INSTRUCTIONAL TELEVISION AS A MEDIUM OF TEACHING IN HIGHER EDUCATION

DISSERTATION

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CHAPTER I

THE UTILIZATION OF TELEVISION AS AN EDUCATIONAL MEDIUM

The idea that television may be utilized in the teaching-learning process is being seriously considered by professional educators and laymen generally throughout the country. Some view it with misgivings and alarm, as a mechanization of education. Others hope to find in it a tool which will spread the influence of the gifted teacher over a larger number of students, without loss of dimension or personality, and thus upgrade the quality of education, and as a secondary but not incidental benefit, help to meet the growing crisis in teacher supply and increased enrollments.

It is generally true that when a new technology is about to be applied to an old problem, at first a gap exists between those who thoroughly understand the problem and those familiar with the new technology. The existence of this inevitable initial gap can result in poor starts, badly conducted experimentation, and a waste of time, effort and money.

Educators generally are agreed that television has great potentialities but there has been considerable uncertainty about how it will be used. Many consider it merely an accessory to existing methods of instruction.
On the other hand, others see it as a means for revolutionizing educational techniques.

This current concern about television and its place in education can best be stated by quoting a portion of the summary of a panel discussion at the 43d Annual Meeting of the American Association of Collegiate Registrars:

Television affects us whether we like it or not. If we do not study it now, we shall be caught napping when policies and procedures involved in television teaching are brought up that concern our functions. The use of television teaching is at present the liveliest matter under discussion and experimentation in education.\(^1\)

No other single one of the technological media of communication has ever received such widespread recognition as a potential instructional tool in so short a time. The United States Department of Health, Education and Welfare in its investigation of television states, "...within the few short years since World War II, television has advanced from the status of an electronic novelty—one of these scientific wonders of the post-war era—to the position of a universally heralded medium of instruction."\(^2\)

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\(^1\)"Implications of Television for Higher Education With Special Reference to the Registrar and Admissions Officer," Educational Television Newsletter, Number 17, October 1957.

Whether the medium of television used for direct teaching is a partial answer to the current problems in higher education remains to be seen. Educators cannot afford to be indifferent to the potential values of television to education. During the last decade television has become one of the most prominent media of mass communication in American culture. There are many problems to be solved in the area of educational television, but the primary one is to determine to what extent it is possible to learn through television.

It is the purpose of this dissertation to try to bridge the gap between pedagogy and technology, between what is educationally needed and what is feasible—to assess the merits or demerits of teaching by television and to evaluate the results of several years of experiments conducted to determine whether television can be used with success for classroom education. For the most part this experimentation has been conducted by educators in public and private colleges and universities and in the government services motivated by the pressing problems facing the educator: quality of instruction, scarcity of facilities, shortage of teachers and pending lack of classroom space.

Need for the Study

It now seems certain that higher education is at the threshold of an era of vast expansion. Maul states this
problem succinctly when he concludes that, "higher education must arrive at some far-reaching decisions concerning such problems as the kinds of education to be provided; the groups to be served; the number, size and function of the institutions to be maintained; and the administrative organization of the institutions."  

The pending crisis in higher education is best described in the report of the President's committee on Education beyond the High School in its second report:

Revolutionary changes are occurring in American education of which even yet we are only dimly aware. This Nation has been propelled into a challenging new educational era since World War II by the convergence of powerful forces—an explosion of knowledge and population, a burst of technological and economic advance, the outbreak of ideological conflict and the uprooting of old political and cultural patterns on a world-wide scale, and the unparalleled demand by Americans for more and better education.

These forces have created enormously increased educational challenges of which we have not yet taken full stock and which our educational institutions as a whole are ill-prepared to meet. The gap between this Nation's educational needs and its educational effort is widening ominously.  

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One of the biggest problems facing higher education is that of increasing enrollments. Currently 30 per cent of all of the eighteen- to twenty-one-year-olds in the United States attend college. The 1957-1958 enrollment figures for 930 accredited universities and four-year colleges and technical schools (representing well over 1,000 separate campuses) throughout the United States and its territories report a grand total of 2,415,214 students.  

Ronald B. Thompson predicts double the number of college students by 1970 and he states that if the present trend continues we will have five and one-half million students by 1973 with a possibility of seven million.  

The increase of college enrollments is closely related to the problem of the shortage of well qualified college teachers in most subject areas of the curriculum, and a very serious shortage in some areas. The potential college teacher supply is not keeping pace with increasing college enrollments. 

It is apparent that we are entering a period of rapid and continuous growth of student enrollments, and there

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is little likelihood of this growth being slowed down materially, particularly in state supported institutions. This condition in the face of a growing shortage of "good" teachers, will force the lowering of the quality of instruction unless a means can be found for greatly increasing the ratio of students to teachers without seriously compromising instructional standards.

The present short supply of competent teachers was caused primarily by population and educational trends and by competition with other occupations bidding for college-prepared personnel. Each year the number of persons to be educated increases, while the potential supply of teachers decreases. W. Earl Armstrong points out another factor to consider, "the present ratio of loss of teachers from the profession to other occupations estimated at 16 per cent a year; exclusive of deaths and retirements which may be as high as 7 per cent a year."\(^7\)

Concurrently with the increasing number of students and the decreasing number of qualified teachers is the increasing shortage of buildings and facilities. Classroom, laboratory and other teaching space is becoming overcrowded. There is a great shortage of buildings and facilities necessary

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to service the students currently enrolled in the nation's colleges and universities. Means of supplementing and adapting buildings and facilities to meet the demands of the present and future have to be found.

The administrators of higher education are going to have to cope with stupendous problems. Therefore, it seems imperative that administrators and faculties do not wait until adjustment is forced upon them, but to begin now to consider what action must be taken to solve the existing, and future, problems of higher education.

The time is at hand for administrators and faculties of higher education to appraise objectively and scientifically television, for its strengths and its weaknesses, and to determine in what ways and under what conditions television can make a contribution to instruction in higher education. When the demand for proficient and increased teaching appears to exceed the potential supply, it is fortunate that television, a system that has the capacities for readily communicating information, is available to educators. The potential capabilities of television are available to educators at a time when every resource must be utilized to meet the need for the expansion and improvement of instruction in higher education.

While televised instruction cannot substitute for buildings and facilities, it should be considered as one means
of supplementing and adapting the existing buildings and facilities. Television will not necessarily replace teachers, but it seems apparent that it can be used to extend the instructional services of the teacher.

Television used for direct teaching in higher education should be recognized as a neutral carrier of no meaning in itself, drawing intelligence and significance only from the thoughts of men impressed upon it and transmitting this intelligence instantaneously to those who need to know. If television is wisely used it has the ability to magnify the effectiveness of a good instructor, bring to the aid of the teacher visual material, as well as specialists in all fields of learning; and enlarge the physical and intellectual dimensions of higher education.

Television possesses certain administrative and logistic advantages in relation to education. By this medium it is possible to multiply our best instructors, that is, to select a single best instructor and give all students some of the benefits to be derived from superior instruction. Television provides a front-row seat for all students.

Therefore, it is apparent that television is primarily an agency of distribution. It can enable many to hear and see to the best advantage. For students it means that inspiration derived from the talented teacher can be shared
by many. I concur with Levenson and Stasheff\(^8\) when they state that "given an expert teacher plus the opportunity to reach many classes rather than one, it is likely that the results of such [television] teaching will be highly productive."

Edgar Dale offers one of the best definitions of the role of television as an educational tool:

> Television may be considered as a neutral vehicle for conveying a message—and also as specific educational material. When we think of books we concern ourselves not only with printing as a way of duplicating words and pictures, but also with the subject-matter in the books.

If I were to make only one statement about television as an educational tool, I would emphasize it as a multiple-medium device. It is radio, it is the film-strip, it is the photograph, it is the museum, it is the exhibit, it is a blackboard, a feltboard, a poster, a field trip, a demonstration. Sometimes it is reading, as in the trade names, simple charts, blackboard material. It is all of these things singly and, far more important, it is all of these things put together in an integrated way and served up with a warm friendly personal voice.\(^9\)

The inherent characteristics of television make possible certain educational advantages heretofore unavailable

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to schools. By means of television, sound and picture can be transmitted simultaneously as they are created. Television can represent in picture and sound anything that can be seen and heard.

In technique it is intimate. In area coverage, it is instantaneous. From the viewer's point of view it is mobile: it can move in for a closer look, move around for a better look, and back away for a broader look.

Television also has limitations. Its rate is constant. There is not spontaneous speed-up for the highly alert student, or slow-down for the less alert. The size of the television receiving screen is relatively small.

Therefore, in considering television as a medium for instruction, it is important to recognize that television, like other materials and media of instruction, has certain unique values and limitations. Its uses in education must capitalize on values and take account of limitations. Television, like books, films, radio, maps, models, and recordings, is a tool of instruction.

It should be noted that colleges and universities have already made considerable use of television for instructional purposes. However, the use of instructional television in higher education has not been systematic. If television is to succeed as a medium of instruction in higher education, a methodology for its effective use must be developed.
There is a need to carefully evaluate and synthesize experimental information and material that has been collected. Recommendations should be made in order to secure additional information that can be used in the establishment of a methodology that will systematize the use of instructional television in colleges and universities. Only by its systematic use can the medium of television help meet the problems of higher education.

**Television Used for Educational Purposes**

Television used for the purposes of education is usually identified as "educational television." In the broad sense educational television is the use of the medium by an educational or commercial station to broadcast telescourses, cultural and informative programs, educational programs of general interest and educational lessons designed for classroom use. The term, educational television, implies a wide range of educational activities. The concept of educational television points to the development of programs for the home audience and programs for in-school use from the preschool age through graduate studies and the highest level of professional training.

Educational television is not restricted to television stations operating under an educational television license from the Federal Communications Commission.
Commercial television often supports education through its public service programs by telecasting programs having an educational intent. These programs are used by viewers in the home and in some cases used directly in the classroom by the teachers or indirectly by teachers in their daily work.

Educational television is generally thought of in terms of open circuit broadcasting. Open circuit television can be defined as television signals that can be received by a television station's transmitter. When educational programs are on open circuit they can be received by the entire audience of the station even though they are usually designed with a specific purpose for the specific audience.

Closed-circuit television refers to the system of distribution of the television signal by a controlled method to selected television receivers. This means that the television signals are received only by interconnected television receiver sets and viewed by a selected audience.

The term the writer will use to describe television used for systematic instruction in institutions of higher education is "instructional television." This term refers to television used in the formal classroom context on any educational level.
The best overall definition of this term is made by Dr. I. Keith Tyler:

**Instructional television** is television used in formal, organized, sequential education. It does not include television involved in casual, informal education. It involves a sequential presentation, one step following another, in series. It is usually employed by a recognized educational organization—a school, an adult education group, a branch of the armed services. Instructional television can take place on either open or closed-circuit, and it can involve any level of learning, primary, intermediate, junior high, senior high, the college level, or adult education.\(^{10}\)

The above term is used to avoid confusion with possible conflicting terms such as, "wired television," "captive television," "closed loop television," "industrial television," and "vidicon television." This is in contrast to the generally accepted term "educational television" which places emphasis on broad non-credit cultural or educational programs aired on both commercial and educational television stations. Instructional television is often distributed throughout a campus or building by means of coaxial cable. Under certain conditions, it may be delivered to distant areas by microwave or low-powered transmitters; this possibility does not, however, alter the basic differentiation.

\(^{10}\) I. Keith Tyler, "Instructional Television: Types and Objectives," Paper read at the Workshop-Conference on Educational Television, San Jose State College, San Jose, California, July 15, 1957, p. 1.
between instructional and educational television.

Instructional television can be divided into four types for the purpose of further description. We can accept Dr. I. Keith Tyler's classification of instructional television as providing helpful descriptions of these types. His first type is "Total Television Teaching." This is where the entire instructional presentation is by television. The student receiving this type of instruction is entirely on his own. The responsibility is entirely on the student for complementing the presentation with the other means necessary for learning. The student has to do his own laboratory work, he has to hunt up other persons if he wants to discuss, and so on—the responsibility is placed squarely upon him. This is the procedure generally found in telecourses broadcast over an open circuit to a specific audience.

Planning for this type of instructional television is at the point of origin only and not at the point of reception. The planning of the course, no matter how many classrooms or students are involved, takes place at some central point. Classroom teachers, if there are such, are monitors with purely clerical or disciplinary duties.

The second type of instructional television is "Supplemented Television Teaching." Here the medium of

11Ibid.
television is used to present demonstration lectures, illustrated lectures, laboratory demonstrations, and these presentations are supplemented in the receiving classrooms by discussion groups, laboratory periods, drill sessions or supervised practice. The student has less responsibility for his own learning, since the institution makes provision for other learning situations.

This type of instructional television, like the preceding type, is centrally planned and administered. This planning is generally done by "experts" and the classroom assistants in the receiving classrooms are not usually involved.

Dr. Tyler's third type of instructional television is "Television Supplementing the Classroom." The receiving classroom is the planning center for this type of presentation. Receiving teachers do their instructional planning in the classroom in terms of their students and the course of study. This type of instructional television is primarily planned to "enrich" the instruction and to assist the teacher with supplemental material. The planning is at the classroom teacher level, and the broadcast is used only because it furthers the receiving teacher's instructional purposes.

This type of instructional television is very similar to the school radio broadcast that is used to supplement the curriculum especially at the primary grades in
such subjects as art, music, science and the social sciences. The frequency of such television used as a supplement to instruction may vary from daily use to weekly or semi-weekly use.

"Television as a Teaching Aid" is the fourth type of instructional television which has a variety of specific uses as an instructional tool within the classroom. The primary purpose of this type of instructional television is to provide a better opportunity for students to observe under more optimum conditions permitting closer and more varied observation. In the areas of engineering and science this use of television permits the students to view simultaneously things which heretofore had been observable by only a few at a time. A television camera placed on a microscope transmits the slide to the entire class. Cameras can also be placed in radioactive areas and observation can be done in the safety of a classroom.

Some examples of the use of television for observation follow: In teaching a course in guidance, a simple vidicon camera and a microphone are used to observe clinical procedures of interviewing, diagnostic testing, or advisement. This piece of life experience becomes a part of the instructor's presentation to the student for critical analysis. Again, closed-circuit television is becoming a common instrument in medical education for the observation of operations. Similar
uses are to be found in dentistry and veterinary education. This type of television is being used in teacher training education for the purpose of student-teacher observation. This allows a maximum number of students to observe a classroom through the medium of television without disrupting the class by their physical presence.

**Summary**

Television provides higher education with the possibility of helping to solve the pending crisis in higher education. For several years educators have been conducting experiments to determine whether television can be used with success for classroom education.

The problem of lack of teachers, classroom space, laboratories and facilities prompt an interest in television as a partial solution to these problems. Educators are also interested in the possibility of saving, or cutting costs of education, by using television.

This interest in television as a teaching tool is the result of several factors. Educators are continually interested in new instructional media. They are interested in increasing teaching effectiveness and better ways of carrying out the work.

Many educators believe that television is not just a possible, but an imperative, partial solution to the problems
of higher education. Educators have been motivated to examine television closely to find out how this medium is related to existing methods of instruction and how best it can be used.

The broad implication is that, sooner or later, practical solutions must be found to the mounting problems of higher education. The specific implication is that the educational use of television be considered with reference to meeting the basic problems in colleges and universities and that its uses be integrated into proposed and demonstrated methods of solution of the problems posed by the pending crisis in higher education.

In succeeding chapters of this dissertation instructional television will be examined in detail to ascertain its potential position in higher education.

In Chapter II the place of instructional television in colleges and universities will be considered in relation to a philosophy of higher education that calls for a universal education, that is both liberal and specific, for all who are qualified and motivated.

Chapter III traces the development and growth of television as a medium of instruction in institutions of higher education.

Chapter IV considers the principles of learning relevant to instructional television, and in Chapter V an
evaluation of instructional television research findings is made in terms of some of the objectives of education.

Chapter VI discusses the role of the teacher in instructional television and a consideration of his selection and training is made.

Chapter VII is concerned with the attitudes and opinions of the faculties and students of higher education toward the use of television as an instructional medium, and in Chapter VIII some of the practical problems of instructional television are considered.

In the final chapter a statement of some conclusions and recommendations that will be of value to persons interested in the utilization of instructional television in higher education are formulated.
CHAPTER II

HIGHER EDUCATION AND INSTRUCTIONAL TELEVISION

One of the primary goals of American education is to develop and maintain a free society. Consequently, the basic commitment of American education is to a universal education, to provide equal educational opportunity for all. The "democratic" philosophy of education prevalent in this country is that intelligence is not the unique property of an aristocratic group, is not a racial characteristic, and does not depend upon economic status. Clarence H. Faust has expressed this thought most cogently, "...it is essential to provide equal educational opportunities for all—although we are still struggling to realize this ideal fully—so that the possibilities of intelligence could be most fully realized, both in the interests of individuals, who are the primary concern of democratic society, and in the interests of society itself."¹

This "democratic" philosophy of higher education and general education as well, implies a curriculum that is twofold in nature and not necessarily separate: one, a

¹Clarence H. Faust, "Educational Philosophy and Television," Address at Conference on Teaching by Television in Colleges and Universities, Pennsylvania State University, October 20, 1957, p. 2.
specialized education for training for a career and the other; a general, liberal, education to give the student values, attitudes, knowledge and skill that will equip him to live rightly and well in a free society.

The traditional belief that there is a necessary antithesis between liberal and specialized education is no longer acceptable. The relationship between these two forms of higher education should be characterized by mutual respect on the part of liberal and specialized educators and there should be an honest and free exchange of ideas. It is neither desirable nor possible to distinguish between learning to live and learning to earn a living. Russell M. Cooper summarized this concept well when he stated that, "both... specialization and general education are... essential for a healthy society and the problem becomes one of determining the proper balance between them. If each is to be achieved in considerable measure, neither can be realized in its entirety, and a compromise must be drawn."^2

Edwin S. Burdell, at the twelfth annual conference on higher education, extended this interpretation of the philosophical objectives shared by liberal and specialized education:

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Liberal education...is those phases of nonspecialized and nonvocational learning which should be the common experience of all educated men and women. It should embrace ethical values, scientific generalizations, and aesthetic conceptions, as well as an understanding of the purposes and character of the political, economic, and social institutions that men have devised. But the knowledge and understanding which general education aims to secure, whether drawn from the past or from a living present, are not to be regarded only as ends in themselves. They are means to a more abundant personal life and a stronger, freer social order.

Specialized education—whether at the professional level of law, medicine, engineering, or architecture; at the technical level of drafting, electric circuits, or dental bridgework; or at the commercial level of accounting, insurance, banking—must concern itself with more than the subject matter of the field. Specialized education is educating human beings, and as human beings they will function, not as disembodied spirits acting on some occult plane. To make the specialized education count most, the educator and the student must place the subject matter sooner or later in a human frame of reference. To this extent these two fields are one.

There must be a continual appraisal of educational objectives and methods, in both liberal and special education. Both must be designed to produce graduates to live in a free, dynamic, technological society prepared to attack and to

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solve the new social and technological problems which are arising constantly.

The educational requirements of today's democratic society with its needs for increased knowledge, skills and cultural achievement makes necessary expanding opportunities for study past the secondary school level. Democratic education means unlimited education, education for all who wish to go to college and can benefit by going. Higher education should be available to all qualified people regardless of economic or social distinction. President Eisenhower voiced this belief in October, 1953, when he said, "I firmly believe more extensive education than that obtained in high school must be brought to every community and every locality in such a way that every young person, regardless of his means or lack of means, can go to school for a minimum of two additional years."\(^4\)

This thinking is further exemplified by the Executive Director of the President's Committee on Education Beyond the High School, Elvis J. Stahr, Jr.:

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Education is a continuing thing—no step in it or phase of it should be a 'rival' or a competitor of any other.

For those who can profit from, who are qualified and motivated for, continued
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formal education beyond the high school, the doors should be open wide—and there should be no great gulf to cross in order to enter these doors.

The nation cannot afford failure to provide these opportunities. It is important to our people, as free individuals, to have opportunities to develop themselves throughout life, and it is imperative for the Nation to have the kind of citizens and the quality of manpower that a self-governing, complex, technological, rapidly-developing society needs to survive, to be healthy, to be enlightened, to be cultivated, and to be prosperous.

Our present educational resources are not sufficient either for the people's needs or for the nation's needs in the years ahead. In almost every area of higher education there is the need for expansion to meet the multiplying educational needs and demands of American society. This situation presents numerous critical problems which are a part of the present crisis in higher education.

