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ABSTRACT

Seven papers concerning use of media in educating handicapped children are presented. Given the learning problems of handicapped children, Philip H. Mann urges teachers to explore a wide variety of media as an aid to education. The proliferation of media and materials need not provide an insurmountable problem to the teacher, according to Marguerite A. Follett, who suggests that selection of tools may be simplified by understanding the uniqueness of the individual learner and his educational needs. Frank C. Stuart then recommends the use of closed circuit television in higher education courses, especially courses required of a large number of students. Television as an effective educational device for utilization in the teaching-learning process is discussed by Henry Hubinger. John A. Fiske then provides an overview of instructional technology and recommends systems planning in educational planning and use of instructional media. A brief discussion of micro-teaching and educational communications by James D. Wells is followed by a list of 25 uses for the videotape recorder within special education programs. The concluding paper by Vernon Bronson focuses on instructional communication for specialists and administrators. (CB)

PROCEEDINGS

ON THE

CONFERENCE ON

USE OF MEDIA IN EDUCATING THE HANDICAPPED

SPONSORED BY:

THE DIVISION OF SPECIAL EDUCATION

EPDA PROGRAM IN LEARNING DISABILITIES

MAY 20 - 21, 1971

AT THE

LEARNING AND INSTRUCTIONAL RESOURCES CENTER
UNIVERSITY OF MIAMI
CORAL GABLES, FLORIDA

The Mann Project

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TABLE OF CONTENTS

CONFERENCE PLANNING COMMITTEE

Dr. Philip H. Mann, Chairman
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Miss May T. Chisling
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INTRODUCTION

It was once said that "if the only tool you have is a hammer, then the whole world looks like a nail." It would appear that this maxim is particularly appropriate to the use of media in education since many become accustomed to only one way of doing things. It was, therefore, the purpose of this Conference to bring together individuals who are successfully using multi-media in a viable manner to facilitate learning in their particular educational settings.

These educators represent different disciplines; however, teacher trainers or teachers of the handicapped may well adopt or adapt as the case may be, some of these concepts into their own programs.

Dr. Philip H. Mann
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MEDIA AND SPECIAL EDUCATION

BY: Dr. Philip H. Mann
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Considering all that we have in terms of "specialists" in the technology of media, in the final analysis it is the classroom teacher who plays a vital role in determining the use of such media within the learning environment. In a sense, he not only makes available different forms of media for his own use and for the use of students, but even more importantly he determines the emotional climate for the utilization of such media. The teacher who is fearful of using machines of one kind or another, for example, often imposes his negative feelings upon the students in his classroom; hence, building in a fear for the use of some forms of media. Media, to my way of thinking, represents any aid which helps the learner to better understand and internalize concepts.

I am reminded of a situation in which I had the opportunity to observe a special education teacher introducing a science lesson to a group of intermediate educable mentally retarded students. As a directing professor observing a potential directing teacher, I sat down in the back of the room. It was during the time of

classroom break and the youngsters were coming back to the room. The teacher was in the hallway and did not observe that some of the children in the room were exploring a microscope that had been set up on a table along with some slides. A few of the children circled the microscope and proceeded to touch it, and look through the eyepiece. Some were intently examining the slides. One of the children said, "You know, it smells funny." Another child said, "Look, this moves up and down. I guess it makes it smaller or bigger that way." A little girl retorted, "That's what focuses it. I have one at home. It makes it easier for you to see it." "I wonder what these other lenses are for?" said another. The little girl who owned a microscope proceeded to explain that, "One of these lenses helps you to see things better and you can see smaller things with them." A group of about ten children had gathered about the microscope by this time as the teacher walked into the room. "Now all of you get away from there, and sit down immediately! You know you're not supposed to touch any of the equipment unless I give you specific permission to do so." The children went hurriedly to their seats. The spell was broken. At one point during the lesson, they were all lined up and permitted a three-second look at an amoeba while being continually cautioned not to touch any part of the "equipment". I particularly noted

that one young boy, who was told to keep his hands off the microscope, as he passed through the line for his three-second look at the amoeba, proceeded to push the slide a bit when the teacher wasn't looking, giving the other 27 children a nice look at a clean white field. It was also interesting to note that no one complained.

Very often, teachers develop a feeling in children that media of one kind or another is only to be used by adults - except for the "special projector boy" or the "audio-visual helper" few get to participate. Young children especially tend to think that in order to learn to use things like this, you have to go to a special school for training.

It is my opinion that this same fear related to special training exists to some extent in teachers and often prevents them from using media effectively. Some schools perpetuate this fear by having one person purchasing all or most of the materials for that school and then proceeding to lock them up for "safe keeping". Perhaps it is, in part, the fault of institutions of higher education who do not provide future teachers with enough media experiences during the pre-service training period. Many feel insecure in the use of media and fail to become knowledgeable in how to incorporate media techniques into every aspect of teaching. This

includes the planning stage as well as the implementation and evaluation stages of curriculum.

