who could be called active participants, there would be the necessity for preparation and follow-up activities in the classroom involving a financial commitment for the provision of advance lesson guides and supplementary materials.

This introduces the element of the second complexity, which is to be found in the attitudes of those using television in school. Instructional television requires a team approach to teaching which in some instances has had an adverse effect upon the acceptance of the medium as a teaching method.

Television has become an integral part of our culture. It is heavily used by a large segment of the population. Children spend hours each day viewing programs on the television receiver at home. For them to accept teaching over television is natural, there is little resistance to

instructional programming on the part of younger pupils. Students on the college level, however, seem to be less ready to accept television teaching. And adults who did not receive any of their education over electronic communication media have even greater difficulty accepting the new technique. Teachers report irritation in having to accept the change of their status in the classroom from one who was insulated from outside influence when the classroom door was closed, to one who must accept and actually help the personality of the television teacher if the instructional goals of the lesson are to be achieved.

Because the most complex production aspects of television are being performed by centralizing agencies, classroom use of the device is relatively simple. This simplicity no doubt has contributed to its widespread adoption in Michigan school systems. On the other hand, negative attitudes on the part of many teachers and administrators may be having an adverse effect upon television use in other school districts.

Visibility

Several developments have contributed to educational television's rapid growth, one of which is its visibility. Potential users have been able to observe instructional television in action at many locations, including their own school systems in many cases. Broadcast programming has been available from Midwest Airborne, Channel 56, Channel 10

and other sources. Evidence concerning the impact which this visibility has had upon adoption of educational television comes from school administrators. In response to the questionnaire, educators indicated the high degree to which they were influenced by the sharing of attitudes and opinions of other neighboring school people who had tried to use the programs. Furthermore, educational television has been the topic of discussion at professional meetings and conventions. Research reports have been abundant. Publications including many professional magazines have presented articles and statements about the application of television to education. Such statements verify the fact that in many ways instructional television has been one of the most visible educational innovations ever to have become available to teachers.

Divisibility

A technique which lends itself to use on a limited, trial basis will generally be adopted more readily than one which cannot be used on a small scale. This has been true of television in that teachers were able to bring their own receivers into the classroom for occasional inclusion of television programs within a given day's instruction. The fact that much of the instructional and enrichment programming was being broadcast, made it possible for teachers to receive the telecasts on their own sets with portable antenna. Some schools had to invest in receivers that had Ultra High Frequency capabilities in that broadcasts were

in the upper frequency ranges and could not be viewed on standard equipment. Generally speaking, educational television was easily used on a limited and experimental basis.

Compatability

The acceptance of educational television receives its greatest resistance from the influence of incompatable values, or the incompatability between new procedures required and customs and practices of the past.

Much has been made of the potentials inherent in the use of television to effect economies in instruction. There is an implication that fewer teachers can perform the same service, teach the same number of pupils, if television is used. Many educators have expressed fear of being replaced or relegated to unprofessional paper grading or attendance checking. These kinds of attitudes are being eliminated by reaffirmation of the fact that the classroom teacher is the prime influence in the learning situation and that unless there is a team approach, maximum utilization of televised instruction will not be realized. In situations where it has been possible to enlist the help of the classroom teachers in the planning and development of the tele-lessons, teachers have been more willing to accept the change in their role.

An observation coming out of the study of that made by administrators who felt that a major difficulty in using television is the fact that it requires a change in district

policy in most cases. Use of the new device was somewhat incompatable with previous instructional and administrative policy. Although the use of television in school might be in harmony with theoretical goals of efficiency, educational economy, standardization of high quality content, improvement of instruction or acquisition of greater educational resources, these theoretical goals were not always in harmony with the facts of daily school life. For a school district to obtain these theoretical benefits required a concrete change in policy and financial investment as well as in procedure in administration and teaching. The necessity for making these kinds of official and operational changes has been an obstacle to television use in many school districts.

On the basis of this study several conclusions can be drawn concerning factors which influence the use of educational television in Michigan school districts.