Conditions That Caused the Rise of Instructional Television in Higher Education

With the advent of television it is apparent that there is a new communication force in the world today. In the past ten years this medium of mass communications has

greatly affected our way of life, ordering a portion of our leisure time, helping form our tastes, affecting our viewpoints and modifying our social and business relations. In its everyday use by its large audience it has educational implications in its presentations of new experiences, which are cultural, social, and informational in nature.

Specifically used there are intrinsic values in television that are very beneficial to education. Television, however, is not the "device" or the "deus ex machina" that will solve the problems of higher education. It is an indispensable tool that can be used to assist in solving the current plight of education. The educational use of television offers a new and dynamic instrument to reckon with in future educational planning.

What justifies this endeavor to appraise television is that higher education cannot afford to disregard a new means of communication. Faust illustrates this point when he states that, "education depends so heavily on communications—oral and printed—that it cannot afford to brush aside any new means of accomplishing it. ...we cannot, in good conscience, refuse complacently to examine any new means for meeting educational needs."\(^6\)

\(^6\)Faust, op. cit., p. 2.
It is apparent that there are several factors relating to educational needs and social pressures that have, and will, influence the development of the use of television for instruction in institutions of higher education. Dr. I. Keith Tyler states that there are certain critical factors affecting the pressures which are exerted upon schools, colleges, and universities. Such factors are at least five in number:

The first is the trend of enrollments and birthrates. The critical question is whether numbers will increase more rapidly than the communities and the states are able to provide faculties, facilities and buildings...

The second factor, related to the first, is the adequacy in numbers of the teacher supply. The critical question is whether enough teachers can be turned out to maintain our present student-teacher ratios.

The third factor is the quality of the teacher supply. Will we be able to maintain our teaching standards? ... Will the supply of superior teachers, particularly in higher education be exhausted? This is not a question of lowering standards, but a recognition that there are not enough people now in graduate school seeking advanced degrees to supply the qualified teachers that will be needed in the rapidly growing number of colleges and their rapidly growing enrollments...

The fourth factor has to do with facilities—laboratories, intricate demonstration equipment, and the like... The advance of learning means that increasing complex equipment is necessary for adequate education in increasingly specialized fields...

The fifth factor is buildings—especially in higher education. The question is similar to that relating to facilities...
There may be ways of using present buildings to greater capacity. Nevertheless, there will be the problem of providing enough buildings to service the greater enrollment.

Those are the basic factors that have caused the potential for the development of instructional television in higher education.

Dr. Tyler has also codified four reasons for the sudden development of interest in instructional television on the part of educators:

In the first place, educational administrators and lay board members were brought into the educational television picture early. They saw what it was and they grasped its potentialities. It is only logical that they should be putting pressure on teachers to use this instrument for the improvement of education. In the early days of television's development ... there was held a national conference on educational television... In attendance were the top administrators of colleges and public school systems, and they were exposed to what television might do. In similar fashion ... trustees of colleges and universities ... have been exposed to the medium and they have envisioned some of its potentialities...

In the second place, foundations have played an important part in the development of educational television. The Ford Foundation, particularly, saw opportunities in this medium. It was looking for new educational enterprises that had not been developed by older, established foundations.

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It saw in television an opportunity to develop something that might be very much worthwhile in education.

In the third place, there is the alarming growing increase in school and college enrollment with the consequent threatened shortages in buildings, facilities, and teachers. And particularly a marked shortage in well-qualified teachers. This results in a pressure upon schools and colleges to do something to meet these impending shortages. Otherwise there is likely to be a drastic drop in the levels of instruction. Is it possible to maintain the present quality by extending good instruction by one means or another? Could television do this? Could it, perhaps, make possible even higher levels of instruction? In other words, could we increase student-teacher ratios, could we take our good teachers and give them a larger clientele? It was only natural that such questions be raised.

A fourth factor must not be overlooked. At a strategic time when such questions as the above were being raised, there appeared the research findings of the Armed Services, particularly the Navy Special Devices Center, which seemed to indicate that it was possible to achieve satisfactory results with television. It should be noted, of course, that this research was based largely upon certain limited types of educational objectives—skills, factual information, and the like. Nevertheless, the research appeared at a psychological time so that it seemed to re-enforce the desires of the administrators on the one hand, and of the lay leaders on the other. Apparently a tried tool was at hand to meet the upcoming emergency.

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8I. Keith Tyler, "Instructional Television: Types and Objectives," Paper read at the Workshop-Conference on Educational Television, San Jose State College, San Jose, California, July 15, 1957, pp. 4-6.
During the past five years or so the use of television to help meet the current problems in higher education has been given careful scrutiny under experimental conditions. A vast body of information has been gathered and compared and likely hypotheses tested. These findings will be evaluated and reported in the following chapters. This experimentation has centered on what, distinctively, television has to contribute to better teaching; and its particular relation to the problems created by the mounting crisis in higher education.

With this information, what institutions of higher education will do with instructional television will depend upon its own nature and character, the seriousness of the problems that the college or university faces and the ability of the institution—financially and personnel-wise—to utilize this new educational medium. What develops will depend, too, upon size and whether the institution is highly specialized or is a general institution with many multi-section courses.

Summary

With our commitment to universal education in our democratic society, the commitment to equal liberal and specialized educational opportunities for all and the pending crisis in higher education the use of television as an
educational medium could follow up the advantage we have had from the printed book, audio visual aids, the educational film and radio by making available as teachers our wisest, most thoughtful, and most effective people in every field of knowledge. The intelligent use of instructional television in institutions of higher education in relation to the other educational ingredients that are necessary for the development of human intelligence may be one of the means for mustering our educational resources to accomplish what seems otherwise a hopeless task. However, instructional television must be subjected to a most critical analysis and evaluation before any general conclusions can be reached concerning the place of television as a medium of teaching in higher education.
CHAPTER III

THE DEVELOPMENT OF TELEVISION AS A MEDIUM OF INSTRUCTION IN HIGHER EDUCATION

The use of television as an educational medium grew out of the creation and development of educational broadcasting. Therefore, in the consideration of the development of instructional television in higher education, it is only logical that the highlights of the development of educational broadcasting be surveyed.

There is a long history of accomplishments in the use of radio as an educational medium by institutions of higher education. Educational radio came into existence in the early days of radio with the establishment of station WHA, at the University of Wisconsin, in 1919. This was the first station to broadcast educational programs in the United States. Other colleges and universities soon followed the example of the University of Wisconsin and today there are over 160 educational radio stations operating in this country.

Development of Broadcasting as an Educational Medium

During radio's infancy in the 1920's educators became aware of the educational possibilities of the new medium, radio. The New York City Board of Education began to experiment with radio in 1923 and the following year they
conducted a radio class in accounting.\(^1\) The next year, 1924, educators in Chicago began to use radio offering programs in art, music and geography.\(^2\) In 1925 the cities of Oakland and Cleveland used the radio facilities of their community to broadcast programs of an educational nature. Atlanta, Georgia, was the site for the next experimental use of radio as an educational medium with broadcasts beginning in 1926.\(^3\) By 1927 at least six broadcasting stations in five cities had scheduled radio programs for use in school classrooms with varying degrees of success.

Institutions of higher education became active in educational broadcasting in the late 1920's. The pioneer university was The Ohio State University with the broadcasting of "The Ohio School of the Air" by WOSU, the school's radio station. The first broadcast was made January 2, 1929, under the direction of the State Department of Education.\(^4\) By 1945 the "School" was transferred to the Bureau of Educational Research at The Ohio State University, where it remains to the


\(^2\)Darrow, *op. cit.*., p. 19.

\(^3\)Darrow, *op. cit.*., p. 27.

present time. 5

The University of Wisconsin's school broadcasts began in the fall of 1931, with programs aired by the University stations WHA and WLBL. 6

In 1933 the educational station of the state of Oregon, KOAC, began its school of the air broadcasts. These broadcasts were produced in cooperation with Oregon State College, the University of Oregon, and the colleges of education in the state. 7

The Minnesota School of the Air came into existence in the fall of 1943 with a series of classroom broadcasts over the University of Minnesota's station WLB, later assigned the call letters KUOM. 8 Later the programs were tape recorded and made available to teachers also by the "Tapes for Teaching Project" of the Minnesota State Department of Education.

By the middle 1930's, credit-course broadcasting at the University and college level had become fairly common,

5Otto Schlaak, "The Planning, Production, and Evaluation of Two Experimental Series of Classroom Telecasts for Use in the Intermediate Grades in the Columbus, Ohio Area" (Unpublished PhD dissertation, The Ohio State University, Columbus, 1955), p. 16.


8Woelfel and Tyler, op. cit., p. 83.
particularly in colleges and universities that operated their own radio stations. Most of these radio courses employed the conventional college lecture type of lesson presentation with little modification from conventional teaching methods.

With the advent of television, classroom broadcasting started much as it had with radio. However, as colleges and universities began to adapt their credit-course offerings for presentation by television, the whole instructional approach underwent a change in character and within a very short time the familiar lecture method had been superseded by what has been termed the "lecture demonstration" method. What on radio, had been verbally communicated, on television became virtually the visual and verbal extension of the classroom and college course broadcasting began to take on a new significance.

The pioneers of educational radio, for the most part, were the same pioneers of educational television. However, having seen the educational benefits of radio, the administrators of education also played an important role in the development of educational television.

The Development of Educational Television

Educational Institutions were among the first to recognize the potential of television as an educational medium. In the early 1930's the University of Iowa, Purdue University and Kansas State College began to experiment with
the early "scanning disk" type of television. Later New York University began to experiment with the educational uses of television.

During World War II the experimentation with television was halted and it was not until 1946 that educational institutions could return to their experiments. Prior to 1948, Iowa State College had been issued a construction permit to build a television station. On February 21, 1950, this college became the first institution of higher education to operate an educational television station. Iowa State's television station, WOI-TV was given a commercial grant and it carried commercial network programs for income. However, the station served an educational function in the college community.

Before other educational institutions could enter into television the Federal Communications Commission issued a "freeze" on the granting of television channel allocations. This freeze was necessary to allow the commission time to study the problems involving interference and lack of sufficient VHF channels for all television applicants. A period of four years was devoted to this study and in 1952 the Commission issued the Sixth Report and Order lifting the freeze effective July 1, 1952.9 This report made an overall

assignment plan assigning both VHF and UHF channels. At that time a total of 242 assignments was made for non-commercial educational stations. This number has since been increased to 258.

Earlier in this chapter it was stated that institutions of higher education had a long history of accomplishment in the use of radio as an educational medium. This activity was accomplished on AM radio stations operated by these institutions. When a college or university was granted a license to operate a radio station this grant did not specify specifically that the station was an "educational radio station." It was decided by the Federal Communications Commission, in the early 1930's, that there was no need for educational reservations for AM stations operated by colleges and universities. However, with the development of the FM radio the Commission did make reservations setting aside specific channels for educational FM broadcasting. This action, on the part of the Commission, established a precedent for the allocation of channels for non-commercial educational television stations.

Many educators date the beginning of educational television with the Federal Communications Commission "freeze." As Hunt and Stewart have pointed out, "even though educational programs had been produced on commercial stations prior to 1948, the Federal Communications Commission 'freeze' order of
that year can be looked upon in retrospect as the beginning of educational television as it shapes up at present. The four years the Commission delayed the granting of allocations gave organized education time and opportunity to present its brief for the reservation of channels for educational use.

The obtaining of the educational reservations for television was the result of great support and effort on the part of educators, educational institutions and organizations. The proposed allocations of reserved channels for educational television stations, requested during the period of the "freeze" by the U. S. Commissioner of Education, prompted the organization of a committee to represent education at the Federal Communications Commission hearings. On October 16, 1950, a meeting was held by the U. S. Office of Education to organize such a committee. An ad hoc Joint Committee on Educational Television was founded under the leadership of Dr. I. Keith Tyler, who was released from his teaching duties by The Ohio State University to Chairman the committee.

Long hearings were conducted by the Federal Communications Commission. Under the sponsorship of the ad hoc Joint Committee on Educational Television some seventy-six witnesses testified on the issue, five were opposed to the

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reservation and the remaining seventy-one supported the reservations, presented evidence of the need for educational television stations, and demonstrated the uses of television in both in-school and out-of-school education. **Numerous educational organizations participated in the effort to secure the educational reservations. A total of 836 colleges, universities, state boards of education, school systems, and public service agencies submitted written statements urging the commission to make the reservations.***

The ad hoc committee, by securing funds from organizations, financed the expense of the Federal Communications Hearings. The membership of this joint committee was composed of the following organizations and each organization had a member serving on the committee: American Council on Education, Association for Education by Radio, Association of Land Grant Colleges and Universities, National Association of Educational Broadcasters, National Association of State Universities, National Council of Chief State School Officers and the National Education Association. Later the Fund for Adult Education gave a grant for the establishment and operation of a permanent Joint Committee on Educational Television.

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**Ibid.**
In 1956 the Joint Committee on Educational Television was reconstituted the Joint Council on Educational Television and received funds directly from the Ford Foundation for its support. The present membership of the joint council is: American Association of School Administrators, American Council on Education, Association for Education by Radio—Television, Association of Land—Grant Colleges and State Universities, Council of Chief State School Officers, Educational Television and Radio Center, National Association of Educational Broadcasters, National Association of State Universities, National Citizens Committee for Educational Television, National Congress of Parents and Teachers and the National Education Association.

It was the testimony of educators and others interested in education that persuaded the Commission to reserve channels for educational television. With the lifting of the freeze in 1952 educational institutions began to apply for the reserved channels. The first educational television station to go on the air after the Federal Communications Commission ruling was KUHT in 1953. The station was licensed to the University of Houston and the Houston Independent School District. The following year four educational stations were licensed. The first of these stations was KTHE, the University of Southern California's station, which at this writing has ceased operation. Then came WKAR—TV at
Michigan State University with a commercial license but operating as a non-commercial station; WQED in Pittsburg, the first community organized and operated station; and WHA-TV, located at the University of Wisconsin and licensed to the Wisconsin State Radio Council.

By the end of 1955 thirteen more educational television stations were operating. The first three were community stations. They were located at San Francisco, (KQED); Cincinnati, (WCET); and St. Louis, (KETC). Then the University of Nebraska went on the air with station KUON-TV followed by another community station in Seattle, (KCTS). The key station in the projected Alabama educational state network, (WTIQ) began operation with a transmitter in Munford, Alabama. The Birmingham station, (WB1G) began operation later that same year. Station WUNC-TV began broadcasting in North Carolina with inter-connected stations at the University in Chapel Hill, the State College at Raleigh, and the Woman's College at Greensboro with the transmitter located at Chapel Hill.

An Educational Foundation composed of colleges and universities in the Boston area went on the air with station WGBH-TV in Boston. The University of Illinois was the licensee of the next educational station to begin broadcasting, WILL-TV. Station WTHS-TV, licensed to the Dade County Board of Public Instruction at Miami, Florida, began broadcasting activities. Two city-wide educational television foundation supported
stations began operation, Chicago with WTTW and Detroit with WTVS. Both of the foundations include the membership of the institutions of higher education located in the cities.

The year of 1956 saw the addition of six educational television stations. The Denver Public Schools began to operate KRMA-TV. The Ohio State University went on the air with its educational television station, WOSU-TV. The Oklahoma Educational Television Authority started the first station, KETA, in a projected state network. Station KLSE-TV, Monroe, Louisiana, began operation with the Louisiana Department of Education as the licensee. The Memphis Community Television Foundation went on the air with WKNO-TV and the third station in the Alabama State Network, (WAIZ) at Andalusia, Alabama, began operation.

Three foundation supported stations and two board of education operated stations began to broadcast in 1957. The educational television foundation stations were WYES-TV, New Orleans, Louisiana; KTCA-TV, Minneapolis-St. Paul, Minnesota; and WHYY-TV, Philadelphia, Pennsylvania. Station KOAC-TV located at Corvallis, Oregon, was licensed to the Oregon State Board of Higher Education and WMVS-TV in Milwaukee, Wisconsin, to the Board of Vocational and Adult Education.

To date three stations have begun operation in 1958, WIPR-TV, San Juan, Puerto Rico, licensed to the Department of
Education of Puerto Rico; the University of Utah's educational television station, KUED; and station WETV, licensed to the Board of Education at Atlanta, Georgia. Five stations are slated to go on the air later in 1958, three operated by institutions of higher education, one by an educational television foundation and one by a city board of education. There are currently thirty-one non-commercial, educational, television stations and three commercial university-operated stations on the air today. Approximately twenty-five educational institutions or organizations are in the planning stages for the operation of educational television stations in the future.

The development of educational television has not been restricted to educational institutions that have their own television facilities. Many colleges and universities have used the facilities of both non-commercial educational stations and commercial television stations for the presentation of programs of a cultural and informational nature, as well as direct teaching presentations that have come to be known as "telecourses."

Those institutions of higher education with extension, correspondence, or adult education divisions have generally pioneered in offering courses on television. These courses usually started as non-credit courses of general interest and today there is scarcely a subject taught in the
curricula which is not also presented as a telecourse either with or without credit.

One of the earliest telecourse pioneers was Western Reserve University which was offering in 1951 formal courses on the air for which credit could be taken and for which fees were paid.

Other universities and colleges pioneering in granting credit toward degrees by television were: University of Michigan; Michigan State University; Wayne State University; Butler University, Indianapolis; University of Toledo; University of Washington; New York University; Quincy College, Quincy, Illinois; Iowa State College; The University of Houston; The State University of Iowa; University of Wisconsin; Illinois Tech, Chicago; University of Bridgeport, Connecticut; Indiana University; James Milliken University, Decatur, Illinois; University of Georgia; San Diego State College and the University of Kansas City. 13

Today there are over 400 different telecourses offered by over one hundred institutions of higher education. Two types of courses have been developed at these institutions. The first includes practical courses, the result of university

research in such fields as economics, agriculture, engineering, government, child welfare, health, geriatrics, home building and school construction, all close to "where people live."

Such courses give direct service to the people of the extended campus at a time when need is paramount and are usually a non-credit offering. The second type of course is of an extension nature enabling people to continue their education, receiving credit for their efforts.

The Development of Television for Direct Teaching

The first use of television for direct teaching by institutions of higher education began twenty years ago. The first educational television program was presented on May 19, 1938, to 250 students of the New York University School of Commerce. The program lasted forty-five minutes, was carried over twenty-five sets in the RCA building, New York, New York; there were two or more students and an instructor at every screen, and a two-way radio system permitted intercommunication. Similar programs followed using the idea of television to enable a teacher to reach students beyond the physical confines of the immediate classroom.

The armed services were also early experimenters with television as a method of direct classroom instruction. As early as 1942 the Armed Service used television to train personnel such as air raid wardens. Organizations within the Armed Forces, such as the Navy's Special Devices Center, have conducted and are conducting programs of research, teaching and training through the use of closed-circuit television.

Institutions of higher education have cooperated with the Armed Services in experimenting with television as a direct teaching device. One such study was done by the Army Quartermaster School, Fort Lee, Virginia, with the University of Houston and its station KUHT-TV. This study was designed to investigate a short program of instruction through television to discover if it would be as effective and as acceptable to Quartermaster ROTC students as is classroom teaching. Another Army television study was carried out in 1954 with the cooperation of the Human Resources Research office of the George Washington University. This study effectively demonstrated that television could be used to replace some of the face-to-face teaching in Army basic training.

Some of the pioneer research by the Armed Services and institutions of higher education in the use of television was done by Fordam University psychologists for the Navy Special Devices Center, Port Washington, New York. Their
first study\textsuperscript{15} dealt with the teaching of Naval Air Reservists by television and it was concluded that in 80 per cent of all comparisons, television was as good or better than classroom instruction. In another study\textsuperscript{16} with Army Field Force Reservists it was found that all grades of reservists profited from television instruction.

Particularly available to institutions of higher education using instructional television as a teaching tool is the option of closed-circuit television rather than the telecourse broadcast over an educational or commercial television station. The use of this type of television gives the institution complete control over the organization and operation of the program of televised teaching.

One of the first schools to use a television closed-circuit system was Creighton University in Omaha, Nebraska, in 1947. In 1948 Idaho State College in Pocatello began to experiment with closed-circuit television. In 1951 Syracuse University and in 1952 Cornell University experimented with the use of this form of television in the classroom.