Recently, a chief school administrator visited a classroom of youngsters in a "Developmental Primary" situation. This class was comprised of "high risk" children who competent educators and other related personnel agreed would not "make it in the first grade". These "high risk" children were identified primarily on the basis of lacking readiness skills and/or as having certain processing problems preventing them from learning by traditional teaching techniques. The administrator visiting this classroom was amazed to see young children (six year olds) using overhead projectors and tape recorders and other forms of media by themselves without the aid of the teacher. He questioned the principal about this phenomena and was told that all of the material and equipment in the classroom is available for use by the children and they may use this material and equipment as is necessary in order to enhance their own individualized instructional programs. When asked whether or not all of the teachers in the school were able to use all the media material that they had available, the principal stated that there were still a few teachers who could not use some of the equipment

available in the school with the efficiency of some of the students in this particular class. This frankness on the part of the principal impressed the visitor and he requested an explanation. "The answer," stated the principal, "is that these children have learned to incorporate media as a part of their everyday learning experiences, and most of this was done in an incidental fashion. They were not told that this is what you can use and this is what you cannot touch. They were taught to utilize the "machinery" in the classroom of actual involvement while learning a specific task. Therefore, the task itself became the focal point, the media merely the vehicle used to enhance the learning of the particular task. The children were taught through involvement that the overhead projector was not very fragile in a useable sense and that it was not a mystery nor did it require a grown up to run it."

It appears that especially in the area of the handicapped that there is a great deal available within the classroom that teachers have not learned to utilize appropriately. Many teachers are "material bound" to begin with, by things that they have grown accustomed to using over the years and find it difficult to depart from. This is particularly true in terms of the use of textbooks. Textbooks in and of themselves do not

determine the rate at which children learn. They often set the pace for learning too rapidly, especially with regard to children whose rate of learning is slower. Those who are not able to learn when taught by traditional methods due to learning difficulties must have the learning environment modified. Books and materials are part of that environment. The teacher must control the rate of input rather than the textbook. In many cases, teachers need to teach without books before introducing children to the printed material. This is where the use of instructional media can really pay off. Visuals and listening devices used appropriately as reinforcers to learning can aid the child at the learning task. This is especially true for children exhibiting learning problems where the classroom should be set up as a media laboratory. In a very real sense, children must feel that every piece of material within that classroom is available to them at any time as needed to enhance the learning of a given task. This can be accomplished right from the start when the child first enters school. This is where it is particularly important since initial teaching or initial learning often sets the pattern for future behavior in school. It would appear that a part of every educational program ought to include the teaching of media utilization. This applies to children as well as to teachers. We need to get away from designating one child in the classroom as

the "audio-visual boy", or finding one or two children in the classroom who draw better than the others and utilizing them for the reproduction of materials. We need to instill in youngsters the feeling that anything in school is for their use and that there are many things available in the classroom that can be used to enhance the learning task. We must permit children to make mistakes and accept their failures as a best attempt rather than as a "failure" as many will not have all the prerequisites necessary to produce media or to make good use of it. Such things as acetates, slides, and overlays are often a mystery to children in that they have little or no understanding of the nature of the production of these aids. Some forward looking teachers are producing these things in the classroom with the aid of children and in this way providing experiences by which students can become involved in the actual development of the material themselves. If a primary concern in terms of the use of media is to enhance the learning task, and we know that children tend to learn better when reinforced through participation directly in that learning task, then "professional quality" becomes really a moot point if it does little to aid the child in his attempt to learn a particular task. If we are ever going to get teachers and youngsters involved in the utilization and production of

media for purposes of instruction then we must reduce the feeling on the part of many that they could never produce "something professional." I submit that there is quite a difference between professional work and acceptable work. In any case, it appears that just being involved in the production of visuals, for example, may in and of itself enhance the learning situation.

It has become apparent to many of us in the area of special education that some of the films that have been produced for instructional purposes, especially when used for the intellectually handicapped, have a concept level that is much too difficult for these youngsters to cope with. Teachers need to be taught how to analyze a film not only for its interest and content levels, but also for its concept levels.

Students who have spatial and time difficulties find it difficult to synthesize information that require ordering the spatial-temporal environment. For example, students with spatial problems living in Miami where it is tropical and low might find it difficult to comprehend mountains or the nature of the desert even though aided by visuals. Teachers of these students will need to utilize a concrete object or experience along with the visuals. Therefore, if you are going to show a film

about mountains to these students it would help if they could build some out of clay or some other material. In using films for students with learning handicaps, the teacher must first determine whether or not the rate, amount, and sequence of input is appropriate for the group for which it is intended. It seems that a great deal of time is wasted in showing films or other visuals that have little or no relevance to the children viewing them.

One of the difficulties in present learning environments is that teachers are reluctant to record their own speech or the speech of their students. One of the few things that we have very little record of is what the teacher has said in the classroom. It would appear that tape recorders could be utilized by the teacher to record what was said so that children who were unable to understand the lesson the first time it was presented could get another opportunity later on. There are so many ways by which media can be used to enhance the instructional program, not only to illustrate a point in a lesson, but also to provide reinforcement through repetition as in listening to pre-recorded presentations. In this way, media can also become an important evaluative technique in determining whether or not what has taken place in the learning situation during a given time is really appropriate.

In essence, media can be utilized as a record of performance. There are certain points that need to be considered in determining the type, amount, and presentation of media to be utilized for a given instructional task.

1. The teacher needs to determine the prerequisite skills a child needs to have in order to succeed at the task that will be presented.

2. He must then determine which students do or do not have the prerequisite skills.

3. Once the teacher has determined what the student needs in order to acquire the prerequisite skills, then he must utilize all of the media resources available to aid the student to develop these skills.

4. After the prerequisite skills have been built in, the teacher should enhance the learning of new skills through the utilization of media resources.

In summary, it is apparent that analyzing a given instructional task in terms of the above stated principles will enable the teacher to become more effective in not only delineating that task, but also in the presentation of the task and the evaluation of its effectiveness in any given learning situation.

MEDIA FOR THE HANDICAPPED

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When considering media for the handicapped, whether it be in relation to the teacher and the learner, the trainer of teachers and the student, the administrator and the teacher, or the parent and the child, concepts of media, as well as handicapped, are confusing.