Patterns of Adoption

When the rate of acceptance of educational television as a teaching device is compared with the adoption patterns of other educational innovations which have been studied in the past, it appears that it is being accepted at a much more rapid pace. Although the time lapse between invention and the first educational application of television was fifty-five years, this is a short period of time in comparison to some inventions which were not applied to teaching

for up to one hundred years. Subsequent periods have also been shorter than might have been expected. If television's adoption pattern had followed those of earlier innovations the present adoption level of instructional television in Michigan, which by now exceeds 30 per cent, might not have been reached until 1990, counting from the date of its first educational application. In other ways, however, the sequence of adoption of in-school television seems to follow patterns of adoption described by sociological research studies reported in the review of literature. Leaders in the school districts approach acceptance of television through the sequence of awareness of the existence of the medium, interest in its use, evaluation through determination of the opinions of neighboring school people and those who have used it, trial on a limited, cautious basis and final adoption by seeking membership in one or another of the instructional television programs available in the state. There are a few notable exceptions to this pattern. Some districts have found themselves with an educational problem such as lack of space or teachers or resources, and have attacked the problem by means of deliberate use of television. Excluding the Midwest Airborne pilot schools and Channel 56 participants in the Detroit area, such institutions as the Buena Vista district near Saginaw, and Holland High School have deliberately included television as an instructional medium in their program. Others could

be mentioned.

Acceptance of television as an instructional technique has diffused according to patterns described in earlier studies. The earliest and most intense use of the device took place in urban centers. Gradual acceptance by other districts has radiated outward from the nuclear points of origin. Only in recent months is there indication of any widespread, sporadic involvement by outlying school districts in television programs such as Midwest Airborne, Classroom 10, Channel 56 or the Central Michigan Television Council.

Predisposition

Responses from the school districts indicating the types of equipment being used by teachers brought out the fact that technological items of greatest tenure or longevity are those that are most heavily used by the schools. It would seem that some predisposition or favorable attitude towards technological aids tempers earlier or increased use of newer inventions. This is borne out by the fact that schools using television use all types of visual aids to a greater extent than non-television schools. Television using schools use other newer devices such as programmed learning or teaching machines more than schools not using television.

Administrative Problems

Data obtained in the study indicate that in the opinion

of school administrators in the State of Michigan, cost is the principal problematic factor in adopting television for use in school. Lack of funds, failure to include television in projected budgets or the expectation that television would be too expensive have prevented many educators from giving the medium serious consideration.

A second problem of major importance to school administrators lies in the difficulty to fit telecasts into the local schedules. Responses made to the questionnaire and verbal statements from many superintendents and principals show that even though statements from educators who have been successful in scheduling television into school programs have been widely circulated and even though suggested techniques have been publicised scheduling remains as a major problem for many schools. Hesitancy to change hard won patterns might be having a negative impact here.

A problem of lesser concern is the dissimilarity between the content of the telecasts and that of the local lessons being taught by teachers in the district. Many educators are concerned that involvement with television will result in giving up local control and autonomy. Some would prefer to do without benefits inherent in television use if it would require alteration in local lesson content.

Statistical Relationships

Eight administrative characteristics of school districts were selected for analysis of their possible influence

upon the degree of television use in Michigan school districts: (1) quality expressed in terms of accreditation status of the district, (2) location expressed in terms of urban versus rural situation, (3) size in terms of resident pupil membership, (4) median level of personal income earned in the district, (5) ratio of the number of pupils per teacher, (6) the median number of years of school completed by the adult population in the district, (7) effort expressed in terms of the millage assessed by the district for the support of education and (8) wealth expressed in terms of State Equalized Valuation of property in the district.

Size. Earlier studies have pointed out the influence of size upon adoption of educational innovations. Size was the only factor which interacted significantly with every other selected characteristic in this study. In the way of summarizing the pattern of its interrelationships it can be said that there was a trend for larger school districts to be wealthier, to be located in urban areas, and to be accredited to a greater degree. The larger districts tended to be those assessing a higher rate of tax millage, having a higher level of personal income and a higher level of educational attainment with a lower ratio of pupils per teacher.