\textsuperscript{15} Robert T. Rock, Jr., James S. Duva and John E. Murry, 

\textsuperscript{16} Robert T. Rock, Jr., James S. Duva and John E. Murry, 
\textit{Training by Television: A Study In Learning and Retention}, Port Washington, L. I.: Special Devices Center, SDC Report 4760-02-3 (NAVEXOS P-850-3) (no date).
In 1947 a surgical operation was televised in the Creighton Memorial St. Joseph's Hospital. Experiments in instruction of graduate students in surgical techniques began at the University of Pennsylvania in 1949. The same year the University of Kansas completed the installation of the first permanent installation for the day-by-day use of television for medical education in its Medical Center.

Early pioneers in this field have been Chicago Teachers College and New Jersey State Teachers College. Perhaps the most comprehensive and intensive study of the classroom use of closed-circuit television has been carried on at Pennsylvania State University. The Pennsylvania State University project involved an interest in instructional television as a means of extending the teaching of outstanding instructors through the medium of closed-circuit television, thus providing one potential solution to the impending enrollment increases in colleges and universities.\*\*\*\*

Specifically the project's objectives were threefold:

[a] To study the relative "effectiveness" of unmodified courses (Psychology and General Chemistry) taught for a full semester over closed-circuit television using moderate

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cost equipment with the same instruction
given in the conventional manner. [b] To
collect information on the acceptability of
television instruction . . . [c] To study
problems related to feasibility (in terms
of costs and practicality) of television
used for resident university instruction.

Thus a great deal of emphasis is being
placed on the teaching of representative
courses for a full semester via television
and on the developing of feasible and
economical methods of doing this. The
autonomy of the instructor was to be of
paramount importance. Equipment and
technical personnel were held to a minimum,
and were to be at the service of the
instructor. Still another aspect of the
Penn State project was that of studying
the feasibility of using and operating
several closed-circuit systems simul-
taneously within the university.18

To date some 140 systems of closed-circuit instruc-
tional television are currently in operation in our schools
and universities. The relatively extensive use of this
system is partly accounted for by the limited number of
open circuit educational stations on the air and available
for use.

Early experimentation in the use of television for
direct teaching was handicapped by the fact that most school
systems and colleges were completely dependent on the gener-
osity of local commercial stations for any opportunity to
explore possibilities of adapting established instructional

18 Ibid.
techniques and procedures to the new medium and devising such new lesson presentations as might be needed.

When closed-circuit television equipment became available, colleges and universities interested in television as a medium of instruction were quick to interest themselves in exploring its potential applicability. Once experimentation in direct-teaching application of closed-circuit television began, it spread rapidly, until, according to a survey made in 1955, experimental projects of this character were in progress in seventy different schools and colleges and in seven military training centers, distributed over thirty-three different States and the District of Columbia.\(^\text{19}\)

There is no longer any question as to whether or not the student can learn from direct teaching using the medium of television. Instead, the focus of interest today for educators is that of determining, experimentally, the extent to which direct teaching by television in the basic subject areas at higher education levels can be used effectively to perform teaching functions traditionally performed by individual teachers working directly with small class groups under conventional classroom recitation-discussion conditions.

\[^{19}\text{Dunham, Lowdermilk and Broderick, op. cit., p. 82.}\]
Summary

The use of television grew out of the creation and development of educational broadcasting. There has been a long history of accomplishments in the use of radio as an educational medium by institutions of higher education. The pioneers of educational radio, for the most part, were the same pioneers of educational television. However, having seen the educational benefits of radio, the administrators of education also played an important role in the development of educational television.

With the advent of television, classroom broadcasting started much as it had with radio. As colleges and universities began to adapt their credit-course offerings for presentation by television, the whole instructional approach underwent a change in character and within a very short time the familiar lecture method had been superseded by what has been termed the "lecture demonstration" method. What had been verbally communicated on radio, on television could be both visually and verbally communicated and college courses broadcasting began to take on a new significance.

The start of educational television has been dated, by many educators, as beginning with the Federal Communications Commission freeze of television channel allocations. This gave education time to organize and present and win their case for the reservation of television channels for educational
television stations. With the lifting of the freeze, educational institutions began to apply for the reserved channels and the first educational television station went on the air in 1953. To date there are over thirty educational television stations on the air with five more slated to begin operation later in 1958.

The first experimental use of television for direct systematic teaching in institutions of higher education began twenty years ago. However, early experimentation in the use of television for instructional purposes was handicapped by the fact that most school systems and colleges were completely dependent on the generosity of local commercial stations for any opportunity to explore possibilities of adapting established techniques and procedures to the new medium and devising such new techniques as needed. When closed-circuit television equipment became available, colleges and universities interested in television as a medium of instruction were quick to interest themselves in exploring its potential applicability. Once experimentation in direct-teaching application of instructional television began, it spread rapidly, until to date there are over 115 systems of closed-circuit instructional television in addition to the facilities of educational television stations currently in operation in higher education at this writing.
CHAPTER IV

PRINCIPLES OF LEARNING RELEVANT TO INSTRUCTIONAL TELEVISION

The consideration of the potential contribution of instructional television to education should be made in relation to the process of learning. Therefore, television should not be evaluated as a means of presenting information or of teaching objective facts, however important these functions may be. It should be decided for what particular uses television is effective, appropriate, acceptable and feasible in the academic work of institutions of higher education. Television must be examined in its relation to the complex processes of teaching and learning.

Learning is and will be the central problem of education, yet there is not even a satisfactory definition of the term "learning" itself. "...There is no clearly operational definition of learning available as a starting point...To pretend otherwise would be nonsensical and dangerous."\(^1\) There are, however, certain basic generalizations based on learning psychology which are significant in the consideration of the potential contributions of television to education.

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Dr. Neal E. Miller calls these "basic generalizations problems involved in teaching-learning" and groups four certain fundamental factors:

a. **Drive**, or as it is often called, motivation. The student must want something.

b. **Cue**, or as it is often called, stimulus. The student must notice something.

c. **Response**, or as it is often called, participation. The student must do something.

d. **Reward**, or as it is sometimes called, reinforcement. The student must get something that he wants.²

Learning, using any form of communication medium, must be motivated to be effective. Dr. Arthur W. Foshay cogently pointed out that, "the ideal learning situation would involve a perfectly motivated, perfectly focused learner in a perfectly relevant, perfectly open environment, moving toward a perfectly clear goal or goal complex."³

Instructional television used in institutions of higher education will tend to have a motivated student. The very fact that the student is in the classroom of his own will for a specific purpose indicates a


high degree of motivation to learn. Also, in the future when the great wave of students from the increased birth-rate hits, it will probably be more difficult to get into and to stay in college. Consequently, students will be still more highly selected and motivated.

A note of caution should be made in the use of television for teaching. In the teaching process a relevant motivation produces a relevant response and the desired type of learning. Some of the production techniques and artistic effects which are transferred from entertainment television into educational television may actually distract the students from what they are supposed to learn. Such devices are useful for creating interest, but they should be analyzed as to whether they really direct the student's interest toward the essential points or distract it from them.

It is obvious that television has a powerful capacity to attract and hold attention. However, this is an area where research is needed to devise better ways to measure the types of motivations that can be created through the use of instructional television. There is also need to determine how the principles governing the potentialities of television can be most effectively used to motivate learning.

In order to learn the student must be "cued" or "stimulated" to respond to something. Research has demonstrated that television has the capacity for supplying a
variety of realistic cues in the classroom. In stimulating learning Foshay points out that, "the teacher participates with the learner as necessary in the interaction process that results in the formulation of goals that are satisfying and meaningful, and in the selection from the environment [which instructional television is able to facilitate] of whatever is relevant to the pursuit of these goals." ⁴

Miller reported that one of the principles of learning "is that responses transfer best to other similar stimulus situations. This is called gradients of stimulus generalization. The greater capacity of television to realistically reproduce many situations should help to facilitate transfer of training from classroom to life." ⁵ All other factors being equal the attempt should be made to produce teaching demonstrations that are as similar as possible to the situation which the student will encounter when he performs the demonstration in the laboratory or in the "real life" situation out of the classroom. A study at Pennsylvania State University ⁶ has shown that it is more effective to present demonstrations from the subjective angle of view. This is because, when the camera looks over the

⁴Foshay, op. cit., p. III-2.
⁵Miller, op. cit., p. 12.
⁶Ibid.
demonstrator's shoulder, it sees the scene in the same way the student will see it when he is actually trying to perform the task, while when the camera looks at the demonstration from the position which would ordinarily be occupied by the class, it sees a different scene.

Television has the potential to be very effective in focusing on relevant cues, eliminating a large number of irrelevant cues, that will assist in reducing the complexity of many learning situations. "The techniques of deliberate exaggeration or diagrammatic simplification emphasize relevant cues. Similarly, other special attention-gaining devices should help if they direct attention to the relevant cues and hinder if they fail to do this." 7

In order to learn the student must "respond" to instruction; he must observe, perceive, participate, reason and try to retain what he has been taught. This is elicited by cues, and also related to motivation. Students who are motivated to learn are less likely to respond by inattention and are more apt to be participating and responding with trains of relevant thought.

Miller states that the degree that information is transmitted to the student is dependent upon "the response

7Miller, op. cit., p. 13.
units he already has." Therefore, it is important to know what response units the student possesses and what cues can elicit these responses. The instructor is likely to have a prodigious amount of knowledge and experience in his subject. For him a few words rapidly communicate whole contexts of integrated meaningful responses. But the student has not yet learned these complex, integrated responses. Using the audio-visual potentialities of television may be very helpful in securing the correct responses from the student so that the instructor's words become more meaningful. The ability to secure more responses by a wider variety of cues can be an educational advantage of television.

One paramount disadvantage of instructional television should be noted at this point. The teacher, located in the originating classroom, does not have the advantage of verbal or non-verbal feedback from the student located in the receiving classroom. Therefore, the television teacher must pay special attention to determine the special responses he can count on in his students to determine the extent of learning that has transpired. Diagnostic testing is one method of determining progress, and the utilization of discussion periods under the direction of classroom assistants can help assure the maximum amount of learning.

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8Ibid.
Many experiments on educational motion pictures show that building opportunities for participation into the film increases learning. Such experiments were not experiments on participation as opposed to non-participation, but rather ones which require the response to be made overtly intensifying the participation, insuring that it occurs. And it was found that covert participation, or instructing the student to rehearse mentally, also improves learning.

One of the challenges of instructional television will be in finding out how to get the maximum active participation from the students.

To insure the learning process the student must be rewarded; he must get something that he has established as a goal. This factor of reward is directly related to motivation because if the student does not obtain what he wants from the instruction, he is not rewarded by it. On the other hand rewards can also function as an incentive to increase motivation. A student becomes more interested in the instruction for which he is rewarded. "The learning process is good if the rewards (reinforcements) presented are intrinsic to the goals being sought, with a minimum of irrelevant rewards and punishments."9

When the rewards are immediate they are more effective

9Foshay, loc. cit.
than if delayed. In the small class it is easy for the instructor to reward correct responses. In instructing large groups, by either television or lecture, it is much more difficult to use immediate rewards. Knowledge of results has been found to be a very important factor in producing learning. It serves as a reward to those who want to learn.

New methods should be developed to devise a way of introducing more immediate knowledge of results, thereby rewards, in televised instruction. Miller describes a method that might facilitate securing immediate knowledge of results:

The anticipation method can frequently be adopted for [the purpose of immediate knowledge of results.] In its simplest form the subject is presented with a cue, required to make a response and given the correct response for comparison. If correct he is rewarded by the satisfaction of knowing that he is succeeding; if incorrect he is supposed to correct himself by rehearsing the right response. Later the item is repeated until the student learns to anticipate correctly every time.\(^\text{10}\)

It should be possible to apply the general principles of the anticipation method to certain phases of instruction by television for the purpose of immediate knowledge resulting in more immediate reward for the student.

Special problems are posed in using instructional television to teach large numbers of students. It becomes

\(^{10}\)Miller, op. cit., p. 18.
difficult to keep track of the individual student and to be aware of and diagnose his problems as is possible in the small discussion type of class. Consequently, the television instructor has to plan his lesson presentations in such a way as to produce a sequential order that will allow the students to follow from the more simple responses called for in the beginning stages of the instruction to the more complex ones desired at the end of the instruction. With careful planning on the part of the instructor the student should be able to respond correctly, thereby be rewarded at each step along the way.

Research is needed in the area of discovering ways and means of developing, channeling and using the rewards students get in the successful solving of problems, answering of questions, learning and achieving when the instruction is by television.

The instructor is instrumental in the development of attitudes and skills which make continuous learning possible. In appraising the potential contribution of television to instruction, the role of the instructor within the classroom must be taken into account.
Helen Heffernan has significantly presented the following in this connection:

One of the teacher's functions is to arrange the environment and guide the learner in adapting to the environment.

Method, as well as content, is of vital importance in the learning process.

A general curriculum framework is necessary, but individual teachers and students must be allowed freedom to develop their learning activities within the framework.

Teaching problems must be identified and then explore ways in which television can be used in providing desirable learning experiences. In doing this we need to free ourselves from the assumption that all education should be carried on in classrooms of twenty-five to thirty-five students being taught by one teacher.\footnote{Helen Heffernan, "Learning: The Group and the Guide," Max U. Bildersee, (ed.) \textit{Seminar on Educational Television}, NEA Leadership Seminar in Instructional Television, Washington: September 9, 1957, p. IV-3.}

Teaching in terms of general principles, logically and meaningfully related to the ultimate goals the student has been motivated to achieve, is good practice with almost any type of subject matter using any medium of instruction. In preparing a course for instruction through the medium of television the instructor should be mindful of whether he is teaching merely rote facts or teaching the most general principles in a meaningful fashion so that the student is receiving the intellectual skill that will enable him to
continue learning after college and to think creatively for himself. A primary purpose of each significant learning experience is to equip the learner to continue with his learning process.

Carpenter, in reporting on Pennsylvania State University instructional television research found that television when viewed functionally in relation to the process of learning has these characteristics:

Cues and information are picked up, transmitted and presented to students. The stimulus fields are planned, prepared in advance and are highly selected; they are composed and have limits or boundaries. The picture of what was before the camera is presented on a tube face, but with varying degrees of fidelity and effectiveness. Both the visual and auditory systems of television may be so used as to strengthen and improve the quality of some kinds of information or instruction. They may also be so used as to change, distort or reduce the fidelity and effectiveness of instruction.12

It should be recognized that television instruction may become a valuable teaching tool in higher education dependent upon its pertinence to learning needs and upon its method of application. The nature of learning through television is essentially the same as learning through any other medium. This implies that television must be adapted to the

learner rather than modify the nature of learning to fit the characteristics of the medium of television.

Television has tremendous potential in bringing to the classroom a variety of cultural and aesthetic resources not otherwise available in many instances. These experiences may motivate learning, stimulate creative activity, provide a common background of information in order to promote participation or responses in the form of problem solving and critical thinking as parts of the enriching process. These experiences, that television is capable of providing, may also contribute to the building of desirable attitudes not only toward learning itself but also toward the realization of personal and social goals.

Instructional television may be designed to help develop intellectual skill such as analyzing the components of a problem so the problem may be dealt with, understanding the steps in problem-solving and analyzing various viewpoints on a significant issue.

It is inconceivable that television can be used to do everything that our colleges and universities now attempt to do. The nature of the learning process and the importance of the "individuality" of the student precludes any domination of the educational process by any method or mode of communication. It is equally inconceivable, on the other hand, that television should fail to be used in education for
those functions which it can perform with unique and significant advantage. The case for instructional television in institutions of higher education is directly related to the significant improvement in learning opportunities which it can bring to education.
CHAPTER V

AN EVALUATION OF INSTRUCTIONAL TELEVISION RESEARCH

Since the early 1950's a great deal of experimental research has been done on instructional television. This research has been corroborated sufficiently to permit a tentative evaluation of the effectiveness of instructional television as a teaching medium. However, there still remains the need for a great deal of additional research to afford a more conclusive evaluation. This chapter surveys a majority of the instructional television research efforts of educators and psychologists in colleges and universities, and in the armed forces. The evaluation of this research is made in terms of some of the educational objectives of higher education.

In the search for a model for evaluation of educational objectives, the writer has turned to the work of the committee of college and university examiners.¹ This committee has spent over ten years in developing a taxonomy of educational objectives. This system of classification of objectives is most valuable in the evaluation of educational procedures.

Bloom and his associates,\(^2\) in their original plan, conceived three major parts to the complete taxonomy. The first was the cognitive domain that included those objectives which deal with the recognition or recall of knowledge [information] and the development of intellectual abilities and intellectual skills. A second part of the taxonomy was the affective domain which included educational objectives described under such terms as interest, appreciation, attitudes, values and adjustment. The third domain was the psychomotor domain which is the manipulative or motor skill area.

The instructional television research that is considered in this chapter is evaluated in terms of the cognitive domain and the psychomotor domain. There has been little or no research done at this writing that has been concerned with the educational objectives included in the affective domain; appreciations, values, interests, and judgments. However, in a later chapter attitudes and opinions will be considered.

The instructional television research that has been done to date has been largely at the basic level of subject matter information or knowledge. It is natural that the majority of the research in colleges and universities has

\(^2\)Ibid.
dealt with the attempt to determine the achievement, or the extent of learning and retention of information, presented by televised instruction because it is probable that the most common measurable educational objective in higher education is the acquisition of knowledge (organized information). The development of intellectual abilities and skills are also important educational objectives in higher education, but they are more difficult to measure than the acquisition of knowledge. Most teachers measure only the acquisition of knowledge, using objective or essay type tests, because it is the most expedient and easiest method of measurement. Consequently, instructional television researchers have, for the most part, been interested in the measurement of the acquisition of knowledge, using existing methods of evaluation taken from conventional methods of instruction.

For some courses or classes factual knowledge is almost the sole or primary educational objective, and college courses that have been taught through instructional television have been, for the most part, those courses where the primary objective is the presentation of knowledge. In the more advanced courses, knowledge is a necessary objective. Knowledge is the basis for the more complex categories of which these courses often consist: comprehension, where the emphasis is on the grasp of meanings or intent of the material; application, with the emphasis on remembering and
bringing to bear upon the given materials the appropriate
generalizations or principles; analysis, which emphasizes
the breakdown of the material into its constituent parts and
the detection of the relationship of the parts and the way
they are organized; synthesis, the putting together of
elements and parts to form a whole; and evaluation, the
making of judgements about the value, for some purpose, of
ideas, works, solutions, methods and materials. These cate-
gories comprise the educational objectives of the cognitive
domain that lead to the development of intellectual abilities
and skills.

It is probable that instructional television will
not be immediately used to present such complex advanced
courses that involve more than just the teaching of knowledge.
Present research has not presented evidence whether we can
use instructional television with complete success for
teaching advanced courses. Consequently, there is still
some doubt as to the potential utilization of instructional
television for these kinds of courses. The research done to
date has been with subjects that are easily measured.

An Evaluation of the Effectiveness of
Instructional Television

The research findings comparing the effectiveness of
instructional television with other methods of instruction are
the best documented of all the research done on television. In considering television as a potential method of instruction, educators are concerned with the effectiveness of television as a method of teaching in comparison with conventional methods of teaching that are considered successful in the instruction of knowledge.

Using the teaching of knowledge as a criteria for evaluation, studies of instructional television used in higher education are usually reported in terms of was there less, as much as, or more informational learning on the part of students taught by television as students taught by conventional methods.

One of the first, more comprehensive, studies of instructional television in higher education was done at Pennsylvania State University. The second semester part of two basic general courses, Chemistry and Psychology, as well as a course in Psychology of Marriage, were taught for a full semester by instructional television. It was found that learning of the information presented was equal to that of the control group which was conventionally taught.

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R. C. Carpenter, the person in charge of the research project, reported that the difference on informational learning tests between television classes and those taught conventionally was not statistically significant. The main purpose of the examinations was to determine whether the student learned less, an equal amount, or more when taught over a full semester. He concluded that there was no basis in the evidence found on informational learning for rejecting the use of instructional television for teaching courses and college students like those used in the experiment [basic general courses].

L. P. Greenhill, the associate director of the project, reported that the academic achievement, as shown by grades assigned by the instructor, of students at Pennsylvania State University did not suffer as a result of the use of television instruction. He stated that in many of the comparisons made, much larger numbers of students were included in the television group than in the directly taught

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group. This suggested that television is making it possible to extend the teaching of experienced professors to larger numbers of students than is possible under conditions of direct instruction without effecting the academic achievement, grades earned by the students.