For this brief paper, media will be considered as any means of communication through the printed or non-printed word. The handicapped will be those children who have any kind of learning problem, which at one time or another may mean any child during his learning period.

Obviously today, the ideal situation in working with the child would be if everyone were a media specialist, one who understands the theory of communications as well as the latest in the media machine world, and who knows of the most recent and valid materials appropriate for each individual learner.

The next best thing is to know where to find what is available in both hardware (the machine), software (the validated materials),

and the media specialist required for the software as well as hardware. In order to know where to look, a person wishing to use the machine must first study the child, discern his needs, and set objectives to meet those needs.

Realizing that there is this problem of men, materials and machines, in almost every area of learning there are various resources available if only the person wishing to use such instructional technology knew where to locate them. But there are so many media improvements, both in materials and machines, it is difficult to know which way to turn.

Since this communications problem is so complex, the best approach at this time seems to be that of examining the problem in a "localized" way, considering all available resources -- men and machines -- and how readily obtainable they are. Depending on the location, oftentimes media are attainable through local schools and/or universities, the state department of education, the public libraries, and so forth; each area obviously would provide different services. For example, at the University of Miami, Dr. Philip H. Mann is project director for an EPDA Special Education project which sponsored the Media Institute from which this monograph is published, and who could possibly provide assistance.

After learning what is available, whether it be in audio-visual or printed form, lists may be obtained of current materials in the specific area required for the learner. For the handicapped child, there is the Council for Exceptional Children in Arlington, Virginia, where the ERIC (Educational Resources Information Center) Clearinghouse on Exceptional Children is located. Throughout the United States, Special Education Instructional Materials Centers (SEIMC) are located which provide information and materials on request.

When the handicapped child happens to be a pre-schooler, obviously the National Laboratory on Early Childhood Education in Urbana, Illinois could be contacted as well as the ERIC Clearinghouse on Early Childhood Education. National service organizations such as the National Association for the Early Education of Young Children (NAEYC) might be able to provide information. Various associations, such as the National Association for Retarded Children or the National Association for the Blind may have the answer.

Depending on the need, the appropriate Federal government agency could be contacted. For example, the Office of the Deputy Commissioner for Development, U.S. Office of Education, could assist in supplying information. In addition to ERIC and SEIMC mentioned above, other government office of education information

centers include Regional Educational Laboratories, Research and Development Centers, and U.S. Office of Education regional offices. Commercial firms have their respective software and hardware which can be examined for potential usefulness.

Men, materials, and machines should be selected on the basis of the educational objectives set for the learner, keeping in mind that the instructional technology has a supportive function in the learning process and is intended in no way to replace the teacher. Certain materials may require modification to meet specific needs.

In addition to individualized instruction for the learner, media may also be used to communicate and disseminate information about the handicapped to teachers, trainers of teachers, other educational personnel, families, and individuals outside the educational field. Again, the objectives of using technology must be defined with a built in means of measuring whether these goals have been met.

The intent of this article is only to provide a starting point for the educator interested in utilizing media for the handicapped. Obviously there are many associations, government agencies, private institutions, commercial organizations, and others who

could be of assistance; journals and other publications may also be useful.

In summary, with the proliferation of media and materials, what may seem like an overwhelming problem of selection may be simplified if the person planning to use these tools understands the uniqueness of the individual learner, his needs and where the instructional technology will work best in the learning process; and if the person planning to use the media for other communication purposes realizes which "market" he wishes to reach and examines the best means to accomplish his end. Success usually lies in knowing which men, materials, and machines are readily available, and then moving in a planned way to accomplish specific goals.

THE USE OF EDUCATIONAL COMMUNICATIONS IN HIGHER EDUCATION: A PERSONAL VIEW

BY: Dr. Frank C. Stuart
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Western Civilization is a basic freshman course at most colleges and universities. It is in this course that the student acquires a more mature understanding of the values underpinning his society, and of the men and women whose lives have contributed to the formation of these values. It is here that the freshman's interest in history, which earlier might have been squelched by an insistence upon memorization of dates, places, and battles, is, hopefully, rekindled through a humanistic approach to the development of Western society and institutions. Hundreds of young men and women enroll in History 101-102 who will never again take a college-level history course; this, then, will be their final exposure to a systematic treatment of the cardinal ideas and decisive events of the Western world. Yet, many universities find this one of the most difficult survey courses to teach, due largely to the immense size of the class and the breadth of the subject matter.

One approach to the problem has been to utilize closed circuit television. When there have been instructors and professors in special education as in other disciplines to adapt their pedagogical approach to the peculiar needs of television, use of the media on

college campuses has met with remarkable success. The most successful teachers of broad survey courses have been made available to all students. Conversely, where professors have only reluctantly permitted the television camera to penetrate the inner sanctum of the classroom, student reaction has been negative, if not downright hostile. My three years' experience with the medium convinces me that the success of educational communications depends more than anything else upon the willingness of the professor to depart from traditional teaching techniques in favor of a visual approach to learning.

Even today there is a sizeable body of professors on every campus who shy away from closed circuit television as an instructional aid. For some, it is simply a matter of being camera shy, but for others this reluctance has deeper roots. To begin with, the television studio on campus is still regarded by many professors as an innovation, a stop-gap measure to deal with burgeoning freshmen enrollments that someday will decrease. To view educational television in this way, is to discount a potential "ally" before its merits as an enricher of the educational process have been tested. Another reason why some professors avoid the television studio is the fear that the transition from classroom teaching to video instruction is too time consuming, too demanding

and that if one agrees to adapt his material to the needs of television, there will be no time left for research and writing. It must be admitted that there is some truth in this. Even when a wise department chairman allows his novice television instructor full time to devote to script writing, visual research, rehearsal, filming, and general administration of the course, the professor quickly discovers that he has attached himself to a jealous mistress, that he has made a near-total commitment of his time, energy and imagination for the first year or two at least.