Wealth. This study has pointed out that cost was a strong negative factor influencing television use. Operating funds of school districts are reallocated to new

activities only with great difficulty or when some expectation of greater efficiency and economy exists. Therefore, it must be remembered that the element of actual operating wealth from which television expenditures would be made, is different from total wealth of a school district represented in state equalized valuation. There was no significant interaction between the factor of school district wealth and the use of educational television in Michigan schools. In fact the interaction of the characteristic of wealth, defined with emphasis upon valuation, did not follow strong patterns reported in earlier research, at least where television use, personal income and educational level were concerned. (There was a strong interaction between wealth and the factors of size, effort, location, pupil teacher ratio and quality.)

Pupil Teacher Ratio. The characteristic of pupil teacher ratio was generally disappointing as a measure of behavior of the administrative unit. There was a measure of significant interaction between this characteristic and those of size and wealth, the trend being towards a low proportion of pupils per teacher in the large, wealthy districts. There was no statistically significant relationship between any of the other characteristics and pupil teacher ratio. Television use interacted significantly in an inverse manner, with schools having fewer pupils per teacher using television to a greater extent. This would

tend to indicate that educational television in Michigan is being used as an enrichment technique and is not generally serving to reduce the numbers of pupils per unit of staff.

Television. All of the characteristics selected for analysis interacted significantly with the factor of television use except that of wealth, even though they did not all interact with each other. In some cases the dependence between the characteristics was very strong. A summary statement of the direction of the interaction between use of educational television and the selected characteristics is given below in the order of intensity of interaction.

As a result of the statistical analysis undertaken in this study it has been shown that there is a tendency for school districts using television to be: (1) accredited to a greater extend, (2) located in urban areas, (3) larger in population of membership pupils, (4) communities enjoying a higher level of personal income, (5) districts having fewer pupils per teacher, (6) areas in which the population had completed a larger median number of years of school, and (7) communities which supported their schools by means of a higher millage rate. The factor which interacted most strongly was that of quality in terms of accreditation status. This is probably due to the fact that accreditation itself represents a constellation of administrative characteristics. Urban location also interacted with great intensity as did the accompanying characteristic of large size. The

factor of effort in terms of millage was barely significant in its dependence with the factor of television use.

Recommendations

It has become apparent during the course of this investigation that one of the most crucial contributing factors to the acceptance of educational television in Michigan school districts has been the ability of educators to use television in the classroom on a low cost, trial basis. If any recommendation can be made to television practitioners concerning the stimulation of use of this teaching device, it would be to plead for programming methods which are so flexible and generous as to make it possible for anyone to use the signals to profit. Ideally it should be possible for new "customers" to obtain not only the telecast but also the accompanying lessons and guides printed for the guidance of the classroom teachers of member schools. Though this would increase the difficulty of eliminating "bootlegging" of programs, this non-membership participation would tend to result in full affiliation in the long run and through knowledge about the medium bring about more rapid acceptance of it in schools.

One of the weaknesses of educational television in the state is its scope. Centrally located television personnel are making the major content decisions. But it is very important for teachers to be able to react to their television counterparts about the lesson content and procedure.

Because of distance and numbers of schools involved over a wide geographic area this is usually impossible except by mail, which gives no assurance of action. Some means must be devised whereby intercommunication, feedback, is possible. Classroom teachers should be involved in the planning and evaluation of the content of the telecasts where possible. This might be done on the basis of district or regional workshops scheduled regularly in which local teachers could plan how best to use television in their classes.

In order to eliminate some of the misgivings about the content and scheduling of television programs, it would be profitable for school people to take a long, hard look at local curriculum in an attempt to arrive at common goals for specific areas of learning. This would enhance television planning as well as curriculum development, and make the medium more immediately useful to the school districts.

A final observation resulting from the study concerns the lack of knowledge about educational television prevalent in the outlying districts which stand to gain the most profit from its use. Administrators interviewed plead lack of size as a reason for not being concerned with broadcast lessons. Others were unaware of the availability of educational telecasts in their area. Some merely indicated that their board members would not be interested.