It appears that in this study, which seems to be adequately designed and executed, that positive evidence was found indicating that televised instruction was as successful in meeting the objective of teaching organized information in general basic courses as were conventional teaching methods. There was no indication, even in the Psychology of Marriage courses where it might be expected, that the other educational objectives in the cognitive domain, such as comprehension, application, analysis, synthesis or evaluation were measured. It may be well to take for granted the measurement of the development of intellectual abilities and skills in conventional teaching methods, but when instructional television is used as a method of teaching it is important that this be measured if we are to be certain that these important educational objectives are learned. Herein lies a weakness in the present methods of testing the results of teaching by television.

A second comprehensive study of instructional television in higher education has been under way for the past three years at Miami University, Oxford, Ohio. The first
report of the Miami University Experimental Study in Instructional Procedures found that television presentation of such college courses as Introductory Sociology, Educational Psychology (Foundations of Human Behavior), Principles of Human Physiology and Human Biology does not adversely affect achievement as defined by subject matter examinations. This conclusion was reached at the end of one semester of instruction. The second Miami University report stated that when the data for three semesters of investigation are considered in toto, it was apparent that students in the television sections acquire about as much of the subject matter knowledge as do those assigned to control [conventionally taught] classes. One significant factor that was an exception to this generalization was apparent during the second semester of full year courses, suggesting the possibility of motivational decline as the uniqueness of television instruction is dissipated. This possibility was to be explored further in the next year of study.

The courses that were taught by television and reported on in Miami University's second report were Air

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Science I, Foundations of Human Behavior, Principles of Economics and Principles of Human Physiology. These courses are what could be considered as basic or general courses usually taught in large sections, oftentimes by graduate assistants. Here, as in the case of the Pennsylvania State University study, indications are that these basic type courses, where the primary objective is the acquisition of knowledge, might be taught by instructional television.

New York University\(^8\) reported on its study of the experimental use of instructional television as a teaching medium for a period of two semesters. Two courses were taught, a freshman course in English Composition and a sophomore course in the Literature of England. This experimentation was based on the premise that television had shown an extraordinary ability to communicate the voice and image of individuals or groups, extending the distance the human eye can see; and that it had also an unexpected ability to bring the personality of a person close to his viewers. It seemed highly probable that, if effectively used by a good teacher, instructional television could, where teachers and students have learned how to use the medium, bring a good teacher

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closer to a larger number of students than he could reach in a large classroom, and it could bring written material and visual aids closer to the eyes of all the students at once than would be possible in a normal classroom.

The specific purpose of this experiment was to discover whether the use of instructional television would maintain, lower, or improve the quality of instruction in particular courses.

English Composition was selected as one of the courses for study because it is a basic course in practically all colleges and universities. In terms of the number of teachers concerned, English Composition probably involves far more instructional personnel than does any other college course. Consequently, any information concerning the use of instructional television that might bring the best teacher to the students of this, or similar courses, should have widespread value.

The teaching of Literature of England was selected as the second course to provide, in the same department, an opportunity for instructional television experimentation in a "standard" course that does not have the same characteristics of the basic course, consequently, affording the opportunity for comparison between two different types of courses.

It was concluded, by those in charge of the experiment, as far as a general conclusion can be drawn from the
comparison of final grades (which the whole evaluation was based on) in the experimental and control class, that students have an approximately equal opportunity for learning in the television class as in the conventional class.

A fourth comprehensive experimental study of instructional television in higher education was conducted at the Los Angeles City College. One of the principal purposes of the study was to attempt to determine the value of instructional television as a teaching medium.

The classes that were televised for the purpose of experimentation were Physical Education (Health), a required course for all students which results in comparatively large enrollments and an unselected population; Geography, an elective elementary course; and the lecture portions of the Introductory Physics course.

All of the tests, including the final examination, of all the courses throughout the semester were recorded and systematically analyzed to serve as measures of achievement of informational learning.

It was concluded in the study that there were no significant differences in information learning among the

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equated television originating classes, television receiving classes and non-televised classes, as measured by tests systematically administered and analyzed.

The four experimental studies considered above are the only systematic ones that have been done to date in higher education over a period of at least two or more semesters. For the most part all of these studies were carefully designed and executed, and these studies were primarily concerned with the first educational objective in the cognitive domain—the dissemination of knowledge.

All of these studies treated at least one or more introductory or elementary courses for the purpose of evaluation. It was generally concluded, by the experimenters, that this was the area that should be investigated first, in that the most immediate educational needs that television might help solve were in the televised instruction of courses, that, for the most part, had large enrollments and were often taught by graduate assistants or new, inexperienced teachers.

The general conclusion that can be reached from evaluating these long term studies is that television is an effective teaching medium for the presentation of knowledge or organized information. This is, perhaps, the basic purpose of many of the introductory or elementary courses taught in higher education during the first two years.

In addition to the studies reported above there have
been several experimental studies of instructional television at the level of knowledge of single courses, usually over one quarter or semester, that merit consideration.

Harshbarger and Becker, working with a political science course with an enrollment primarily of freshmen and sophomores, found that instructors felt that there was no difference in performance between classes taught by television and conventionally taught classes. Performance, in this case, was defined as scores made by the experimental class and the control class on the first two examinations of subject matter in the course.

Seibert has conducted three experimental studies evaluating televised instruction, in comparison to conventional methods of instruction, in terms of informational learning, of a junior level course in Mechanical Engineering (Mechanisms), a course in Physics and a course in Mathematics (first semester Calculus).


In the Mechanical Engineering course, Siebert concluded that the television taught students learned, on the average, as much of the course content (information) as their conventionally taught counterparts. This conclusion was reached as the result of an item analysis comparison of the responses of television and conventionally taught students on a twenty-eight item criterion test. In the evaluation of the Physics course it was concluded by Siebert that the television instruction that was given resulted in learning test scores which were not significantly smaller, on the average, than those earned by conventionally taught students; however, there is some tendency for television groups to score lower than conventionally taught groups. Student achievement in Calculus, as measured by six classroom tests, is very nearly the same for conventionally and television taught students. There was no significant differences in the total semester's performance of the two groups.

Boone, 14 teaching a portion of two electronics courses (Transients in Electrical Circuits and Wave Shaping Circuits) to Naval Academy students, found that television students revealed no significant difference in achievement on informational learning in either course between the

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14 W. F. Boone, Evaluation of the U. S. Naval Academy Educational Television as a Teaching Aid, 7010 7-26-54, Annapolis: United States Naval Academy, October 29, 1954.
television taught and the conventionally taught classes. Achievement was measured by the comparison of daily prognostic test scores between the two groups. It appears that television may probably be utilized for visual aid purposes to teach these highly technical skills courses if the situation demands.

Williams\textsuperscript{15} compared the results of teaching of the subject matter "Thinking Through Language," by television, conventional lectures, radio and reading the material only. An examination consisting of nineteen multiple-choice questions and an essay type question was administered immediately after exposure as a measure of learning information. Generally television was superior to the other methods used to present the information. It was concluded that unembellished lessons on television are at least as effective as lectures in person, so far as the factors measured. This conclusion, however, is based on a single experiment, one time only, of isolated material. It is important to note that television was as effective as other mass media in presenting information.

These experimental studies of single courses or over short periods of time, indicated that television probably can be utilized for teaching the acquisition of knowledge,

\textsuperscript{15}D. C. Williams, "Mass Media and Learning—An Experiment," Explorations, Number 3, 1957, p. 75.
one of the educational objectives of college and university courses, as effectively as conventional teaching methods.

The concern of the investigators of instructional television used in higher education, as previously stated, has been primarily with the first educational objective in the cognitive domain—the dissemination of knowledge. There has been only one study done to date where the use of instructional television in higher education was evaluated in terms of the educational objectives in the cognitive domain that develop intellectual abilities and skills—analysis, application, synthesis, comprehension and evaluation.

The Miami University study\(^1\) went beyond the testing of knowledge learned in televised courses, in that achievement defined as critical thinking, problem-solving and synthesis, which fall under the intellectual abilities and skills objectives of the cognitive domain was measured. It was reported that the experimental method of instruction (television) was inferior in the Economics course, but not in the other courses where this problem was investigated.

The Miami University study, which was well designed and executed, demonstrates that it is possible to measure more than just subject matter knowledge learned. Their preliminary

\(^1\) Miami University, *Experimental Study in Instruction*, Report Number 2, Oxford, Ohio: Miami University, October 1, 1957.
findings suggest there might be inherent differences among the different types of courses taught by instructional television that would affect the learning of the educational objectives that develop intellectual abilities and skills. This type of research is very necessary if the full potentials of instructional television are to be appraised.

The domain that is the third part of the complete taxonomy of educational objectives is the psychomotor domain—manipulative and motor skills. While this domain is not generally considered a major part of the educational objectives of higher education, there are some instances where manipulative and motor skills constitute all or part of college and university courses.

There has been one study, dealing with this domain, that evaluates the effectiveness of television for teaching a skills course in higher education. Pasewark,\(^{17}\) in his study of teaching a beginning typewriting course through instructional television, reported that findings of his study indicated college students taught by television were significantly faster on typing speed than those taught in the conventional manner. This was true not only for the final test, but for all timed speed tests during the course.

This study appears to be well designed and systematically executed and evaluated. Pasewark's general conclusion merits consideration; that when comparing the achievement of students learning through television with students who learned through conventional classroom methods, the findings of the study evidences that television is an effective medium for learning beginning typewriting.

It may be concluded, if typing is considered a manipulative skills course concerned with the learning of speed and accuracy, that television can effectively teach such courses in the psychomotor domain as effectively as conventional teaching methods.

The armed services have pioneered in the use of television for the purpose of teaching and training in the area of manipulative and motor skills. This type of instruction is primary in armed forces basic training.

Instructional television research in the armed services, for the most part, covers experiments lasting only for short periods of time and the courses that are taught by television usually are not as extensive in scope and subject matter as college and university courses. However, this research is usually conducted by highly trained personnel who develop systematic and scientific testing measures for the purpose of the evaluation of instructional television in comparison with conventional teaching methods.
Rock, Duva and Murray\textsuperscript{18} conducted one of the first studies of training by television. Two series of eight one-hour classes were taught by television, kinescopes and by conventional classroom teaching methods. The first course was a basic information refresher course for officers and the second course for enlisted men treated subjects of a technical skills nature. Based on achievement measured by multiple-choice tests given before and after each lesson, it was concluded that television compared favorably with conventional methods of instruction.

In another study by Rock, Duva and Murray\textsuperscript{19} a series of eight one-hour television presentations were made to classes composed of enlisted men and officers. The information presented on television dealt with the different phases of an Army division's operations in an encounter. Learning was measured by multiple-choice type questions administered before and after each session, with the exception of the first session. It was reported that all grades of officers and enlisted men reservists profited from television instruction,


remembered well what they had learned, and liked instruction by television.

The value of these two studies is primarily one of historical importance. These studies served to stimulate instructional television research in both the armed services and in colleges and universities, and if for no other reason than this, they are of great value.

Kanner, Runyon and Desiderato\textsuperscript{20} conducted a well designed study for purposes of obtaining basic information on the comparative teaching effectiveness of television in the Army's regular basic training instruction. Fourteen hours of instruction representative of the skills taught in the first eight weeks of Army basic training were taught by television and by conventional Army classroom methods. The educational objectives of these courses, for the most part, involve teaching skills and are in the psychomotor domain.

Seventeen tests were constructed, including written tests (consisting of multiple-choice, fill-in, and picture identification items) and performance tests, for the purpose of obtaining a measure of the relative teaching effectiveness of television instruction as compared to conventional

instruction, utilizing Army basic training subject matters. These tests were administered immediately after each hour of instruction. On the basis of these tests it was generally concluded that television instruction was at least as effective as regular instruction and there was an indication that television instruction was more effective for lower-aptitude groups. Kanner and his associates also reported, in an attempt to isolate those factors which appear to be related to the superiority of television instruction, that television instruction is particularly adaptable to training situations which require manipulation of small equipment pieces by the trainee, situations which require simple rote learning and situations which require understanding of the relationships among small moving parts. All of these situations are integral factors in the teaching of manipulative or motor skills.

Fritz, Humphrey, Greenlee and Madison\(^{21}\) conducted a study for the armed services to interpret previous findings and experience in terms of the direct application of instructional television to Army training problems. It was felt that television might be expected to intensify and improve the

learning process with its appeal to both sight and hearing. This study made a rather thorough investigation of the re-search findings available at the time, 1952. Fritz and associates generally concluded that there was no difference between television and non-television students when subjects were paired according to high and low aptitude and information scores. Evidence seemed to indicate that when audio-visual elements of instructional television are utilized advantageously the lower aptitude student will tend to learn information better through television instruction.

Kanner, Katz and Goldsmith 22 experimented with the teaching of thirty-eight hours of continuous television training over a five day period. The subject matter was that of a basic electrical maintenance course. Their purpose was to compare the effect upon learning from televised instruction with conventional instructional methods. It was found that there was no consistent differences in teaching effectiveness between television and regular instruction. They reported that television can be employed as a teaching medium without the day-to-day losses in teaching effectiveness exceeding to any great extent those normally obtained with regular instruction. Kanner and associates also found that television

instruction, of these types of skills, was particularly effective for low aptitude groups. These findings concurred with those of the study of Fritz and associates reported above.

This study is unique in that it represents a pioneer attempt to present a relatively large segment of training concentrated over a continuous period of thirty-five hours in one week. It was not conjectured whether the effectiveness of television would hold up under more than one week of continuous teaching.

In a study made by the Quartermaster Corps in cooperation with the University of Houston, a training course on Army food services was instructed by television. A group of 128 ROTC students was divided into two sections. One section took the course in a regular classroom and the other received instruction by television. All students took a thirty-two item multiple-choice and true-false test, based on the subject matter presented in the course, four days after the conclusion of the four hour course. In scoring and analyzing the test no statistical difference in learning between the two sections was reported.

These armed service experimental studies are

representative of a majority of the different kinds of research efforts being conducted to determine the effectiveness and the place for the potential utilization of instructional television for teaching purposes. These studies conclude that television is just as effective a method for teaching armed services subjects as are other conventional methods of instruction. It should be pointed out again that, for the most part, these subjects are primarily concerned with the development of manipulative or motor skills. It can be concluded that television, because of its visual aid characteristics, can effectively teach psychomotor skills, where these skills constitute all or part of college and university courses, as well as conventional teaching methods.

The Retention of Televised Instruction

Earlier in this chapter it was stated that it is probable that the most common measurable educational objective in higher education is the acquisition and retention of knowledge or information. Herein lies, probably, the paramount weakness in the evaluation of the effectiveness of instructional television. To date there have been no long term retention studies done with instructional television. This can be explained, in part, by the relative newness of instructional television and its evaluation. Instructional television research efforts, which are just now passing out of an
embryonic stage, are at a point where sufficient data have now been collected to permit such studies of retention of information or knowledge learned through instructional television. An example of this is the plan for next year at Miami University where the retention of knowledge students have learned in university courses over a period of three years will be studied.

Some studies have included a consideration of retention of knowledge learned through instructional television, but usually only after a short period of time has elapsed. However, these findings merit reporting in order that some tentative conclusion might be made.

Paul and Ogilvie\textsuperscript{24} did a follow-up study of Canadian university students, reported on page 79 of this chapter, eight months after the end of their course. A retention test, using the same multiple-choice questions used in the immediate recall test, was administered to a majority of the students who had been subjects in the original experiment. The same comparable results, taking into consideration retention losses, were achieved as in the original experiment. Generally television was superior to the other methods used to present the information. It was also reported that the amount of

\textsuperscript{24}J. Paul and J. C. Ogilvie, "Mass Media and Retention," Explorations, Number 4, 1955, p. 120.
forgetting between groups was not significantly different. It seemed that forgetting was proportional to the amount learned and was generally independent of the medium by which the information was acquired.

Kanner, Runyon and Desiderato retested the Army trainees that had received fourteen hours of television training in eight subjects one month later. In four out of fourteen comparisons the retention of rote learning, manipulative and motor skills learned by the television student was significantly superior to the regular students. In the remaining ten out of fourteen comparisons, no significant differences in retention were shown between the television students and conventionally instructed students. In general, the retention results supported the findings based on immediate-test performances; that is, in no instance was there a reversal where the immediate-test results indicated the general superiority of television instruction for teaching technical skills.

Rock, Duva and Murray tested Army reservists six

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26 Robert T. Rock, Jr., James Duva and John E. Murray, Training by Television: A Study in Learning and Retention, NAVEXOS P-850-3, Port Washington, L. I.: Special Devices Center (no date).
weeks after exposure to television instruction and found that retention figures for both officers and enlisted men were high. Officers retained 85 per cent of the newly learned informational material and the enlisted men retained 65 per cent. The experimenters concluded that not only do reservists learn from television, but that they retain substantial amounts of material.

Kanner, Katz and Goldsmith 27 tested Army television instructed and conventionally instructed students one month after they had received the original thirty-eight hours of training in a skills course dealing with electrical maintenance. There was no significant difference in the retention tests between scores of the groups having the two methods of instruction. The results of the experiment indicated that material taught over television is retained as well as material taught in the regular instruction situation. This was considered important in that retention of the skills learned on the job would be more directly related to the retention of instruction than the learning of instruction.

Boone 28 found that Naval Academy students in two


28 W. F. Boone, Evaluation of the U. S. Naval Academy Educational Television as a Teaching Aid, 7010 7-26-54, Annapolis: United States Naval Academy, October 29, 1954.
electronics courses, when tested six weeks later showed no significant differences in the retention of organized information learned between television students and regular classroom students.

All of these studies on the effect on retention of knowledge and skill learned through televised courses reported that television instruction was remembered as well as regular classroom instruction. Evidence from these studies indicated that it can be tentatively concluded that television is as effective as traditional classroom teaching in the amount learned and retained. However, before any firm conclusion can be reached, considerable investigation of long term retention of knowledge or information and skills taught in college and university courses must be made.

**Feedback Between the Television Instructor and Students**

Since the television teacher has little or no face-to-face contact with students over television, some procedure must be established so that there is feedback between the teacher and students if for no other purpose than to determine how well the lesson has been received. There is really no essential difference in this requirement with or without television. But, in television instruction, the requirement is more pressing, since the television teacher is
remote, seldom even sees all the students being taught, and
can easily lose the feel of student response unless some
effective feedback system is established. This cannot easily
be built into a television system; rather it must be estab-
lished externally.

This problem has been considered by Harris\(^\text{29}\) in his
survey of colleges and universities offering televised in-
struction. He felt that televised instruction posed no great
handicap as far as feedback is concerned. Harris felt that
there is an important place in education for well-organized,
systematic lectures. He was surprised at the number of
comments he received expressing appreciation of the systematic,
factual presentation of material. While the student who was
perplexed by, or misses, a point cannot raise his hand for
assistance, he can and often does write questions, some of
which require considerable discussion by the instructor.
Many large universities currently are committed to large
class practices, which, the author felt, tends likewise to
discourage questions and discussion. However, in the tele-
vised teaching of college and university courses for optimum
learning, some procedure should be provided for feedback
between the students and the instructor for the purpose of
appraising response and reception of instruction.

\(^{29}\) Dale B. Harris, "Courses for Credit," The American
Kanner, Runyon and Desiderato, in their evaluation of television in Army training for teaching skills, studied the use of procedures in television instruction to provide feedback. The problem was approached by phrasing in these terms: "what are the effects of isolating the instructor from students, preventing students from asking questions, etc., upon trainee learning?" Several approaches were made in evaluating the problem. One of the first was to examine the types of questions raised by students during regular instruction. Many classes were observed and the questions noted. In the majority of instances, it was found that many of the questions were irrelevant to the objectives of the lesson plan or reflected omission by the instructor of information suggested by the lesson plan. Some questions persisted from class to class, and upon examination were found to indicate a teaching or presentation deficiency of the subject matter. With this information as a guide the following steps were taken: the instructor was trained to cover the lesson-plan objectives more completely; where necessary, attempts were made to enhance the teaching effectiveness for particular lesson-plan sections by using charts and similar

devices; a technique was used in which important questions were incorporated in the teaching, that is, the instructor raised the question, asked the student for an answer, and then gave the correct answer.

These procedures were employed in both the television and regular instruction sessions that were involved in the study. When these procedures were used, no indication was found in the student-reaction questionnaire of any dissatisfaction because of lack of contact between instructor and students. The Army school authorities and instructors were of the opinion that these procedures greatly enhanced student interest and response to the instructor.