Let me share with you, for a moment, my own experience in this line at the University of Miami. The Western Civilization television course at this university is comprised of eighty-two video lectures of forty-three minutes' duration each. Each production requires fifteen to twenty hours for script writing alone, not to mention conferences with the director and the perpetual quest for visuals. I mention script writing because, in my experience, the impact of a television lecture depends to a large degree upon the quality of the script. An instructor who steps before the cameras armed only with his traditional classroom notes, or a hastily-scribbled outline, is either immensely talented or so overworked in other areas of his profession that he cannot devote the hours necessary to planning the successful video production. The chief advantage of television

teaching over the straight classroom lecture is that the instructor can utilize sight and sound simultaneously, but to do this effectively his subject matter must be researched and presented with an eye to visualization. This takes time, planning, and imagination.

Another argument in favor of the carefully planned script is that it enables everyone concerned with the video production to participate fully; it is a road map for director, cameraman and audio technician. If, on the other hand, these vital members of the television set are left in the dark about what the professor is going to say, the screen probably will be dominated by "Talking Fact," as he is known disparagingly in the profession. The ideal television lecture in the humanities should be about eighty per cent visualized. In a forth-three minute history lecture this means the student will view between 100 and 140 visuals. It is the responsibility of the director (and his cameramen on the floor) to see that these visuals (photographs, book illustrations, maps, drawing, film inserts, etc.) appear at the right moment and remain on the screen for the desired duration. The director cannot hope to perform this function if he does not know what the professor is going to say, when he is going to say it, and how long he is going to dwell on a given topic. Without a fairly complete script, the director can only rely upon a sixth sense

or sheer dead reckoning.

But let us assume that you have agreed to adapt your course to television presentation. What can you expect to encounter in the beginning and how do you learn your job? To begin with, it should be reassuring to know that most successful television teachers are self-taught. All of them SURVIVED the excruciating moment when they faced the cameras for the first time, with forty-three minutes to call their very own, but with no visible audience. Such an experience is unforgettable, and certain to keep you humble in the future. Perhaps you will allow me to share my impressions of the first lecture with you for a few minutes.

The studio, on first entering, resembled a concrete mine pit or air raid shelter crammed with electronic gear. As the lights were gradually turned up, cameras and cameramen emerged, all training their lenses in my direction. The crew conversed in a media lingo uniquely their own, but I noticed that they referred to me as "the talent". I fervently hoped they were right. The klieg lights now came on full and someone took a light reading; someone else asked for an audio level; and a third person emerged from the shadows to cake my highly reflective forehead with makeup. High above, and only dimly visible behind a thick

pane of glass, was my director thumbing through a copy of the script. This prompted me to check mine for the fourth time, for the abiding fear of all "talent" is to turn page nine of the script and find page eleven. A few encouraging words drifted in my direction from the cameramen, and then the red light atop camera one blinked on. History 101, Lecture No. 1 was launched! Never before had I felt such a total reliance upon the drama of history to see me through a frightening situation. Yet, looking back on it, I am still amazed how swiftly time passed and how quickly I learned to generate inner enthusiasm without the stimulus of student "feedback". Certainly the adrenal glands had something to do with it.

My apprenticeship began the instant that little red light clicked on. Fortunately, I taped my lectures "live" at 10:00 a. m. and could view the results a few hours later in an afternoon class. This is unquestionably the best way to learn your new profession, by sitting with the students. Today's freshmen come to college having already been exposed to 15,000 hours of television in the home. They have been conditioned to expect a certain level of professionalism on the screen, or they tune out. By observing yourself as objectively as possible and studying student reaction, one can correct glaring errors of style and presentation in short order. If you survive the initial shock of seeing yourself in

action on the larger-than-life-size screen, the second lecture is bound to be a vast improvement over the first.

One of the tendencies of television is to magnify both one's good and bad qualities. This means that you discover very quickly certain personal mannerisms which are highly distracting to the viewer. For example, I have a nervous habit of adjusting my black hornrimmed glasses two or three times during a lecture. This may not be particularly disturbing in a class of thirty students, but on the oversized television screen it becomes the focus of attention. Under the heat of klieg lights, I discovered that my traveling glasses slipped down four or five times. Seated there in the semi-obscurity of the T. V. classroom I winced each time. So did the students. As quickly as possible, I abandoned the glasses and had myself fitted with contact lenses. I also became aware, sitting with the students, of my over-reliance upon certain pet words and phrases, especially introductory clauses. I rationed myself in the use of these words and varied my language.

Also, there is no better way to learn the proper pacing of a lecture than to watch students taking notes from the screen. Because television lectures are uninterrupted, they tend to move more quickly than classroom lectures. This means that the video

instructor should slow down periodically, stress certain points in a very deliberate fashion, underscore salient facts, even repeat certain ideas and concepts in a different way, in order to give the student pause. During the pause the student will not only have time to collect his thoughts; he will have time to look at the screen. Another vital assist to the television student is a guide or outline to the course, one which states the objective of each lecture and lists the important names and events of each lecture in order of their treatment on the screen. Still another technique is to superimpose important names on the screen. The latter not only assi sts the student with spelling, but again draws his eyes to the visuals.