These kinds of responses, both in conversation and in

the questionnaire point to the need for intensive dissemination of information about the medium to populations outside the immediate influence of urban activity. Increased knowledge about an innovation has been shown to be a factor which enhances adoption rates. This would be particularly true of television which offers great benefits to the small school system. Through its electronic abilities vast, new resources can be tapped. A far wider range of information, previously unobtainable skills and human abilities as well as financial benefits can be made available to the schools. This knowledge must be given to people in our rural areas. It will have to be done by leaders in the field in a deliberate attempt to achieve a wider understanding and use of this valuable educational tool.

Some questions remain to be answered. As schools are studied as social systems, the role of the school administrator requires penetrating examination. The forces that influence his decision making need to be isolated and understood.

In many respects the producers of television programs for schools are running blind in that they must sense the values and goals of the schools they serve. Though very difficult, it might be possible for educators in various regions to assess the educational aspirations of their area as a guide for internal as well as external sources of instructional aid and content.

In explaining a higher degree of use of educational television among the large, progressive, urban school districts one might turn to an analysis of community attitudes towards various indexes of progress. A curriculum analysis could be undertaken to ascertain whether newer approaches to teaching language, science or mathematics were being used. Or it might be possible to find out whether various kinds of technological innovations are being used in the administration of the school, its physical plant, its library and instructional programs. Many studies need to be made of the complex interworkings of the academic social system and its impact upon the thoughts and attitudes of the people in the community being served.

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1. Has any evaluation of educational television, or consideration of any use of broadcast television in your schools been made by your

	Yes (explain if necessary)	No (if your answer is no, skip to question 4)
administrative staff	_____	_____
teaching staff	_____	_____
members of Board	_____	_____
citizens in the community	_____	_____

2. Was this evaluation, or consideration of use or non-use of ETV, made on the basis of (check any that apply to your situation):

Casual opinion	____
Citizens Study Group	____
Review of professional literature	____
Administrative Study Team	____
Statements made by consultants	____
Research made by the Board	____
Opinions of educators in your area	____
Actual use of television programs	____
Teacher ETV Study Committee	____
Other (explain)	____

3. What were the findings of this evaluation?

4. Are you presently using any television broadcasts in the schools of your district? Yes_____ No_____

5. From what television stations are these broadcasts coming? If possible indicate the call letters of the stations.

6. Have any broadcast television programs such as the orbital flights of astronauts, sessions of the Constitutional Convention, documentaries, public service programs, news casts etc. been used in your schools during the school hours during the past year?

7. Has information brought to the public in magazine articles, programs, newspaper statements and special bulletins increased the interest in the possibilities of ETV in your district? Explain.

8. As a result of your evaluation or use of television in school, do you visualize an increase (____), no change (____), or decrease (____) in your future involvement in educational television? Comment.

9. Do the personnel in your schools use other audio-visual devices for instructional purposes? (Please check the spaces that apply)

	Frequently	Occasionally	Seldom	Never
Motion picture projector	____	____	____	____
Slide and/or film strip projector	____	____	____	____
Overhead projector	____	____	____	____
Opaque projector	____	____	____	____
Teaching machines	____	____	____	____
Other devices such as:	____	____	____	____

_____

10. In your estimation what are the primary reasons for your not using television for educational purposes at this time? (Please check any o of the following that may apply to your situation and/or add a brief description of other factors influencing your degree of use of instructional television.)

Insufficient information about content and schedules	_____
TV lessons do not readily blend into our curriculum	_____
Difficult to schedule TV lessons into our daily program	_____
No influence over the content of TV lessons	_____
Lack of funds for receivers and other equipment	_____
Our program is adequate--no need for TV	_____
No budget provision for TV enrollment fees	_____
Teaching staff opposes the use of ETV	_____
Picture quality in our area is too poor to use	_____
Community attitude opposes adoption of ETV	_____
No Board policy about ETV has been formulated	_____
We do not have enough students	_____
Possible uses for ETV are too limited	_____
Too expensive	_____
Others:	_____

11. Please indicate the three primary reasons among those you checked in the above list by writing a 1, 2, or 3 rank order of importance after the pertinent items.

12. In your estimation what changes should be made in broadcast television to make it more useful for you?