Kelly and Conrad attempted to substitute for feedback in their study with instructional television. Several studio techniques for "stimulating or simulating" feedback in a television teaching situation were tried out. The authors tried and named the following methods: Mind reading, a method by which a teacher anticipates the kinds of questions and answers the students may raise. Intercession, a method in which an interviewer is used to take the place of the students. Panel of peers, the presence of a group of pupils in the program. Emergent personality, the regular appearance of the

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television teacher in the viewing classrooms to establish familiarity so that a feeling of feedback can arise. Disembodied voice, the use of an off-camera voice to ask questions. Roving eye, the panning of cameras to simulate a visitor visiting the instructor's room. Teacher's lap, the utilization of close-up shots. Interlude, breaking the program so that viewers have a chance to raise questions with the person in charge of the receiving classroom before continuing with television instruction. Hog fattening, instilling a competitive spirit by having interludes of classroom work after viewing a group of peers perform on the screen.

The authors concluded that mind reading works well; intercession or the use of an interviewer is the least effective of the methods to secure a sense of feedback; panel of peers is a good technique if the panel is spontaneous and not rehearsed; the use of intimate close-ups is an effective device; the use of interludes in teaching has potential as a technique and should be explored further and "hog fattening" technique is effective when there are "open-ended" presentations—presentations in which questions are raised and only partly answered, where controversial viewpoints are expressed, and where, if possible, there is a great deal of the kind of activity in the studio which can be duplicated in the classroom.

Feedback between the instructor and his students is a vital and necessary part of the educational process for
determining student response and reception of the lesson. Experiments seem to indicate that where the acquisition of knowledge is the primary goal of the course taught by instructional television, the use of rhetorical questions, well organized lesson presentations and other similar techniques can be substituted, in part, for the lack of face-to-face contact, not possible in instructional television, which allows the instructor to secure the feedback that indicates student response and reception. This is an area that needs additional and continual investigation to insure the optimum results in learning from instructional television.

Intercommunication As a Part of the Teaching—Learning Process

In the previous section feedback between the television instructor and his students was considered in terms of its importance to the instructor in order that he can determine what kind of response, and how the information he is presenting is received by his students. A second important form of feedback is the intercommunication between the teacher and his students, as a part of the total teaching—learning process, for the purpose of clarification and practice through such methods as discussion, drill, laboratory sessions, recitation and other similar exercises. This form of intercommunication is also involved in at least two other phases
of the teaching—learning process: testing for adequacy and proficiency—performing, writing, reporting, creating, constructing, taking tests; and the application and use of the information, skills and techniques that have been learned. Experiments have demonstrated that instructional television is able to motivate the student and to provide realistic cues to stimulate learning. Consequently, the presentation of the subject matter information of the course can be effectively done by instructional television; however, it is at this point in the teaching—learning process that televised teaching must be reinforced by other methods if the learning cycle is to be completed.

Most instructors tend to think of the motivation and presentation phases of teaching—learning as being the primary, if not the entire process. Actually the course effectiveness is dependent to a great degree upon the opportunities provided, and the extent to which students engage in the other learning activities.

There have been experimental attempts to provide a method to allow intercommunication for the purposes of assuring the participation in all the phases of the teaching—learning process. The Pennsylvania State University studies of

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instructional television had four principal approaches to the solution of the problem of this type of intercommunication. The first approach to the problem of providing for questions and discussion from students in television classrooms was to install two-way communication between these and the originating rooms. Pauses were provided in the instructor's presentation for questions. Students asked questions which were answered by the instructor so that everyone could hear them. The effects on students' performance of being able to ask questions over the two-way communication system have been evaluated in two different courses, ROTC Air Science and Principles of Economics. In each course the performance of students in microphone-equipped rooms was compared with that of students in non-equipped rooms. In both instances the opportunity to ask questions had no significant effect on student performance. Student reaction to the availability of the two-way communication system was quite favorable and from 67 to 92 per cent, depending on the course, believed that the microphones should be available, even though the majority of students in most courses rarely or never used them to ask a question.

The second approach involved a thirty-five minute lecture period followed by a fifteen-minute discussion in which television receivers were turned off and the students had a live discussion with teaching assistants. In a
General Psychology course comparisons were made between several different methods of using fifteen minute discussion periods following a thirty-five minute lecture demonstration on television. Groups in some receiving rooms participated in discussions led by graduate assistants, others observed, by means of television, discussion sessions which were conducted by the principal instructor for the course with a small group of students in the originating room. A third category of groups received no discussion at all. They were permitted to review their notes, read the text-book or leave. The study was repeated in two different sections of the course, but the analysis of the results in academic achievements of the groups using the various discussion procedures indicated no significant differences among the three methods used to allow for questions and discussion. However, the students who participated in the discussions led by graduate students were much more favorable to the idea of the split class period than were the other groups.

The third pattern that the Pennsylvania State University study utilized was to have two one-hour lecture-demonstrations a week, followed by a recitation or a discussion period of one hour per week. This procedure was evaluated in two studies in the course, Principles of Economics. In the first study student preferences were obtained relative to two teaching situations in which for the
first part of the semester each class period was split into thirty-five minute lectures on television followed immediately by a fifteen minute recitation, while for the latter part of the semester two fifty minute lecture demonstrations over television were followed by a fifty minute problem-solving session each week. Seventy per cent of the students expressed a preference for the two lectures, one recitation period; and 29 per cent preferred the split period arrangement. A second study was made experimentally to evaluate the usefulness of the fifty minute problem-solving session. The 120 students who scored in the upper 40 per cent on the first examination in an Economics course were randomly divided into two groups. One group was required to attend the weekly problem-solving sessions in which assigned problems in economics were worked out by the students under the guidance of graduate assistants. The members of the other group were required to solve the same assigned problems independently in their own time. All students attended the two televised lectures per week. After a period of four weeks all students took a common examination, part of which covered the facts and principles taught in the televised lectures, and part of which consisted of problems to be solved. There was no difference between the two groups on the items covering the facts and principles learned from the television instruction, but there was a significant difference on the problem-solving items in favor of the group
that had attended the problem-solving sessions conducted by graduate assistants.

A fourth approach was that of rotating students in and out of the television originating room. The system of rotating students through television originating rooms was tested in a course in Business Law. In this course it was possible during the first four weeks to have fifty students continuously in the originating room, fifty continuously in a receiving room while two other groups spent two weeks in the originating room and two weeks in receiving rooms. Comparisons of achievement revealed no significant differences among any of the groups. During the next four weeks the television-room and originating-room groups changed places and the other two groups continued to rotate every two weeks. Thus at the end of eight weeks comparisons could be made between groups that rotated every two weeks or monthly. Again, no significant differences in achievement were found between the groups who rotated every two weeks and every month.

Kanner, Runyon and Desiderato\(^{33}\) were concerned with the aspect of the problem of intercommunication, that of

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student participation. Television instruction generally induces a mental picture of a number of students passively seated before a television receiver. They felt there was enough evidence to suggest that such a situation is not the most conducive to effective teaching and learning. Experimental studies in other areas have indicated that teaching is more effective where the student is asked to participate in some active manner. This study was used as a vehicle for applying and evaluating such procedures in television teaching.

For various subject matters, students were asked to call out correct answers or write down materials suggested by the instructor. In one subject matter the students were taught to disassemble a machine. In this procedure the television instructor first asked the students to call out while he made the disassembly. Then each student was provided with a machine. The instructor "paced" the students in disassembling the machine by first asking them to watch him remove a particular piece and then telling them to do the same thing. This type of participation appeared to be most effective. Because of the close-up views of the television camera, one instructor was able to provide "personal instruction" to a group of students.

The other participation techniques also appeared effective. The requests of the instructor for the students to call out or name the various parts or supply answers to
questions met with a favorable response from the students. The fact that the television instructor was not in the classroom and did not have "contact" with them as ordinarily defined, seemed not to be noticed by the students when they were asked to do various things by the instructor. Evidence was obtained in the study that students can effectively participate under conditions of television instruction at the level of skills learning.

Experiments seem to indicate that, where the acquisition of information or manipulative or motor skills is the primary goal of the course, instructional television can be used for presentational purposes and additional methods can be incorporated to insure intercommunication for the purpose of participation in all the phases of the teaching-learning process.

There have been two methods of experimentation which might help solve this problem; two televised class meetings followed by one class meeting for recitation or discussion, or a fifteen or twenty minute period at the end of each televised session for discussion or questions.

Good intercommunication is vital to the success of instructional television in higher education. There have been several research attempts to determine the need for intercommunication in some types of courses, the effectiveness of methods presently used to facilitate intercommunication and to
discover new methods that might be used to assure intercommunication in television teaching. However, this too is an area that needs additional and continual investigation to insure the optimum results in learning from instructional television.

The "Novelty" or Motivation Effect of Instructional Television

A question frequently raised in the interpretation of studies of instructional television is whether observed results may be, in part, due to a "novelty effect." The relative newness of the television medium has led some to conclude that the superiority sometimes evidenced by television instruction, might be attributed to the greater motivation of the students receiving the instruction. The influence of this type of motivation has been discussed in the past when motion picture films, recordings or radio have been used for instructional purposes.

This question of novelty motivation, in relation to such older media as film and radio, is rarely raised today. It is accepted that some radio programs or films do not present information as well as, and some present information better than, conventional instructional media such as lectures, textbooks and reference materials. Differences in the results of instruction are usually credited to the content of the radio presentation, the film or the conventional media
rather than to the fact that a particular medium is used. Novelty effect of films or radio is seldom referred to simply because these media are no longer a novelty either to students or instructors. With the passage of time a similar situation may be expected where television is concerned.

There has been very little systematic research on this problem of novelty and its potential influence in televised instruction. This is one of the areas of instructional television that needs more extensive investigation. Reported below are conclusions of one study of this type carried on in the armed services where instructional television was used for basic training. Also noted is a report of a portion of a civilian study which examined this question.

Kanner, Runyon and Desiderato made an attempt to reduce the additional motivation of the television student by making both television and regular instruction students aware that they were participating in a comparative study. These attempts to reduce possible initial differences in motivation were guided by the more important objective of obtaining information on the relative teaching effectiveness of television training, unobscured by the problem of differences in

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motivation. Observation of the overt behavior of students receiving either regular or television instruction indicated no apparent difference between the groups.

The authors assumed that if the motivational or novelty effect attributed to television existed, it would be highest in the initial hours of instruction and would tend to taper off as the students approached the twelfth, thirteenth or fourteenth hour of television instruction. This tapering off or decline of initial motivation should be reflected in the test performance of the two groups. However, differences found in testing appeared to be related to the type of subject matter rather than to the chronological position in which the instruction came. The subject matter resulting in the three largest differences favoring television was presented in the fourth, fifth and seventh weeks of training after the students had had their fifth, eighth and thirteenth exposure respectively, to television instruction.

It was therefore concluded from these findings that there was no special motivation effect due to television instruction. The authors felt that this may be either because there is no special motivating effect or because they succeeded in "equalizing" motivation between television and regular instruction.
The Canadian Broadcasting Corporation's investigation of television in the classroom report that in the course of the experiment the experience of television was a novelty to some of the students participating in the study. However, such novelty did not seem to affect the students to any great degree. A comparison of teacher evaluation from areas where the students had no previous experiences with television with those where the viewing of television had been possible for seven years or more, showed no marked differences in the performance of the student.

Here is a facet of instructional television, resulting from the newness of the medium of television in the teaching situation that might affect learning, as suggested previously in this chapter by the Miami University study. Until such a time as instructional television is readily accepted and as familiar a teaching medium as the educational use of radio and motion pictures, this novelty effect will continue to be a serious problem. Meanwhile, investigators must keep the "novelty factor" in mind as a caution in interpreting results of their experimentation.

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Summary

This survey of the evaluation of instructional television has reviewed some of the representative studies of the effectiveness of television as a direct teaching device in higher education. The studies are significant, for they represent the present status in the systematic evaluation of instructional television. They reveal what we now know, and even more important, what we do not know.

The studies included in this chapter suggest several conclusions to this writer concerning the use of television as a medium of teaching. The general conclusion that can be reached from the evaluation of these instructional television studies is that television compares with conventional teaching methods in this respect, it can be used to present the subject matter information taught in courses where the primary goal is the acquisition of knowledge. Beyond this point generalizations concerning the effectiveness of television as a method of teaching cannot be made because of lack of evidence.

The courses, most frequently used for the purposes of experimentation, were courses where the primary purpose was the acquisition of knowledge. Most of the studies treated at least one or more of these types of courses for the purpose of evaluation. This is the area that should be investigated first, in that the most immediate educational need that television might help solve is in the televised
instruction of courses, that for the most part are beginning courses with large enrollments which are primarily concerned with the teaching of knowledge.

Armed services research pointed up the value of instructional television for teaching subjects that primarily consist of manipulative and motor skills. It can be concluded that television, because of its visual aid characteristics, can effectively teach psychomotor skills, where these skills constituted all or part of college and university courses.

However, several pertinent questions concerning instructional television are left unanswered or partially unanswered by the research done to date. The problem of the lack of feedback opportunities for the instructor to determine response and reception as well as the problem of the lack of established methods of intercommunication to provide for all of the phases of the teaching-learning process are serious ones that have not been solved. The study of retention of knowledge and skills learned through instructional television has just begun; there have been no systematic long term studies of this problem and only tentative conclusions can be made now. The evaluation of the research efforts accomplished to date indicate there are great gaps in the investigation of instructional television as a medium of teaching in higher education. These studies are of value
because from them it is possible to determine what we do know and what we don't know about this relatively new medium when it is used as a method of instruction. There must be further evaluations of instructional television if it is to be acceptable and if it is to be improved. There has been the tendency, on the part of instructional television researchers, to go over the same ground covered by previous studies. If television is going to be used in higher education for teaching purposes, there are many questions that research can help answer. Research efforts should be devoted to a study of the problems pointed up in past research.

Many of those who have studied instructional television have concluded that it is as effective as conventional methods of instruction for teaching college and university courses. To this writer, this is a rather sweeping generalization. Research has shown us that a few of the objectives of the teaching-learning process can be accomplished with television, but at this date we do not know about ability of this medium to handle the rest of these objectives. Studies of the effectiveness of television done so far are fine, but they have been limited. Past experience has demonstrated that television has been used to teach college and university courses with acceptable results. What we know about instructional television is encouraging. Television affords educators a method of teaching many students
certain types of educational objectives, thus helping solve the pending crisis in higher education. However, as in the case of any method of instruction, there must be a continual evaluation of the process if it is to be improved and used.
CHAPTER VI

THE ROLE OF THE TEACHER IN INSTRUCTIONAL TELEVISION

Of paramount interest and importance in the utilization of television as a teaching medium is the role of the television instructor. It is relevant to consider what special requirements television imposes upon the instructor, how he should be selected and trained and what advantages and opportunities instructional television offers.

Except for features peculiar to the television originating classroom, teaching through television is similar to teaching by conventional classroom methods for the general principles of good teaching still apply to instructional television.

Kelly and Conrad, in their report on classroom television, found that it was feasible to use outstanding classroom teachers as television teachers, but their conclusion was based upon a number of factors. The first factor was that the television teacher should be genuinely outstanding in his own face-to-face classroom work. The teachers who are merely satisfactory and who are chosen because they like the idea of teaching by television may not perform

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satisfactorily. It requires a clear perception of teaching objectives on the part of the teacher, both in general and with respect to a given lesson, to do a good job of teaching students who are not present in an environment of a television-originating classroom.

The authors stated that it should be recognized that the conclusion that outstanding classroom teachers have many, if not most, of the skills required for successful teaching is subject to qualifications based on the individual differences among these outstanding teachers. What makes one teacher an outstanding success in the classroom is likely to be quite different from what makes another effective and in the case of television teaching there will also be the variation of effectiveness.

Pasewark\(^2\) found, in his area of investigation of the use of instructional television in higher education to teach typewriting, that the good classroom teacher could meet the requirements necessary for teaching effectively on television by objectively adjusting to the new teaching environment.

It may be concluded that the instructor who does a good job of teaching in the classroom and is "compatible" to

television can quickly accustom himself to the extra details involved in television teaching. The outstanding teacher often does an even more effective job of teaching in the instructional television situation. When teaching through television the instructor tends to time his lessons more precisely, choose his vocabulary more carefully, eliminate extraneous material and attempt to enrich the lessons with more details and material.

Selecting the Television Teacher

The success of instructional television as a method of teaching depends upon the selection of instructors who can be trained to adjust to the specialized requirements of the television medium.

Fritz, Humphrey, Greenlee and Madison state that the following criteria must be established for the selection of television instructors. No matter what changes or adaptations must be made when teaching by television or any other medium, basic content must always be of primary concern. And because knowledge of fundamental materials is an indispensable consideration in teaching, television instructors

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must be selected first, just as they always have been, for their knowledge of the fundamental materials to be taught. As previously stated the general principles of good teaching still apply to television.

Accepting this viewpoint, then, all instructors selected for television would be expected to know their subject matter thoroughly and to have had experience or training in the principles of effective instruction.

Carpenter and Greenhill\(^4\) reported that two criteria were used in the selection of television instructors at Pennsylvania State University. The first, that they be faculty members with extensive experience and acknowledged competencies for teaching the experimental courses. Second, that they have sufficient time and interest to participate.

Heath,\(^5\) in a survey of educational institutions engaged in television instruction, asked how faculty members are selected to instruct on television. Ninety-one institutions responded to the survey and the most frequently mentioned factors were: the subject matter handled by the teacher, the teacher's personality and the teacher's reputation


as a good teacher. Other factors mentioned frequently were the teacher's appearance, his experience in presenting radio talks and his interest in the use of visual aids.

It has been the experience of this writer that it is probable in selecting instructors for television that some consideration might well be given to what could be called "television compatibility." While difficult to define, it is manifested by ready adaptation to studio conditions, a relaxed manner, an easy presentation of ideas and an enjoyment of television teaching. Poor television compatibility might be found, for example, in those who normally speak at a rapid rate and who, when required to slow up to the extent considered optimum for television, experience frustration. Another factor to be considered is emotional tension. All instructors going before the camera for the first time reported considerable emotional tension. It is possible that with habituation most instructors become at ease before the camera. However, elimination of this tension does not occur in all cases, for it was reported that a few instructors, even after considerable experience before the camera, did not enjoy television teaching.

Training the Television Teacher

In the utilization of television as an educational medium, just as in conventional classroom teaching, there is no prescribed method of teaching for all subjects, students
or situations. In the case of instructional television each subject must be taken as a new problem. The television instructional techniques and methods must be related to each subject. If a method is found to be successful in one field there is no indication that it will be successful in another. However, as in conventional teaching, some generalizations can be made that will generally be consistent in each teaching situation.

From this writer's observation of regularly established television classes taught by experienced television instructors, observation of instructors who were new to television, and experiences reported by seasoned television teachers recommendations for training television instructors can be made.

Most instructors, when they first teach on television, express a preference for a group of students in front of them. The trend appears to move from having a class of students in the originating classroom to the absence of students as the teacher gains experience with television.

It is recommended that new instructors be provided with a panel of from three to five students in the originating classroom. Whether or not the panel is continued after several weeks can be a matter for the instructor to decide depending upon the need for students for the sake of intercommunication or other similar reasons.
A majority of the television instructors report emotional tension or even fear when appearing before the camera for the first time. Experienced instructors believe this wears off rapidly and estimate that within about two weeks, the individual is comparatively relaxed and calm before the camera. Usually during the first period or two, new instructors will persist in errors such as moving too rapidly, or not holding a pointer in position long enough, even after coaching. It is recommended that all instructors be given several "dry runs" under the observation of an instructor familiar with television teaching techniques. These dry runs also serve to lessen emotional tension.

Unless informed and warned, individuals tend to make movements too rapidly when before the television camera. It is difficult for the new instructor to realize that he must make his movements slowly for best effect. Deliberate, unhurried movements are desirable, especially when demonstrating objects or visual-aids. It is recommended that new instructors be given an opportunity to experience the proper rate of movement under observation and guidance. This was of special importance when an individual's natural rate of movement was rapid.

Unnecessary movements are distracting. Fidgeting and moving about seem to be more distracting on television, perhaps because of the high concentration of the viewing
students, than under ordinary conditions. It is recommended that the instructor give attention to the amount of movement and make certain that movement is restricted without creating an unrealistic situation. If the average individual moves somewhat less than he feels like moving when before the camera his action will be optimum.