Then there is the question of infusing humor effectively into the lecture. Particularly in dealing with the humanities, humor is an indispensable ingredient. My own experience convinces me that the innuendo, the pun, and the understatement are the most successful vehicles of humor on the screen. Anything more blatant is likely to have the reverse of the desired effect. I mention humor because I recently attended a conference on improving university instruction. Student participants at the conference were asked to list the qualities they most admired in professors. Heading the list was a sense of humor.

Another lesson learned by classroom exposure has to do with voice projection and enunciation. It is this: what would be highly exaggerated diction in the live classroom situation is effective diction when it is transmitted electronically into the television classroom. To the degree that the student does not have to strain to hear what you are saying, he can devote himself to an understanding and appreciation of the lecture. I am convinced that there is a measurable correlation between the clarity of the instructor's delivery and the number of times the student views the screen.

One of the accomplishments of closed circuit television instruction is the ability to bring subject matter "to life". In a history course, for example, it is possible to suggest the passing of time, the dawning of eras, and the unfolding of centuries visually. The instructor is limited only by the visual resources at his command, the pressure of time, and his own creativity. But it is here, precisely, that the television instructor must display restraint, and remember that he is a teacher first and a visual artist second. To be effective as a teacher on television, one must avoid the temptation of producing a film instead of a lecture. There is a limit to what the student can take in through his eyes and ears in forty-three minutes,

and the student must come away from each class, not only with a visual impression of history, but with his tri-weekly ration of ideas, facts, and concepts.

To insure self-restraint in this area, I limit myself to four major topics per lecture. Whenever possible, I try to tie these topics to a personality in history. This semester, for example, we taped a lecture on the Paris Peace Conference of 1919 and the Treaty of Versailles. Now, the provisions of this treaty are vital to an understanding of the post World War I period and the origins of the Second World War, but many students, and especially freshmen, are turned off by treaty provisions. We decided, then, to approach the subject through the personalities of the Big Three: Wilson, Clemenceau, and Lloyd George. I remember, in particular, our treatment of Lloyd George. In seven minutes we visualized the career of the fiery little Welsh lawyer. We showed photographs of him at each juncture of his rise to power: as Member of Parliament, as Director of Munitions during the most crucial period of the war, as Prime Minister, and finally as peacemaker in Paris. We pointed out the rare appeal he had for women and how he promised British suffragettes that, if they abandoned their protest marches and hunger strikes and returned to work in the war plants, he would guarantee them the vote after

the war. (Visuals here included press photographs of determined ladies who had chained themselves to the gates of Buckingham Palace in protest of their disenfranchisement.) And then we recounted how, once the war was won, crafty Lloyd George redeemed his pledge, but set the voting age for women at thirty! The point is that later, when we discussed the British Prime Minister's views on the peace, and on the treatment of Germany, he was more than one of the Big Three--he was a personality. That, in a few words, is the beauty of television teaching. It adds the visual dimension to the study of history.

Finally, whether you are in Special Education or History, all of us who find ourselves pursuing our profession before the cameras readily admit that we are novices. Yet it is the very pioneer aspect of the work that is one of its joys. If I read the signs of the future correctly, the teaching profession is going to make enormous use of the educational television medium in the years immediately ahead. More and more of you are going to be challenged to use the medium. If you have the slightest doubt about this, just ponder for a moment the global impact of such productions as "Sesame Street" and Lord Clark's monumental series on "Civilization". The greatest teaching aid devised by man since the chalk board is ready for us to use in whatever manner we choose.

THE USE OF MEDIA IN TEACHING

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The term "special education" implies the recognition of subgroups contained within specified larger groups. The subgroup in question might be comprised of the handicapped or the gifted. In reality, of course, any education could be considered special in the sense that every individual is special, presenting unique challenges to teaching. However, students can also be grouped together with regard to certain aspects of education, and it is this in particular that will be discussed here.

Learning means more than just physical manipulation and systematized practice. Surely the ultimate goal of any education is not "the education", that is, education is not an end in itself simply because it is endless. Rather, any education is an attempt to show the student how to further his own education - the successful student learns how to learn. With this in mind we have developed time-delay slide sequences in which we demonstrate, among other things, the correlation between symbols, models, and the real thing in terms of chemistry. Obtaining a true, useful picture of the relationship of

these three is of great importance, since chemistry must use what is visible (symbols and especially models) to attempt to interpret, understand, and "see" what is not visible - much that interests chemists is submicroscopic. All too often the student confuses the model with the actual or the symbol with the model or even the symbol with the actual. An example will help illustrate the problem. One series of slides is a model scheme for the most important geometric shape in chemistry - the tetrehedron. Unfortunately, this shape occurs only on a submicroscope level in nature. Clearly, any representation of a molecule with this shape can only approach the truth. One simple representation of the structure is four identical balloons tied together, as might be seen at a birthday party. Certain aspects of the real article are partially reproduced, the general shape, flexibility, etc. Yet, reliance on this kind of approach can and does cause the student to develop patterns of thinking on the matter which create problems in themselves. For instance, the student will tend to see the actual as a solid surface, as the balloon. More important, he will fail to develop a dynamic, useful attitude toward the actual, treating it as a "bunch of balloons" in the sense of how it actually operates. Directional aspects of the structure, since they are handed to him with the balloon model and are obvious, will tend to be ignored or

at least not pursued. When operating in a two-dimensional medium such as slides, there is a difficulty in representing three-dimensional aspects. But this can be turned to advantage, as is the case with the tetrehedron. By showing a series of pictures of the tetrehedron from all different views, the student not only gets a better picture and a better appreciation of the shape and lines of direction, but he is impressed with a very important point about this part of chemistry: shape does not change, but point of view or perspective can make it appear to be different.