A deliberate rate of speaking is desirable and for television can be much slower than for radio. The speaking rate will be modified by such factors as complexity of ideas, educational maturity of the students, style of speaking and amount of visual material being demonstrated. Enunciation is also an important factor in effective television instruction because of certain limitations of audio systems. If the voice is dropped too low at times or if the instructor slight words, a student may fail to get an important idea. Speaking clearly is especially important when new and unfamiliar terms are being presented. It is recommended that audio tape recordings be made so that instructors can make objective evaluations of their own voices and strive for improvement.

Educational theory holds that close personal contact of instructor and student is desirable for more effective learning. Television can, in part, simulate this personal contact because of immediacy. And the highest degree of immediacy is achieved when the viewer feels that he is being
personally addressed. This requires the television instructor to "talk to the camera" thus establishing camera eye-contact comparable to the eye-contact of two persons talking with each other. In fact, every member of the television viewing groups will experience the eye-contact illusion. In an actual face-to-face situation a speaker can establish eye-contact with only one member of his audience at a time. It was recommended that all prospective television teachers be taught to recognize its importance.

Kanner, Runyon and Desiderato found that one of the first steps in preparing the armed forces instructor for television teaching was to have him go through his instructional material without cameras. During these preliminary presentations suggestions could be made as to speech rate, elimination of extraneous movement, or other pertinent factors.

In the second stage of instructor training, camera rehearsal, the instructor went through his teaching routine in front of the television cameras. His actions and presentation could be observed over a television receiver. In this rehearsal phase the instructor's presentation could be coordinated with available visual aids in respect to such factors.

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as movement and placement. Arm, hand, and other bodily movements could be corrected.

Television teaching, as in the case of classroom teaching, to be effective should be clear and direct. Extraneous or filler material should be avoided. It can be generally concluded that the informal and extemporaneous presentation of the lesson results in the best television instruction.

Possible Advantages of Instructional Television to Teachers

To date the experimental use of television as a method of teaching has indicated that there are numerous possible advantages to teachers utilizing television to teach their classes. Carpenter and Greenhill\(^7\) found that the productivity per hour of class instruction can be increased and that television is a means for saving time in teaching large basic multiple-section courses and as a consequence faculty members can employ their time to improve instruction, to teach upper level undergraduate and graduate students, to conduct research and to engage in scholarly activities related to personal-professional development.

It was reported that instructional television should make it practical for faculty members to have more assistance in teaching large classes and that television makes it possible to use the cooperative or team approach to instruction. Instructional television also provided a means for faculty members to earn greater rewards for teaching, both in terms of salaries and professional recognition.

Television can be used as one means of enriching and improving instruction. For example, demonstrations, films, photographic and graphic materials, interviews, panels, forums, distinguished lectures, and many other resources may feasibly be presented over television. Instructional television also provides a new means for teacher training for those who are interested and responsible as well as providing, for some instructors, needed and beneficial new challenges and new responsibilities. Television instruction should require the restructuring or reorganizing of courses and this, for many faculty members, is an advantage if time is provided for doing this. By using television an instructor can influence far more students than with conventional limited class instruction, but even so he may save time for intensive work with exceptional individual students.

Television offers the opportunity to consider new self-disciplines in teaching, less waste of words and more vivid illustrations. A release from other duties enables the
television teacher to concentrate on preparation of his course and therefore to give of himself as, for lack of opportunity, he never gave before. The classroom teacher, however, released by television from preparation of some lessons, will have time in which to prepare other courses better. Thus, a general rise in the quality of teaching, to say nothing of teacher morale is possible. And finally, the best teacher can profit from observation of a skilled fellow colleague. By teacher watching teacher on television, new ideas, fresh approaches, unanticipated twists to treatment of familiar subjects can be rapidly adopted and adapted.

**Summary**

It can generally be concluded that the good university or college teacher who knows his subject matter thoroughly, can be a good television teacher if he can adapt himself to the features peculiar to the television originating classroom. The teacher, through training and experience, will have to become familiar with this new instructional method before he can be classified as an effective television teacher.

Instructional television has many advantages to offer the college or university teacher. This new medium of instruction provides a challenge and affords the opportunity for greater rewards for teaching.
CHAPTER VII

ATTITUDES AND OPINIONS OF FACULTIES AND STUDENTS TOWARD INSTRUCTIONAL TELEVISION

The attitudes and opinions of faculty members and students are a very important factor in the progress of any educational innovation. Since the attitudes and opinions of faculty members and students who have participated in the experimental uses of television for the purpose of teaching may well be typical of the attitudes and opinions which college teachers and students throughout the country will hold in similar situations, such opinions and attitudes should be carefully examined.

Attitudes and Opinions of Television Teachers

The general attitude of faculties of institutions of higher education toward the use of television as a teaching medium is generally one of skepticism. As instructors begin to participate in instructional television and its advantages, shortcomings and place in education are defined through research and experience, their attitudes begin to change.

There have been a few studies of instructional television that have systematically considered faculty attitudes toward television as a teaching medium. These will be reported in order succinctly to describe the degree of
acceptance, on the part of college and university teachers, of instructional television. It is, of course, assumed that the attitudes reported are typical of those held in similar situations elsewhere.

The second report of the Miami University experimental study in instructional procedures stated that virtually all instructors who have tried television teaching liked it better than they thought they would. Although they would still prefer to teach conventional classes, there is considerable feeling that television classes are superior to other large group teaching procedures. The major defects inherent in television, as far as the instructors are concerned, are related to the physical barrier between student and teacher and the lengthy preparation time required for each television presentation. This latter objection can probably be overcome by making load adjustments.

Teaching on television does offer certain compensatory satisfactions which may be sufficient to provide "psychic income" for a number of instructors. There are some teachers, however, who probably could never be so compensated for transfer from the classroom to the studio.

Every instructor participating in the Miami

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1Miami University, Experimental Study in Instructional Procedures, Report Number 2, Oxford, Ohio: Miami University, October 1, 1957.
University study\(^2\) completed a questionnaire concerning the relative strengths and weaknesses of the experimental procedures from the teacher's point of view. The instructors uniformly felt that the teaching environment was satisfactory and there was a good working relationship with the television staff (directors, engineer and cameramen). It is important to note that the teacher regards television as an adjunct to effective teaching rather than as an end to itself.

Television was judged to be quite satisfactory for presentation of interviews, panels and demonstrations. This was regarded as a major advantage of television since it is possible to obtain participants for a single interview or panel discussion who would have been unavailable for numerous appearances before conventional classes. Also demonstrations which would have been too unwieldy for repetitive use in conventional classes were amenable to presentation over television.

All instructors reported that they felt quite relaxed and confident while making television presentations. Each, however, experienced an initial feeling of apprehension about being televised. Pacing (covering material at an appropriate rate of speed) was perceived as a problem by the instructors who were on television for the first time. The

\(^2\)Ibid.
television teachers who had prior experience felt they were doing a satisfactory job of pacing.

The Miami University report\(^3\) states that television and conventional instruction were adjudged about comparable with respect to the teacher's ability to animate and enliven his presentations, to make an impact upon student attitudes and appreciations in the subject-matter area and to cover the course completely. The instructors felt that the students learned the basic concepts presented in the course about equally well in television and conventional classes. It was in the realization of the less tangible course objectives that the instructors believed television to be inferior to conventional instruction. They believed that student–teacher rapport was diminished in television sections and they were better able really to influence student's overall growth and development in conventional classes.

Television presentations require much more of the instructor than do presentations in conventional classes. It takes time to organize materials, develop visual aids, prepare special demonstrations and to consult with the television staff.

\(^3\)Ibid.
The Los Angeles City School District's study summarized the attitudes of instructors toward television. After the teachers had taught television classes for four weeks they were surveyed and they reported that at the beginning they had approached their new assignments with mixed emotions: eagerness, misgivings, apprehension over failure. After one month they believed they had achieved considerable, but not complete, relaxation. All estimated that it required only about three weeks to accustom themselves reasonably well to the mechanics of television presentation. All the teachers admitted that they still experienced the difficulty of maintaining a normal, or "natural," attitude, and that they took their television classes "more seriously" than their others. In general they reported no appreciable difference in class attitude.

At the end of nineteen weeks a second questionnaire was distributed to these same television teachers. One of the most significant beliefs, expressed by all instructors, was that by virtue of becoming a television instructor he had become a better teacher. Mention was made of greater and more thorough coverage, necessity for a meticulously prepared lecture and heightened reaction to success of his work.

Pollock\(^5\) reports in his survey of New York University's use of closed-circuit television as a medium of instruction that faculty attitudes were obtained at the beginning of the school year and again at the end of the school year. Asked what, from their own experiences in seeing television programs, their opinion was about the possibility of acquiring new information by television presentation, fewer than half of the teachers responding had a favorable opinion of even the possibility of acquiring new information by television; and a majority of the teachers were uncertain whether their teaching would be up to par or their teaching by the method of television would be as good as usual.

At the end of the year the members of the English faculty who had participated in teaching the television course were asked to fill out questionnaires. Asked if in connection with their actual participation in the television lectures, any mechanics of the medium had been a source of anxiety or trouble, the majority responded "no" and the rest said they had not after they had become acquainted with the medium. Most of the teachers felt that historical and biographical materials were the types of material they considered best

suited for television presentation and they felt that they had found visual techniques to be the most practicable in television teaching.

The chairman of the Department of English, Professor Oscar Cargill, summed up the attitudes and opinions of the teachers involved in the New York University study, reporting that it was the combined judgement of the English staff that the experiment in teaching the course, Literature of England, through television had been a success, an indication that they, at that time at least, were satisfied with what they had accomplished in a course in English literature. It was discovered that about three times as much material could be presented in the fifty-minute period before the camera as could be presented in the usual class hour. It was generally concluded that students got a better course by television than they would have gotten in any other way.

As previously stated the attitudes and opinions of faculty members are a very important factor in the progress of any educational innovation and certainly the acceptance of television as a medium of teaching is no exception. Carpenter and Greenhill reported the following statements of reservation expressed by faculty members which was felt would help define the problems of faculty acceptance of television and indicate

6Ibid.
what needs to be done during the introductory and experimental phases of work with this medium if it is to be applied in college courses:

...it is impossible for students to ask questions; discussions cannot be effectively conducted with television-taught groups; television interposes "barriers" between instructors and students; it is difficult or impossible for an instructor to benefit from the subtle nuances of reactions and "feedback" from students; the instructor is removed from close contact with students, and this feeling of "psychological distance" is a severe handicap; factual information may be taught effectively over television, but the full influence of instruction and the teacher's personality cannot be projected over television; television is "automation" of education, it will lead to a "star system" for faculties; objective test scores of the results of teaching are inadequate; instructors must know their students personally, teaching over television prevents this firsthand knowledge; it is dangerous for college and university teachers to expose themselves and their teaching to public observation, the instructor's position on controversial issues may be misunderstood and it is very risky to permit administrators to observe how a teacher conducts his course; and teaching before television cameras would increase the "stress" on instructors who are already under too much "strain." 7

These viewpoints toward instruction are not merely hypothetical for many faculty members. They are real issues which must be further defined and resolved. Many are sincere

questions which should not be summarily dismissed; the questions should be answered definitively, some by appropriate administrative policies and clearly formulated operational procedures, others of the questions require more and pertinent information than is now available. The information which is available should be given fully to all faculty members of institutions in which instructional television is introduced.

Faculty skepticism is a significant factor influencing the adoption and widespread use of classroom television. There are many reasons why faculty members do not accept instructional television. First, in the plans for television teaching, provisions are made for students, but rarely for faculty, to come and participate, to sit and observe. A second reason is that the faculty had no part in the coming of television to the campus, and hence, no personal involvement. A third reason why some faculty members are skeptical is that television has been described by some of its ardent advocates as a way of saving money, and making the services of the best teachers available to more students. Those claims are easily misunderstood and twisted to mean getting more work out of the faculty for less money. And a fourth reason for this skepticism is that the job of television teaching has been made to sound more electronic than human.

Those persons in higher education responsible for the organization and administration of instructional television
will have to meet the problem of overcoming faculty skepticism. College and university faculties will need to be involved in all phases of planning and kept informed at all times if the full value of instructional television is to be realized.

Attitudes and Opinions of Television Students

Regardless of the fact that in general no significant differences were found in student achievement of information and skills when televised instruction was compared with conventional teaching methods, the element of student attitudes and opinions may be an important factor in the acceptance or rejection of instructional television. It must be granted that attitudes and opinions are difficult to measure and especially difficult to validate. However, several studies of instructional television have made serious attempts to sample student attitudes and opinions systematically as one means of collecting evidence on the acceptability of this method of instruction.

Beck, who investigated several instructional television installations in colleges and universities for the purpose of making some tentative evaluation of their effectiveness, concludes that instructional television will become a

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part of higher education and one of the principal reasons for this is student attitudes toward television instruction. He reports that when given a choice between large sections and small television sections with the same instructor, for half to three-fourths of the students will choose the television sections. Likewise, students will sign up with a renowned instructor on television in preference to a less well known instructor in the conventional classroom. When Beck surveyed students at six large universities utilizing instructional television they reported that the course organization on television is generally better, that there are fewer "odd-ball" professors on television, that the grading is fairer in television classes, and that the smaller television sections allow for more informality, freedom and independence in learning.

Carpenter and Greenhill\textsuperscript{9} reported that for those students who felt they were learning more by television than they would in a conventionally taught class, their reasons broke down into three principal categories. First they felt they could see or hear better. Persons responding in this category frequently would add that their name placed them in

\textsuperscript{9}C. R. Carpenter and L. P. Greenhill, \textit{An Investigation of Closed-Circuit Television for Teaching University Courses}, Project Number One, University Park, Pennsylvania: Pennsylvania State University, July 31, 1955.
the latter part of an alphabetical listing so that they usually were seated in the back of a room. Hence, for them, television brought the instructor close. Secondly, the students felt that there were fewer distractions. The television screen constitutes a center of attention free of the extraneous distractions common in a classroom. The third principal category was that the students thought that instructors prepared their material better and credited television for the improvement. Related comments had to do with making it possible for students to take courses from the best instructor. Additional advantages attributed by students to television included uniformity of instructors and grading and some students felt that the experience was new and different and therefore made the class more interesting.

Carpenter and Greenhill also found that the students who felt they were learning less from television had several reasons for this feeling. The first was the lack of interaction between instructors and students. When the students did not have the facilities to ask questions or discuss topics of interest they complained of this and felt that the professors were remote and they, the students, were "numbers" on a seating chart. The absence of distraction, which some students called a virtue, others claimed as a


10 Ibid.
negative factor in television instruction saying that the limited center of attention, the television screen, induced boredom. Many students felt that the television camera and what it projected was a limiting factor. Students in the receiving rooms complained that after the instructor started on a new topic and the cameras followed him, they could not take notes on previous material still on the blackboard.

Carpenter\textsuperscript{11} reported that some students react to television with the feeling that it is cold, impersonal and remote. However, there are others who react to it as being intimate, personal and close. Some students state that televised instruction is monotonous; others state that too much information is presented too fast. It might be that in these instances, the students are assigning qualities to television which rightly should be assigned to the instruction itself.

The progress report of the Miami University experimental study in instructional procedures\textsuperscript{12} states that in general, students say they will enroll in a conventional (small section) rather than a television section if given the

\textsuperscript{11}C. R. Carpenter, "A Perspective of Televised Instruction," Paper read at the Conference on Teaching by Television in Colleges and Universities, Pennsylvania State University, University Park, Pennsylvania, October, 1957.

\textsuperscript{12}Miami University, Experimental Study in Instructional Procedures, Progress Report, Oxford, Ohio: Miami University, October 1, 1956.
choice the semester following their exposure to television instruction. However, since "other things" are rarely equal students overwhelmingly indicated that they would enroll in a television section if it assured them of an instructor of known excellence. The greatest source of student dissatisfaction with television classes was a perceived diminution of student-instructor contact. However, television instructors receiving extremely favorable ratings from their students overcame the negative bias students have about television. In those courses, students reacted to television in terms of the perceptions of the instructor. The resultant television attitudes were either favorable or neutral. Conversely, instructors perceived to be of average effectiveness exerted no influence upon the prevailing negative attitudinal bias.

The second Miami University report, published a year later, found that student motivation and interest in the specific subject matter is not significantly diminished when the course is presented on television. It was also found that it is possible to teach a television course in such a way that students actually prefer it to conventional instruction. This requires a unique combination of instructor, course material and the full use of the potentialities of

13 Miami University, Experimental Study in Instructional Procedures, Report Number 2, Oxford, Ohio: Miami University, October 1, 1957.
television as an instructional medium. As a general rule, however, most students enrolled in television sections would prefer to be in a conventional (small) class.

The instructor is a major determinant of student attitudes about television instruction. There is a pronounced tendency for students who dislike their instructor to dislike television and vice versa. The majority say they would enroll in a television class (even though they prefer small classes) if it meant that they would be assured of being taught by an excellent instructor.

It is interesting to note, however, that student attitude does not affect achievement. Students who have reported a negative attitude toward instructional television do as well as students who do favor this method of teaching.

In the Los Angeles City School District's evaluation of television for teaching junior college courses, students involved in the experimental project were surveyed about one month after the start of instruction and a second time at the end of the semester. Reported in the initial evaluation survey were a large number of "undesirable" effects which appeared to be psychological rather than actual, especially

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considering the lack of difference in achievement. Disturbing to many was the lack of rapport, the absence of personal contact in the television classroom. A large percentage reported that they were dismayed by the formality which forbade questions-and-answers when they felt the need to ask. Many believed the information came too fast for them to digest. Approximately 26 per cent of the 228 students queried at that time stated that they felt disappointed with instructional television. Most of the remainder believed that there was little difference, while about 21 per cent considered television a definite improvement.

The end-of-the semester survey of the participating students revealed that in all receiving classes, percentages of various replies indicated that degree of student acceptance of instructional television increased during the interval. There was, however, considerable variation among classes, suggesting that attitudes toward accomplishment depends upon such factors as subject and instructor.

The survey at the end of the semester also found that practically all students considered the instructor's lecture by far the most valuable part of their instruction. They were rather evenly divided on the importance of tests, reports by fellow students, and films. Presentations by outside lecturers were least popular. On the average, classes were given a test every three or four weeks. In some cases
there were additional small quizzes which were not recorded. Test spacing satisfied 85 per cent of the students, with only 2 per cent desiring fewer tests.

One-half of the studio classes and 38 per cent of the receiving classes believed that, as far as active participation in class work was concerned, they could see little difference from a non-televised class. Only about 7 per cent of both groups complained that being on the receiving end only was interfering with their achievement in the course. Students of all receiving classes agreed that they did not know their instructor as well as they would have in a non-televised class.

The general reaction of junior college students toward televised instruction was summarized by saying that it was just about what one would expect. A small number are quite enthusiastic about it. The majority are able to adjust quite rapidly to the new technique. Some, while not objecting strenuously to being in a televised class, prefer what they have been used to. Others have not yet been able to make up their minds, or they accept the idea with reservations, while a few see more disadvantages than good points to it.

Pollock, in his report of the New York University

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study of instructional television, stated that the opinions of the students involved in the experiment were invited through an anonymous questionnaire at the beginning of the experiment and again during the final examination period at the end of the school year. Though the students tended from the outset to be critical of the television instruction in comparison with traditional methods of instruction, they were less so than their teachers. This may have been because they were from the outset more favorable disposed than the faculty members to the possibility of acquiring new information through televised instruction. At the end of the year there was a slight shift toward favoring this method of instruction. In general, the students were favorable toward the use of television as an educational device.

Today's college and university students have a heritage of small conventional classes. Consequently, other things being equal, students prefer small to large classes, whether conducted by a teacher in the conventional classroom or over television; and given a choice between learning by television in a small room and learning directly from an instructor in an auditorium, students are about evenly divided in their preference.

The degree of acceptance and the ability to learn from televised courses might be related to the maturity of the student. We might expect beginning students to be less
equipped to adjust to this type of instruction than the more mature student at the advanced or professional school level. Students may need to be taught how to learn from the highly visualized television presentations with which they are not as familiar as they are with conventional teaching methods.

Many students have come to prefer instruction by television in small groups to large conventional classes. Among the reasons given are: that they prefer the comfort of the small viewing rooms; that they feel a greater intimacy of communication on the part of the instructor, feel themselves more personally addressed; that they enjoy the greater absence of distraction; that the television camera directs their eye to what, at the moment, warrants their closest attention and that visual material is seen with greater clarity.