Television is an effective educational device for utilization in the teaching-learning process. There are a number of reasons for this:

1. Television has inherent advantages over personal demonstrations or lectures because video-taping insures a top quality demonstration through preplanning, image magnification for audiences of any size and easy visibility.

2. Realizing that the screen will not answer questions and will not repeat, the student tends to concentrate more, attempting to catch everything the first time.

3. Television is a superior communications tool because of its involvement of the chief sensory receptors, so that "information presented simultaneously to the eye and the ear is more quickly and more easily assimilated and the use of both senses makes distraction of a visual or auditory extraneous character less likely.

4. Television provides immediacy, "hightened true-to-life character and added impact."

5. Storage of material on video-tape increases flexibility by permitting accumulation of concept material, enables utilization of materials at convenient times and with widely different audiences and updating and modification of content to fit current needs.

6. Television permits great saving of faculty time and effort in preparing lectures and programs of importance which can be utilized at any time and beamed to as many different sites as necessary.

7. Television permits educational materials to reach the student exactly as the instructor presents them, and allows for a wide variety of media (slides, film, print, line demonstration, graphics, etc.) to be integrated with other video tape materials.

Our major use of television tapes has been in the laboratory. None of the people in the Chemistry Department are television professionals. However, there are several advantages to making our own programs and presentations. First, we can be very flexible and creative in our programs; we're making them, and we know exactly what we need. Usually the tapes are short, from eight to thirty minutes at the most. Second, there is a better relationship with the student, since the laboratory teaching can be integrated with the lecture. The instructor on television can be put in a laboratory background, to give the students a better "feel" and understanding of what is going on. When teaching a student how to perform in a lab, you are really teaching him how to perform in YOUR lab, and so the television can be used by the teacher to

set things up in exactly the way he wants them to be. Television in the Chemistry Department has been very successful in this respect.

There are three areas in which television has been used by us. The first has been mentioned already: the "nuts and bolts" of it all, namely the laboratory-lecture system. We have one thousand freshmen chemistry students. Labs for each student are once a week in one of four rooms, and there are eleven meetings a week for a total of fourty-four classes a week. Obviously one teacher cannot personally teach all those classes. Graduate students, some of whom are natural born teachers, are a great help, but television makes the operation work even better. While the heterogeneous nature of the student body must be remembered (as we discussed earlier) so also must the heterogeneous nature of the teaching profession. Some teachers or would-be teachers have a natural gift for the job, some learn it, and others, through various handicaps such as speech, never make good teachers. The point is that with the procedure we have, the students are assured a consistent, coherent learning process in the course, with the same teacher throughout. Though not physically present in all those classrooms, he has control over and can effectively organize and operate the entire group session.

One of the biggest problems in any education is convincing the student that what you are teaching him is necessary or at least worth his time. The other two areas of television usage in our department have been particularly successful in this respect. The first is interdisciplinary presentations. An example of this is a tape made by a marine scientist. Many people have a talent for making interesting or even exciting presentations; others can develop the technique. Scientists are all too often regarded as dull equations on a blackboard; there are people and then there are "non-people" or scientists. Clearly, if one can inspire the student by showing him someone who has succeeded in learning a discipline and making it exciting, half the battle is won. These productions are in a sense promotional - they reveal and elucidate various engaging aspects of science, and in our case especially, chemistry.

The third area of audio-visual programs (television) - the use of a visiting expert in teaching a particular aspect of the field. Obviously, we can't expect someone to be available indefinitely for us for lectures, but much cooperation has been obtained by setting up for the expert a taping system so that he can make his program for us, which we in turn can use time and time again. As an example of this, we had a chemist visit us last year who made a tape on mass spectrometry. This tape can be used for several

years to teach students about this topic.

In conclusion, may I suggest that the most important reason for getting involved in audio-visual production is - it's fun, both for the instructor and the student.

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INSTRUCTIONAL TECHNOLOGY - AN OVERVIEW

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Socrates addressed himself to the written word while engaged in debate with Phaedrus: "You who are the father of letters, from a paternal love of your own children have been led to attribute to them a quality which they cannot have; for this discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external characters and not remember of themselves...they will be the learners of many things and will have learned nothing." Thus, the debate over the use of communications media in the teaching-learning process begins, a debate that is still going on today.

In reviewing the world we live in, it is helpful to stop and reflect upon the vast amount of change that has taken place, especially in the area of communications. A thousand years ago the communications environment was limited to a narrow language vocabulary, and the people living in this environment utilized a speaking and listening form of communications. Five hundred years elapsed and the environment I am referring to disappeared when a German developed the ability of placing type on a moveable

tray; the printing press was created. With the development of this tool we progressed from an environment of speaking and listening to a print-oriented communications process. This print-oriented communications process of books, newspapers, writing, etc., is the one most of us are logically well adjusted to.

Communication is a process, a process of transmitting perceptions, thoughts, ideas and information to someone for interaction. The transmitter of any given message must be sure that the information he is sending is accurate, complete, and understandable by the receiver, and that no physical or psychological fences will impair the accuracy of that information.

Most communication is accomplished through a medium. A medium is the substance through which a force acts, an effect is transmitted and through or by which anything is accomplished. The medium chosen to achieve the above is important when you consider it in reference to Dr. Robert M. Gagne's statements on media and learning:

> "As a practical matter, the events of instruction encompass more processes than are included in learning theories themselves. Instruction involves gaining and controlling attention, stimulating recall, guiding the learning, providing feedback, arranging for remembering, and assessing outcomes. It is these functions that are performed by various media

> of instruction, and to a considerable degree by the learner himself. One should not expect, I think, to find that a single medium is best fitted to do all these things. Instead, it seems likely that carefully designed combinations of media may be required to achieve the kind of instruction that is most effective, and which at the same time exploits the properties of media to fullest advantage."