Many students still prefer face-to-face instruction. The reasons given are: that the blackboard is not steadily visible on the screen, which complicates note taking; but, far more important, they miss the opportunity to ask questions and interject comments.

There seems to be evidence of fatigue or disinterest developing as the term progresses in courses given, in in-broken sequence, over television. Students prefer two lectures followed by one full period of discussion, or some similar design that breaks the monotony of lecture courses
even when time is provided for questions at the end of the period.

As students become more exposed to instructional television they may come to accept this method of teaching in the realization that universities and colleges will not always be able to provide or afford small classes, especially at the introductory level where enrollments tend to be high and faculty, equipment and facilities are in short supply.

Studies of instructional television in higher education evidence that there are benefits to students in at least three primary areas: first, all students can have access by television to the best teachers available in the college or university, as part of their schooling experience; second, the stimulus of a new face and personality and of fresh approaches to subject matter through the medium of television enliven students' interest and enrich their learning and finally, on television "back-row" students enjoy clear vision with those up front. Large classes are the rule rather than the exception in most colleges today, and the advantages provided by instructional television are noteworthy.
CHAPTER VIII

PRACTICAL FACTORS IN INSTRUCTIONAL TELEVISION

Instructional television as a medium of teaching poses the problem of the use of electronic television equipment for the origination, distribution and reception of the televised lesson from the originating classroom to one or more receiving classrooms.

Television Origination and Distribution Equipment

Fundamentally, the television system used for instructional purposes consists of three basic parts: the origination facilities, the distribution system and the receiving facilities.

The origination facilities include one or more television cameras and their associated camera-control and switching equipment and one or more microphones and microphone-control equipment. The distribution system consists of one of the following systems for transmission of the television picture and sound: cable, connecting the receivers to the originating facilities; microwave, from the originating point to a receiving point where it is connected to the receivers by cable; or by a transmitter that broadcasts the television picture and sound to receivers within the range of the transmitter. The receiving facilities normally consist
of standard television receivers.

There are two basic types of television in use today. The first type utilizes the image orthicon pick-up tube and is used in most commercial television stations. Image orthicon television equipment is somewhat elaborate and requires well trained technical personnel in order to obtain optimum results. The vidicon tube, used in the second type of television, is considerably simpler in structure than the image orthicon tube and does not necessitate the additional elaborate equipment, or the highly trained technical personnel to operate it with optimum results.

The distinct difference between the two types of television is the cost. Vidicon equipment is only about one-third as expensive as image orthicon equipment. Operational installation and maintenance costs are also less for vidicon equipment. An image orthicon camera costs approximately five dollars per operating hour as compared to one dollar per operating hour for the vidicon camera. Vidicon equipment is less elaborate; consequently, maintenance and installation costs are lower.

The picture quality of the two systems is comparable in the classroom viewing situation with the vidicon equipment requiring less pre-operation "warm-up" time before it can be used. Another significant difference between the image orthicon and vidicon television equipment is size. The vidicon equipment
is very compact in comparison to the image orthicon equipment; all units are self-contained and well enough constructed to permit flexibility and portability.

Most of the armed forces' use of television for instruction has been done with image orthicon equipment. Some experimentation has also been done in colleges and universities with this type of equipment. However, most colleges and universities have adopted vidicon equipment for their instructional television operations. This selection was made because of the low cost, ease of operation, compact design, low maintenance requirements and good quality of vidicon equipment. The one disadvantage of vidicon equipment is that it has a higher light requirement for origination than image orthicon equipment. However, this has not been an unsurmountable problem to the institutions using vidicon equipment.

Greenhill's\textsuperscript{1} report on the suitability of vidicon television equipment for instructional television purposes is typical of the reaction and acceptance of this system by those using it. He reported that many studies of the adequacy and reliability of vidicon television equipment under varying degrees of complexity and for a variety of purposes were made

\textsuperscript{1}L. P. Greenhill, "Research on Televised Instruction at the Pennsylvania State University," Paper read at the Conference on Teaching By Television in Colleges and Universities, Pennsylvania State University, University Park, Pennsylvania, October, 1957.
at Pennsylvania State University over the past two or three years. These studies demonstrated to his satisfaction that suitable vidicon systems are adequate in picture quality and sufficiently reliable in operation for a wide variety of uses ranging from the presentations of complete courses to the simple magnification of demonstrations.

Experimentation on the problem of audio pick-up of the instructor has demonstrated, and the writer concurs, that the best method is to attach a small microphone to the tie of the instructor, allowing the microphone cable to be passed over the shoulder trailing from under the coat causing little inconvenience. Another satisfactory method is to suspend the microphone from the neck allowing the microphone to rest against the chest with the cable hanging in front of the instructor. This arrangement does not restrict the movement of the instructor and he is free to move about the room without altering the audio quality.

An overhead movable microphone on a boom is an advantage where such movement is required and a trailing cord becomes a handicap. The disadvantages of this method are that it requires one or two men for operation, might interfere with the camera, requires greater space in the originating room and increases the distraction for both the instructor and the students in the room.
A studio monitor (television set) is highly desirable in the originating classroom. The teaching of every lesson is partly a developmental situation and it is mandatory that the instructor be able to check his own presentation, movement by movement.

The writer has found that experienced television instructors rely upon the monitor much more than do the inexperienced. Once an instructor becomes thoroughly aware that what he sees in the monitor is what the students are seeing, he tends to create screen pictures and manipulate visual aids to create the most desirable effect.

Care should be taken to place the monitor in a position where it will be easily seen and the view not obstructed by the cameras. A position approximately four feet above the floor has been found satisfactory.

The use of one instead of two cameras for televising the lesson offers advantages and disadvantages. The advantages are that there is a minimum of equipment in the classroom. One camera calls for a minimum of operational personnel and affords the instructor the opportunity to dominate completely the studio situation by centering his activities on one camera.

The disadvantages of one camera are the distracting lens and focal changes, as well as the blackout periods, when the lenses are changed for the purpose of altering the picture for a different view. When only one camera is used
there would be a complete cessation of the lesson in case of a mechanical failure in the camera.

The use of two cameras has certain advantages. There are fewer distractions from lens changes and there is an avoidance of camera blackouts. With two cameras there is the opportunity for a greater variety of shots from a greater variety of angles to reduce monotony. Two cameras make it possible to use superimpositions and there is relatively little time lost in getting shots from one part of the classroom to the other. Two cameras allow for the continuation of the lesson in case of mechanical failure of one of the cameras.

The disadvantages of two cameras are the complexity of equipment and the need for a greater number of operating personnel. The instructor must be aware of which camera is taking the shot and there is the possibility of a television-dominated rather than an instructor-dominated presentation of the lesson. In spite of these disadvantages of cost factors, availability of operating personnel and space conditions there is more opportunity for an optimum presentation of the course if two cameras are used. One advantage alone, that of continuing with the second camera in case of mechanical failures, becomes extremely important when a lesson is televised to a large number of students at one time.
Television Receiving Equipment

Instructional television involves the origination of the televised lesson in the television classroom from whence it is distributed to one or more receiving classrooms. As previously mentioned receiving equipment in these rooms normally consists of standard television receivers.

In early experiments with instructional television there had been some tendency to use large screen projection systems for receiving equipment. The carry-over of familiarity with motion picture equipment and the desire to obtain the largest picture possible prompted this action. The projected picture on the large screen is seen by reflected light which generally necessitates the darkening of the classroom and allows a maximum viewing angle of only some sixty degrees.

The picture on the television receiver screen is seen by transmitted light that is generated within the picture tube itself which gives a greater brightness range and a quality of depth or dimension. The characteristic curvature of the picture-forming surface of the television picture tube, plus the fact that the picture is seen by transmitted light, allows a viewing angle of approximately eighty to ninety degrees.

Where standard television sets are used in the receiving classrooms the picture can be viewed in a room where
the light level is practically normal. This is an important consideration in warm weather when the windows need to be open for ventilation purposes. Light sources may need to be controlled and the television receivers so placed that light reflected on the screen is avoided. The receiving sets are normally located on the window side of the room at an angle of from 35° to 45° so they receive little ambient reflection.

Receivers should be mounted from at least four to six feet above floor level to insure maximum visibility. The tops of the stands on which the receivers are placed should be slanted downward at about ten degrees to lessen the possibility of light reflection from the ceiling light fixtures.

Experiences have shown that a twenty-one inch television set can accommodate between eighteen and twenty-two students and that a twenty-four inch set can accommodate from twenty to twenty-four students.

Commery\(^2\) has proposed a formula that has been generally adopted for determining how far from the screen a viewer should sit. The maximum viewing distance should not exceed ten times the tube size in inches plus two feet. Thus, for a twenty-four inch set the maximum distance would be twenty-two feet.

There has not been a universal adoption of a formula for the closest distance for television viewing. Some of those who have studied this problem would place the closest point for class viewing at about three and three-fourths the width of the actual area on the face of the picture tube. There is another school of thought that states the distance should be at least five times the width of the tube. Here again, the rule can only be approximated.

The audio portion of the televised lesson generally is transmitted by the speakers in the television sets in the receiving classroom. Occasionally the audio system must be modified by adding or substituting speakers so that the audio portion of the lesson will be as close to optimum quality as possible.

Carpenter and Greenhill found that when two twenty-four inch television sets were placed in a classroom, where there would be forty to forty-five students, the speakers in the television set provided a sound level satisfactory for the class. When one television set was placed in the classroom which held thirty students an eight inch speaker had to be installed in a small baffle box mounted underneath the receiver and directed straightforward toward the class.

\footnote{Carpenter and Greenhill, loc. cit.}
Television Receiving Class Size

Compared with "large class" techniques, the television method of instruction has the advantage of handling a large number of students where suitable lecture facilities are lacking or when the number of students is too large to be accommodated in a single lecture hall or effectively taught by a single instructor. The demand for large lecture halls often exceeds the supply and universities are generally reluctant to increase the supply because of the inflexibility of such rooms. Therefore, when student numbers are high, the television method might be used in preference to the large class method, because it can expand almost indefinitely requiring only a sufficient number of small, flexible, conventional classrooms and corresponding minimal increases in the number of teaching assistants.

A problem relating to the adaptation of television to existing classroom facilities is that of the optimum size of the viewing group. It has been previously pointed out that there should not be more than twenty to twenty-four viewers per television set in the receiving classroom. However, more experimentation is needed in the comparison of student achievement in relation to the size of the groups in the television receiving rooms. Greenhill\(^6\) reported that in the course of

\(^6\)Greenhill, loc. cit.
the investigation of instructional television at Pennsylvania State University this problem is being studied. In a comparison of class sizes ranging from fifteen to two hundred no differences in achievement relating to class size were found. However, in a later study conducted on student preferences it was found that students prefer the smaller receiving rooms seating from twenty-five to fifty rather than a room with six or more receivers accommodating a group of two hundred.

Personnel

In addition to the instructional personnel needed to teach the course and the assistants required in the receiving classrooms, personnel are needed to perform the following functions: engineering installation and maintenance; operation of cameras; operation of camera controls and directing of cameras. Personnel are needed for the general coordination of television facilities with the instructor's needs.

The services of audio-visual aids department personnel for the preparation of visual aids is necessary if optimum utilization of the television medium is to be achieved. The instructor does not have the time, and possibly the talent, to prepare all the visual aids used in the presentation of the lesson. Personnel should be available to execute the visual aids requested by the instructional staff.
The number of personnel required for instructional television varies considerably from one teaching situation to another. In general, the number and type of personnel required are based on the needs of the teaching situation in terms of the amount and type of equipment and the number of hours per week of presentations.

Engineering personnel requirements vary with either the amount of equipment, or the complexity of equipment. Image orthicon equipment requires a larger number and more highly trained engineers than does vidicon equipment. One trained engineer can maintain and supervise the operation of vidicon equipment. The extent of television teaching will obviously influence the number of all types of personnel.

Miami University\(^7\) reported that in addition to the instructional personnel, telecasting personnel consisted of a half-time engineer, two members of the speech department for something over half-time for supervising and directing, and approximately seven radio-television students. These students served as cameramen, control operators and floor directors, working partly for laboratory credit, and, after several weeks of experience, for pay. Miami University's vidicon equipment consisted of three camera chains, a film and slide chain and the control equipment.

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\(^7\)Miami University, Experimental Study in Instruction, Report Number 2, Oxford, Ohio: Miami University, October, 1957.
Little information regarding the installation, operational and maintenance costs of instructional television systems have been reported. The initial cost of equipment however, is readily available; the average cost of a vidicon television system for one originating classroom and twenty receiving classrooms is approximately $30,000. This includes two vidicon camera chains, one vidicon film chain, allied control and switching equipment, audio equipment and receivers for the twenty classrooms. A similar image orthicon system would cost approximately $90,000.

Miami University\textsuperscript{8} reported the total cost for their instructional television equipment, including a three vidicon camera chain, a film and slide chain, fourteen twenty-one and twenty-four inch commercial receiving sets, and all control equipment was listed at $34,552.25.

It is difficult to report accurately a meaningful figure for student credit hour costs because these costs are subject to so many variables. A senior professor may receive double the pay of a new instructor for teaching a section of thirty students in a given course. A laboratory conducted by an associate professor is much more expensive than one conducted by a graduate assistant. A television course for

\footnote{Miami University, \textit{loc. cit.}}
250 students utilizing $150,000 worth of equipment and a professional studio crew may be prohibitive in cost, while the same course taught with $30,000 in equipment and a student crew with semi-professional direction may be economically sound.

Miami University, with respect to factors mentioned above, reported the cost per student credit hour for televised courses was approximately $12.90. Course enrollment ranged from 139 to 206 with an average of 180. The cost for the control sections of the experiment (conventionally taught classes) averaging thirty-eight students each approximated $7.50.

Carpenter and Greenhill compared the net cost of instruction for one particular course taught conventionally for one semester and then by television the next semester. In the Fall Semester of 1954, 995 students were taught the General Psychology course using the system of multiple-sections taught by faculty members and graduate assistants. The class average was about forty-two students. There were four professor-taught sections, eight associate professor-taught sections, three assistant professor-taught sections and seven graduate assistant-taught sections. With net

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9 Ibid.
10 Carpenter and Greenhill, loc. cit.
salary costs used as a basis it was found that the cost per student credit unit was $4.65.

Instructional television was used to teach 240 students during the Spring Semester of 1955. Omitting the control groups, there were three professor-taught sections (one in the originating room and two in receiving rooms), and three associate professor-taught sections. The class size averaged forty students. The four receiving rooms were considered to have been serviced by two graduate assistants. Under this arrangement the net instructional cost per student was $3.36. No cost of the television system or its operation was included.

Greenhill \(^\text{11}\) reports the figures that are of the most value in considering the cost of instructional television. He stated that the cutting point in costs between televised instruction and direct instruction in classes of forty-five comes at about 200 students. Below this figure, televised instruction is more expensive than regular instruction, whereas above this figure televised instruction makes it possible to teach larger and larger numbers of students with relatively small increases in cost, and at the same time offer experienced instructors to all students in the course.

\(^{11}\) Greenhill, loc. cit.
Summary

Vidicon television equipment, used for instructional television, has been developed to the point that it is practical and reliable. It is relatively low in cost to purchase and to operate. The equipment is small and can be installed and operated without great difficulty. Studies of the suitability of vidicon equipment for instructional television purposes demonstrated that this system provided an adequate picture quality and was sufficiently reliable in operation for a wide variety of educational uses.

Experience and experimentation has demonstrated that standard television sets can be used in the classrooms for the purpose of receiving the televised lessons. Viewing can be done in rooms where the light level is practically normal. For every twenty to twenty-four students there should be a television set in the receiving room, depending on the size of the set.

Instructional television is not an inexpensive, or low cost method of extending educational opportunities. However, when it is used to teach large classes, television instruction does make it possible to teach more and more students with relatively small increases in cost, and at the same time offer experienced instructors to all students in the course.
CONCLUSIONS AND RECOMMENDATIONS

The problem in this dissertation was to consider the role of television as a method of instruction in colleges and universities in relation to the present philosophy of higher education; to consider the principles of learning relevant to instructional television; and to evaluate instructional television research in terms of some of the educational objectives of higher education to find out what we now know, and even more important, what we do not know about television as a medium of teaching.

The dissertation pointed out that, sooner or later, practical solutions must be found to the mounting problems in higher education of increased enrollment, the shortage of trained instructional personnel and the scarcity of facilities and equipment. It was inevitable that the use of television would be considered in connection with meeting these problems. Hence, this study has examined instructional television critically to determine its actual usefulness and limitations in meeting the problems posed by the pending crisis in higher education.

First of all, higher education was scrutinized in terms of its prevailing philosophies which emphasize both the goal of a liberalizing education and the necessity
of specialized education to provide for the learning of a vocation. The claims for the use of television were seen in relation to this background of basic purposes. Instructional television was seen as a means of conveying a part of the total learning process. Hence, the principles of learning were carefully examined for their implication. The heart of this study consisted of an evaluation of instructional television in terms of the generally recognized educational objectives of higher education. This was followed by a consideration of the role of the teacher in instructional television and the attitudes and opinions of faculties and students who have been involved in instructional television activities. Finally, some of the practical factors in instructional television in higher education were discussed.

The findings of this study grew out of an examination of the literature of higher education, psychology of learning and educational television. Experimental research studies of instructional television in higher education and the armed services were analyzed for the purpose of evaluation in terms of the potential utilization of television as a medium of teaching in colleges and universities. Some discussions were held with university administrators, university and college teachers and educational television broadcasters to ascertain their attitudes, opinions and ideas about certain specific subjects. Throughout the dissertation
the author called for guidance on his own experience as a university instructor and as a practicing educational broadcaster over a period of several years to the present time.

From this method of approach were drawn the findings, general conclusion and recommendations of this study.

Findings of the Study

First the specific findings are reported. Finally the main general conclusion is stated.

1. In examining the literature it was found that the demands on higher education are increasing at a time when staff and facilities are at a low ebb. In almost every area of higher education there is the need for expansion to meet the multiplying educational needs and demands of American society. This situation presents numerous critical problems which is termed a crisis in higher education.

2. With higher education's commitment to universal education in our democratic society, the commitment to equal educational opportunities for all, the use of television as an educational medium could follow up the advantage we have had from the printed book, the audio visual aids, the educational film and radio by making available as teachers our wisest, most thoughtful, and most effective people in every field of knowledge. The use of instructional television in institutions of higher education utilized intelligently in
relation to the other ingredients of educational processes that are necessary for the development of human intelligence may be one of the means for mustering our educational resources to accomplish what seems otherwise a hopeless task.

3. The appraisal of television is justified in that higher education depends so heavily on communication—oral and printed—that it cannot afford to refuse to examine any new means for meeting educational needs.

4. In considering television as a medium for instruction, it is important to recognize that television, like other materials and media of instruction, has certain unique values and limitations. Its uses in education must capitalize on values and take account of limitations. Television, like books, films, radio, maps, models, and recordings is a tool of instruction.

5. There has been considerable use of television for instructional purposes in colleges and universities. However, the use of instructional television in higher education has not been systematic. If television is to succeed as a medium of instruction in higher education, a methodology for its effective use must be developed.

6. What institutions of higher education will do with instructional television will depend upon its own nature and character, the seriousness of the problems that the college or university faces and the ability of the institution—
financially and personnel-wise—to utilize this new educational medium. What develops will depend, too, upon size and whether the institution is highly specialized or is a general institution with many multi-section courses.

7. The consideration of the potential contributions of instructional television to education should be made in relation to the complex process of teaching and learning.

8. Televised instruction may become a valuable teaching tool in higher education dependent upon its pertinence to learning needs and upon application. The nature of learning through television is essentially the same as learning through any other medium. This implies that television must be adapted to the learner rather than modify the nature of learning to fit the characteristics of the medium.

9. Television has tremendous potential in bringing to the classroom a variety of cultural and aesthetic resources not otherwise available in many instances. These experiences may motivate learning, stimulate creative activity, provide a common background of information, and promote problem-solving and critical thinking as parts of the enriching process. These experiences may also contribute to the building of desirable attitudes not only toward learning itself, but also toward the realization of personal and social goals.

10. The focus of interest today for educators is that of determining, experimentally, the extent to which
direct teaching by television of courses in higher education, where the primary goal is the acquisition of knowledge or skills, can be used effectively to perform teaching functions traditionally performed by individual teachers working directly with small class groups under conventional classroom recitation-discussion conditions.