We judge the effect and adequacy of information conveyed by response or feedback. Feedback is any partial return of the effects of a given process to its source. Through the use of feedback the communicator can judge the adequacy of his message; if the active response to the message he sends indicates that certain important elements were lost or added, the message can be altered and sent again. If active response indicates that the effect of the communications matches the intent of the sender, the quantity and accuracy of the information was correct. The best method for improving communications is when feedback is a planned and permanent part of the communications process.

The best communications tool available in the teaching-learning process is the ability to talk to people, face to face, because it provides us with feedback response from the individuals with whom we are trying to communicate. The problem that faces the communicator is relating the animate and inanimate world to the

world of language in which he tries to talk about these things.

Communication media add the necessary visual, audio-visual, or manipulative dimension needed to help the communicator relate to the symbolism of language. They broaden the scope of the instructor's communication with his students and increase the efficiency of his communication.

Today, we are confronted with a tremendous knowledge increase and a revolution in the communications process used to transmit this knowledge. One technique, which provides the necessary efficiency and first-hand experience in the teaching-learning process is the utilization of instructional technology on a systematic basis that is fully integrated within the curriculum.

(Instructional technology means the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook, and blackboard such as television, radio, tapes, films, overhead projector, computers, etc.)

The creative application of instructional technology to the teaching-learning process is directly related to the systems approach to planning. Dr. Robert Heinich, Indiana University, states, "The systems approach is a way of looking at a process....a methodology

which enables us to analyze a complex problem and then to synthesize a solution." The methodology that Dr. Heinich is referring to can be broken down into four basic steps:

1. Objectives - defining clearly and precisely the instructional work to be accomplished.

2. Inputs - resources, individuals, instructional materials and instructional hardware needed to accomplish this work.

3. Process - the procedure, instructional technology, and systematization utilized to merge the inputs into a moving sequence that produces the learning results desired.

4. Outputs - the results actually accomplished, their performance, and modification of the process when objective criteria is not obtained.

Systems planning forces the individuals utilizing it to provide clear definitions of the objectives to be obtained in practical operational terms. The parts that go into a given educational system slowly come to light, and the need to arrange those parts into homogeneous, efficient, and productive processes becomes more evident. This type of planning generally produces insights for new ways of doing things, evaluation of educational results, and a more effective teaching-learning process.

The advantages that can be derived from this process can be classified into four broad categories:

1. Accessibility

   The access to information processes, theories, and practical teaching-learning data in succinct learning units. Software objectives are planned in relation to the curricula being taught and are housed in easily retrievable software-hardware packages, i.e., individual student learning tools.

2. Quality

   The preparation of carefully planned media units, emphasizing quality of presentations, for use as media adjuncts to the teaching-learning process.

3. Efficiency

   The utilization of communications media (the total array of communications devices such as textbooks, 16 mm film, 2 x 2 slides, television) to add the necessary visual, audio-visual, print or manipulative dimension needed to help the instructor develop broader student understanding and assimilation of the knowledge he is seeking.

4. Contact

   The use of communications arts, in a meaningful educational media mix, to provide a more vivid impression on the subjective elements of the teaching-learning process, such as student motivation and the time-related attention-learning span.

The research in instructional media has shown that in many cases the a mount of learning resulting from the use of media is equal to regular classroom instruction and in some cases is superior. The following research literature gives exact studies in this area: (1) Research in Instructional Television and Films, 1967, FS. 234: 34041, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402; (2) Instructional Media Research: Past, Present, and Future, William H. Allen, AV Communications Review, Spring, 1971;

(3) W. H. Allen, Audio-Visual Communications, Encyclopaedia of Educational Research, 1960; (4) A. A. Lumsdaine's Instruments and Media of Instruction, Handbook of Research on Teaching, 1963; (5) B. F. Skinner, The Technology of Teaching, 1968.

I would like to finish by excerpting a few statements from the Presidential Commission Report on Instructional Technology (To Improve Learning) which I feel are important:

1. The organization of schools and colleges takes too little account of the now known process of human learning and range of individual differences among students.

2. Technology could help educators base instruction more systematically on what is known about learning and communication, not only guiding the basic research, but also providing the strategies for applying research findings.

3. Instructional technology could extend the scope and power of instruction, it could help to bridge the gap between the outside world and the school, thus making learning more immediate and more relevant.

4. One-shot injections of a single technological medium are ineffective. Technology can carry out its full potential for eudcation only insofar as educators embrace instructional technology as a system and integrate a range of human and non-human resources into the total educational process.

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MICRO-TEACHING AND EDUCATIONAL COMMUNICATIONS

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Micro-teaching means a micro or mini-lesson. It covers a time period of from 5 to 7 minutes and generally focuses upon a single concept, skill, or idea. It also utilizes a number of skills found to be helpful in effective teaching.

The pioneering work in this area has been done by Dwight Allen and associates at Stanford University. Over a period of several years, a variety of approaches to training beginning teachers was used, a number of teaching skills were identified, and the assistance of the videotape recorder was employed. In reporting on their results, Allen and associates were positive in their evaluation of the effect of micro-teaching in effectively training teachers.