11. The case for instructional television in institutions of higher education is directly related to the significant improvement in learning opportunities which it can bring to education.

12. The instructional television research that has been done to date has been largely at the basic level of subject matter information. It is natural that the majority of the research in colleges and universities has dealt with the attempt to determine the achievement, or the extent of learning and retention of information presented by televised instruction because it is probable that the most common measurable educational objective in higher education is the acquisition of knowledge.

13. Armed services experimental studies of instructional television demonstrate that manipulative and motor skills can be taught as effectively by televised instruction as by conventional instruction methods.

14. It can be concluded that television, because of its visual aid characteristics, can effectively teach
psychomotor skills, where these skills constitute all or part of college and university courses.

15. In light of the information available from the few studies of the retention of knowledge and skill learned through instructional television it was tentatively concluded that television instruction was remembered as well as conventional classroom instruction.

16. The importance of good intercommunication is most vital for the purpose of assuring participation in all the phases of the teaching-learning process.

17. The relative newness of the television medium has led some to conclude that the superiority evidenced by television might be attributed to the greater motivation of the student receiving the instruction and not to the values of the television presentation itself. Until such a time as instructional television is readily accepted and as familiar a teaching medium as the educational use of radio and motion pictures, this novelty effect will continue to be a serious problem. Meanwhile, investigators must keep the "novelty factor" in mind as a caution in interpreting results of their experimentations.

18. Except for features peculiar to the television originating classroom, teaching through television is similar to teaching by conventional classroom methods
for the general principles of good teaching still apply to instructional television.

19. The instructor who does a good job of teaching in the classroom and is "compatible" to television can quickly accustom himself to the extra details involved in television teaching.

20. The outstanding teacher often does an even more effective job of teaching in the instructional television situation. He tends to time his lessons more precisely, choose his vocabulary more carefully, eliminate extraneous material and attempt to enrich the lessons with more details and subject matter.

21. Television teaching, as in the case of classroom teaching, to be effective should be clear and direct. Extraneous or filler material should be avoided. It was generally concluded that the informal and extemporaneous presentation of the lesson results in the best television instruction.

22. Instructional television has many advantages to offer the college or university teacher. This new medium of instruction provides a challenge and affords the opportunity for greater rewards for teaching.

23. The general attitude of faculties of institutions of higher education toward the use of television as a teaching medium is generally one of skepticism. As
instructors begin to participate in instructional television and its advantages, shortcomings and place in education is defined through research and experience, their attitudes begin to change to one of acceptance.

24. Those persons in higher education responsible for the organization and administration of instructional television will have to meet the problem of overcoming faculty skepticism. College and university faculties will need to be involved in all phases of planning and kept informed at all times if the full value of instructional television is to be realized.

25. Students prefer conventionally taught small classes rather than television taught small classes. However, students will enroll in television classes in preference to conventional classes if it assures them of an instructor of known excellence. Given a choice between learning by television in a small classroom and learning directly from an instructor in a large classroom, students are about evenly divided in their preference.

26. Student attitude does not affect achievement. Students who have reported a negative attitude toward instructional television do as well as students who do favor this method of teaching.

27. Instructional television affords benefits to college and university students in at least three primary
areas: first, all students can have access by television to the best teachers available in the institution of higher education, as part of the schooling experience; second, the stimulus of a new face and personality and of fresh approaches to subject matter through the medium of television enliven students' interest and enrich their learning; and finally, on television "back-row" students enjoy clear vision with those up front.

28. Studies of the adequacy and reliability of vidicon television equipment under varying degrees of complexity and for a variety of purposes demonstrate that this type of equipment is adequate in picture quality and sufficiently reliable in operation for a wide variety of uses from the presentation of complete courses to the televising of demonstration for the purpose of magnification.

29. Standard television sets can be used in the classroom for the purpose of receiving the televised lesson. Eighteen to twenty-two students can be accommodated by a twenty-one inch television set and between twenty to twenty-four students can be accommodated by a twenty-four inch television set.

30. The cutting point in costs between televised instruction and direct instruction in classes of forty-five comes at 200 students. Below this figure, televised instruction is more expensive than regular instruction, whereas
above this figure televised instruction makes it possible to teach larger and larger numbers of students with relatively small increases in cost, and at the same time offers experienced instructors to all students in the course.

The findings of this study indicate that television is an effective teaching medium for the presentation of knowledge (organized information) and manipulative or motor skills. Therefore, it was concluded that televised instruction is as an effective a method as conventional instruction for teaching courses for which the primary goal is acquisition of knowledge and courses that consist of, totally or in part, the learning of manipulative or motor skills. In light of this conclusion instructional television, systematically used, has an integral place in higher education as a teaching medium. However, beyond this point generalizations concerning the effectiveness of television as a method of teaching in higher education cannot be made because of the lack of evidence.

Recommendations

In many instances it has been generally concluded that instructional television is as an effective a medium of teaching as conventional methods for instructing college and university courses. This is not the case, too much has been assumed. Research efforts, to date, have demonstrated that a few objectives of the teaching-learning process can be
accomplished with television; however, we do not know about the ability of this medium to handle the rest of these objectives. Before any broad conclusions can be made there are many phases of instructional television that must be explored more extensively.

Listed below are recommendations of additional research that must be done if we are to know everything necessary to insure the most advantageous use of television as a medium of teaching in higher education.

1. All but one of the research studies reported in this dissertation have considered only the effectiveness of instructional television as a medium of teaching knowledge, manipulative or motor skills. The second Miami University study\(^1\) made the first step in evaluating the potentiality of instructional television for presentation of such educational objectives as comprehension, application, analysis, synthesis and evaluation that develop intellectual abilities and skills. If instructional television is to be fully utilized in higher education this kind of research must be accomplished.

2. No research has been reported at the present time that has been concerned with the educational objectives of higher education included in the affective domain; appreciation,

\(^{1}\)Miami University, *Experimental Study in Instructional Procedures*, Report Number 2, Oxford, Ohio: Miami University, October 1, 1957.
values, interests and judgement. Teachers generally do not state these objectives very precisely and covert feelings and emotions are as significant to this domain as are the overt behavioral manifestations, therefore increasing the difficulty of measurement. However, a comprehensive examination of this domain should be undertaken in relation to television teaching and learning.

3. The study of retention of knowledge and skills learned through instruction has just begun. However, before any firm conclusion can be reached there is the need for considerable investigation of long term retention of the educational objective taught in college and university courses.

4. Feedback between the instructor and his student is a vital and necessary part of the educational process for determining student response and reception of the lesson. This area needs additional investigation to insure the optimum results in learning from instructional television.

5. Opportunities must be available to the student to engage in all of the phases, beyond motivation and presentation, of the teaching-learning process. Methods, dependent on intercommunication between the teacher and his students, must be a part of the total process of instructional television to involve the students in the other phases of the teaching-learning process—clarification and practice; testing for adequacy and proficiency; and the application and use of information, skills and techniques. There is a vital need to establish intercommunication methods as a part of television
teaching to insure these phases of the teaching-learning process. This is an area that demands considerable experimental attention.

6. The problem of the novelty effect of television on the motivation of the student to learn has not been clearly defined. There have been indications that as the student becomes more familiar with televised instruction he tends to become disenchanted with this medium of teaching. This too, is an area that needs further investigation.

7. Student acceptance and attitudes toward televised teaching suggests that students might have to be trained how to learn by instructional television. Further research in this area is necessary to determine if such a need exists, and if so, how it can be met.

When comparing television teaching with conventional classroom teaching it should be recognized that a method of teaching that has traditions, adherents, experience and resources is being contrasted with a new method of teaching. There is the necessity for extensive research to guide the development of instructional television in higher education. Above all, instructional television requires a creative thinking and persistent effort to implement findings of past research and to develop areas of further research.
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APPENDIXES
APPENDIX A

INSTITUTIONS OF HIGHER EDUCATION USING
CLOSED-CIRCUIT TELEVISION

ALABAMA

Alabama Polytechnic Institute, Auburn
University of Alabama, University

ARIZONA

Arizona State College, Tempe
University of Arizona, Tucson

ARKANSAS

University of Arkansas, Fayetteville

CALIFORNIA

College of Physicians and Surgeons, San Francisco
Los Angeles City College, Los Angeles
Sacramento State College, Sacramento
San Diego State College, San Diego
San Francisco State College, San Francisco
San Jose State College, San Jose
Stanford Research Institute, Stanford
University of California, Berkeley
University of California, Santa Barbara
University of Southern California, Los Angeles

COLORADO
University of Denver Research Institute, Denver

CONNECTICUT
Yale University, New Haven

DISTRICT OF COLUMBIA
Georgetown University, Institute of Languages and Linguistics, Washington

FLORIDA
University of Florida, Gainesville
University of Miami, Coral Gables

GEORGIA
University of Georgia, Athens

IDAHO
Idaho State College, Pocatello

ILLINOIS
Chicago Teachers College, Chicago
Columbia College, Chicago
Illinois Institute of Technology, Chicago
Loyola University, Chicago
Northwestern University, Department of Radio & Television, School of Speech, Evanston
Northwestern University, Medill School of Journalism, Evanston
University of Chicago, Chicago
University of Illinois, Urbana
University of Illinois, Colleges of Dentistry and Medicine, Chicago
Western Illinois State College, Macomb

INDIANA
Indiana State Teachers College, Terre Haute
Indiana University, Bloomington
Purdue University, Lafayette
University of Notre Dame, Notre Dame

IOWA
Drake University, Des Moines
Iowa State College, Ames
State University of Iowa, Iowa City

KANSAS
Kansas State College, Manhattan
Kansas State Teachers College, Emporia
Kansas State Teachers College, Pittsburg
University of Kansas, Medical Center, Kansas City

LOUISIANA

Louisiana State University, Baton Rouge
Louisiana State University, School of Medicine, New Orleans
Southwestern Louisiana Institute, Lafayette

MARYLAND

John Hopkins University, Baltimore
U. S. Naval Academy, Department of Electrical Engineering, Annapolis

MASSACHUSETTS

Berke-Lee School of Music, Boston
Boston University, Boston
Emerson College, Boston

MICHIGAN

Michigan State University, East Lansing
University of Detroit, Detroit
University of Detroit, School of Dentistry, Detroit
University of Michigan, Ann Arbor
University of Michigan, Willow Run Laboratory, Willow Run

MINNESOTA

University of Minnesota, Minneapolis
MISSISSIPPI
Mississippi Southern College, Hattiesburg

MISSOURI
Stephens College, Columbia
University of Kansas City, School of Dentistry, Kansas City
University of Missouri, Columbia
Washington University, St. Louis

MONTANA
Montana State University, Missoula

NEBRASKA
University of Nebraska College of Medicine, Omaha

NEW JERSEY
Rutgers University, New Brunswick
State Teachers College, Upper Montclair

NEW MEXICO
New Mexico College of Agriculture and Mechanic Arts, State College

NEW YORK
Albany Medical College of Union University, Albany
College for Teachers, State University, Albany
Cornell University, Ithaca
Fordham University, New York City
New York University, New York City
New York University College of Dentistry, New York City
Skidmore College, Saratoga Springs
Syracuse University, Syracuse
Teachers College, State University, Brockport
Union College, Schenectady
University of Rochester, Rochester

NORTH CAROLINA

Consolidated University of North Carolina, Chapel Hill,
  Raleigh, Greensboro

NORTH DAKOTA

University of North Dakota, Grand Forks

OHIO

Case Institute of Technology, Cleveland
College Conservatory of Music, Cincinnati
Miami University, Oxford
Ohio State University, Columbus
Ohio University, Athens
University of Toledo, Toledo
OKLAHOMA
University of Oklahoma, Norman

OREGON
Oregon State College, Corvallis
Oregon Technical Institute, Oretech
University of Oregon, Eugene

PENNSYLVANIA
Carnegie Institute of Technology, Pittsburgh
Duquesne University, Pittsburgh
Hospital of the University of Pennsylvania, Philadelphia
Mellon Institute, Pittsburgh
Pennsylvania State University, University Park
Temple University, Philadelphia
Temple University School of Medicine, Philadelphia
University of Pittsburgh Dental School, Pittsburgh

SOUTH CAROLINA
Medical College of South Carolina, Charleston
South Carolina Area Trade Schools, West Columbia

SOUTH DAKOTA
University of South Dakota, Vermillion
TENNESSEE

Fisk University, Nashville

University of Tennessee, Knoxville

TEXAS

Texas Technological College, Lubbock

Texas Western College, El Paso

University of Houston, Houston

University of Texas, Austin

University of Texas, Dental Branch, Houston

West Texas State Teachers College, Canyon

UTAH

Brigham Young University, Provo

VIRGINIA

Medical College of Virginia, Richmond

Union Theological Seminary, Richmond

WASHINGTON

State College of Washington, Pullman

WISCONSIN

Milwaukee Vocational & Adult Schools, Milwaukee

University of Wisconsin, Madison
APPENDIX B

A PARTIAL LIST OF COURSES THAT HAVE BEEN TAUGHT,
COMPLETELY OR IN PART, BY INSTRUCTIONAL
TELEVISION IN INSTITUTIONS OF HIGHER EDUCATION

Listed below are subject areas that have been taught,
completely or in part, by instructional television. Where
ever possible courses by specific titles have been included:

AGRICULTURE
ARCHITECTURE
ART

Art Appreciation
Art for Elementary Teachers
Ceramics
Crafts
Creative Crafts
Design
Drawing as Communication
French Art
General Art

BACTERIOLOGY

General Bacteriology
Microbiology

BIOLOGY

General Biology
Heredity and Evolution
Physical Antropology

BUSINESS

Advertising
Business Management and Policies
Personnel Management
Purchasing
Typewriting
CHEMISTRY

General Chemistry

CONSERVATION

Forest Conservation
Wildlife Conservation

DENTISTRY

ECONOMICS

Introductory Economics

EDUCATION

Audio Visual Education
Education of the Retarded and Gifted Children
Remedial Reading
Science Education
Teacher Education
Teaching the Pre-school Child

ENGINEERING

Electrical Engineering
Engineering Drawing
Industrial Engineering
Marine Engineering

ENGLISH AND LITERATURE

Comparative Literature
English Composition
English Grammar
English Literature
European Literature
French Literature
General Literature
Introduction to American Literature
Library Techniques
Poetry
Shakespeare
Short Story Writing
Twentieth Century Literature
ENTOMOLOGY

Entomological Techniques
General Entomology
Insects and Human Welfare
Insect Taxonomy
Structure and Function of Insects

GEOGRAPHY

Geography

HEALTH AND HYGIENE

Community Health
Public Health
Personal Adjustment in Family Living
The Human Body

HISTORY

American History
Modern and Contemporary Far East

HOME ECONOMICS

Child Growth and Development
Homemaking

HORTICULTURE

INDUSTRIAL ARTS

General Mechanics
Vocational Crafts

JOURNALISM

Advanced Reporting
Journalism Advertising
Mass Communications
News Events
Newspaper Advertising
Photography
Press and Public
Problems in National Advertising
Radio and Television News
Secondary School Journalism
The Press and World Affairs
LANGUAGES

Conversational Spanish
Elementary French
German
Introduction to Study of Languages

MATHEMATICS

Analytic Geometry
Analytic Geometry and Calculus
Basic Mathematics for General Education
Calculus
Fundamentals of Arithmetic
Intermediate Algebra
Mathematics for Nurses
Mathematics in General Education
Remedial Arithmetic
Slide Rule
Trigonometry

MEDICINE

Anatomy
Endodontics
Operative Dentistry
Pharmacology
Prosthetics
Radiology
Surgery

MUSIC

Music
Music Appreciation

NATURAL SCIENCE

Philosophy of Science
Science and the Citizen

PHILOSOPHY

General Philosophy
History of Philosophy
Man and Religion
Modern Philosophy
Philosophy of Education
PHYSICAL EDUCATION

Dance As Communication
Physical Education

PHYSICAL SCIENCE

PHYSICS

PHYSIOLOGY

POLICE SCIENCE

American Government
Beginning Investigation
Crime Prevention
Criminal Identification
Elementary Criminal Law and Law of Arrest
General Administration of Criminal Justice
Gunnery
Orientation to Police and Penology
Police Record Systems
Traffic

POLITICAL SCIENCE

American Diplomacy
American Government
Democracy in Action
Government and Politics of Latin America
Introduction to Political Science
Political Parties

PSYCHOLOGY

Child Psychology
General Psychology
Guidance
Human Behavior
Mental Hygiene
Psychology of Adolescence
Psychology of Marriage

ROTC

Air Science
Food Service
SOCIAL SCIENCE

Citizenship
Effective Living
General Social Science
Humanities
Ideas and Living Today
Social Problems

SOCIOMETRY AND ANTHROPOLOGY

Anthropology
Archaeology
Introductive Sociology
The Primitive Earth

SPEECH AND DRAMA

Communication Skills
Creative Drama
Drama Appreciation
Dramatic Arts
Group Discussion
Lip Reading
Oral Interpretation
Parliamentary Procedure
Problems of the Deaf
Public Speaking
Speech Therapy
Television Programming and Production

ZOOLOGY

General Zoology
Reptiles and Amphibians
APPENDIX C

ELECTRONIC COMPANIES ENGAGED IN CLOSED-CIRCUIT
TELEVISION SYSTEM ENGINEERING OR IN
THE MANUFACTURE OF CLOSED-CIRCUIT
TELEVISION COMPONENTS

(As of March 31, 1958)

Bendix Aviation Corporation
Fries Instrument Division
1400 Taylor Avenue
Towson, Maryland

Cohu Electronics, Inc.
Kin—Tel Division
5725 Kearney Villa Road
Box 623
San Diego 12, California

Allen B. DuMont Laboratories, Inc.
Communications Products Division
750 Bloomfield Avenue
Clifton, New Jersey

General Electric Company, Inc.
Technical Products Department
Industrial Electronics Division
Electronics Park
Syracuse, New York

Insul—8—Corporation
Electronics Division
1369 Industrial Road
San Carlos, California

Philco Corporation
4700 Wischickon Avenue
Philadelphia 44, Pennsylvania

Pye Corporation of America
Highland Park, New Jersey

199
Radio Corporation of America
Broadcast & Television Equipment Department
Front & Cooper Streets
Camdon, New Jersey

Telecom Systems, Inc.
501 Madison Avenue
New York 22, New York

Thompson Products, Inc.
Department of Education
Dage Television Division
Michigan City, Indiana

Blonder–Tongue Laboratories, Inc.
526 North Avenue
Westfield, New Jersey

Davies Laboratories
10721 Hanna Street
Beltsville, Maryland

Diamond Power Specialty Corporation
Lancaster, Ohio

Farnsworth Electronics Corporation
3700 E. Pontiac Street
Fort Wayne, Indiana

General Precision Laboratories, Inc.
63 Bedford Road
Pleasantville, New York

Hallamore Electronics Company
8352 Brookhurst Avenue
Anaheim, California

Intercontinental Electronics Corporation
Mineola, New York

Jerrold Electronics Corporation
23d & Chestnut Streets
Philadelphia 3, Pennsylvania

Raytheon Manufacturing Company
Waltham, Massachusetts

Sarkes Tarzian, Inc.
Broadcast Equipment Division
Bloomington, Indiana
Taller & Cooper, Inc.
Brooklyn, New York

Telechrome, Inc.
88 Marrick Road
Amityville, New York

Westinghouse Electric Corporation
Television-Radio Division
Metuchen, New Jersey
I, Harold Niven, Jr., was born in Rocky Ford, Colorado, July 2, 1923. I received my secondary school education in the Delta, Colorado, public schools and my undergraduate training at the University of Denver where I received the Bachelor of Arts degree in 1948. While at the University of Denver I served for a year as an undergraduate assistant. I was a part time teacher of speech and drama at St. Joseph High School, Denver, Colorado, in 1947–1948. I received the Master of Arts degree from Stanford University in 1949. While in residence there I was a graduate assistant in the Department of Speech and Drama and a Rockefeller Junior Artist In Residence Fellow. In 1949 I went to Michigan State University as an Instructor in the Department of Speech, Dramatics and Radio Education. While there I helped develop the educational television station WKAR-TV. I also served as a producer-director for the television station for a period of three years. In 1954 I came to The Ohio State University for the purpose of graduate study. I was a graduate assistant in the Department of Speech, Radio-Television area and in 1956 I assumed my present position as a member of the faculty of the Department of Speech at The Ohio State University.