The use of micro-teaching as a method of training teachers has spread not only throughout the United States but also overseas. Recently, I corresponded with a professor at the University of Dublin, Ireland, concerning ways in which he and his institution might employ this technique as well as the videotape recorder in their teacher training program. The recent literature also

reveals that Professor Arye Perlberg at the Techmon-Israel Institute of Technology and I. D. Gregory, Lecturer in Education at the University College of Rhoedesia, are also employing this method at their institutions.

At our own institution, the University of Miami, we have had a program of micro-teaching in our pre-service curriculum for the past four years. With the excellent support of our Learning Resources Center and its Director of Instructional Resources, Mr. John A. Fiske, we have been able to make considerable progress. Each of our students is introduced to the technical skills of teaching: providing feedback, higher order questions, bringing about closure, and providing various frames of reference. They are then helped to attain skill in their use through practice sessions with small groups (5 or 6 persons) of their peers. Through videotaping, and re-teaching when necessary, we feel that by the time our students leave the campus to do their student teaching, they have attained minimal levels of competence in employing these technical skills.

I would like to explore with you ways in which you might effectively employ the videotape recorder in your work in Special Education. The video tape recorder is a fascinating and versatile

piece of hardware which is becoming more and more available to educators. As its use increases, it is becoming apparent that we have just begun to note its versatility. Some of the general uses for the videotape recorder include:

1. Immediate playback for analysis of a wide range of teacher behaviors.

2. Analysis of student behavior either self-initiated or initiated by other students or the teacher.

3. The storage of behavior or episodes for future use. For example, students who are absent from class can retrieve events which took place which might otherwise be lost to them.

4. The use of good models - seeing experts in a variety of fields.

5. Longitudinal behavioral studies.

6. The elimination of inefficient use of resource people. By videotaping guest speakers they only have to budget time for one presentation rather than an entire day, which is too often the case at present.

The following is a list of uses for the videotape recorder within special education programs:

1. Small group reinforcement

2. Individualized instruction

3. Inservice training
   a. teachers
   b. aides
   c. volunteers

4. Tape lessons for visitors' observations.

5. Role playing.

6. Demonstrations - methods, materials, techniques.

7. Observation of child's behavior in various situations and places.

8. Observation of child in testing situations.

9. Reinforcement - after skill has been taught.

10. Evaluation of performance after skill has been taught.

11. Evaluation by team of child's behavior.

12. Observation of child.
    a. parent counseling
    b. teach parent how to work with child
    c. what child can do
    d. help parents become objective observers

13. Behavior shaping techniques.

14. Inter-college communications.

15. Inter-library loans.

16. Teach self-help skills.

17. Tape field trip experiences for recall, follow-up, reinforcement.

18. Teach graduate students how to observe.

19. Specific lessons readily available.

20. Observe children at work and play at regular intervals for longitudinal study of child.

21. For teacher self-evaluation.

22. Observe hyperactive child to see what sets him off.

23. Case studies for total faculty education - who is the Exceptional Child?

24. Case studies for help in staffing.

25. Tape teacher with special skills for teacher training.

INSTRUCTIONAL COMMUNICATION FOR SPECIALISTS AND ADMINISTRATORS

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Instructional communications and instructional technology are relatively new terms, but the basic concepts are as old as the teaching-learning process. The difference lies in the potential of both teaching and learning.

One of the things that instructional communications technology has taught us is that the process of teaching is relatively limited, and must consist in the main in creating environments, opportunities, and guidance in learning. In the concept of the new technology this is as true at one level of educational development as at another.

I have been asked to address myself particularly to specialists and administrators. In a way this is difficult, because instructional communications technology is, in its very nature, a cooperative process that involves everyone in the total learning

environment. If there is a difference in the concerns of administrators and specialists, it is because they have a greater responsibility for making maximum use of the potential of instructional communications technology.

The administrators must perceive the whole picture in terms of functional learning productivity, and tend to create an organizational climate for subject-matter specialists and technological generalists that will lend the necessary flexibility to the determination of learning goals, the analysis of relevant instructional content, and the organization of presentational matter and techniques.

The specialists, on the other hand, must react to such a climate by recognizing that their specialty is only a segment of the whole, however significant, and could not exist without the other areas of the total learning effort and product. In full measure this means that for the achievement of optimum learning productivity that is possible with the serious application of instructional communications technology, specialists in one area must plan, organize, and present learning materials and processes cooperatively with specialists in all other areas of the goal-directed efforts.

Now this may sound like a lot of gobblydegook or double-talk to some of you; and some of the things which I will say presently may either do violence to some of your cherished beliefs, or tend to outrage some of your professional sophistication. Nevertheless, to do justice to the subject of my address, I must say them. In defense of what I say, I must quote my friend Dr. John R. Pierce, the Director of the Bell Laboratories, and among other things, the designer of the communication satellites. He said, "You never know anything until you have tried it and it works." Well, I have tried the comprehensive use of instructional communications technology to increase learning productivity dramatically at various levels of learning, and it works.

But it will not work, or at least learning productivity will not be as effective, unless the administrators, the specialists, the technologists, and the whole instructional team understand fully the nature and the implications of the cooperative use of instructional communications. To begin with, we have two major hierarchies of concern -- first, the clinical evaluation, the establishment of learning or development goals, the preliminary training procedures or adaptational processes, and the functional learning achievement at the child's or basic learner's level. The second, and no less important for our purposes, is our concern for training or rather, educating the professional staff -- the teachers, specialists, administrators, and the technicians.

In the application of instructional communications we approach the latter with more sophistication and more deference to professional knowledge, but basically the approach is the same as with the basic learners. We have one over-riding goal -- to create understanding -- disciplined understanding of the relationships existing within our environment and how to cope with them. The key to this at all levels is functional communication -- there is no other kind -- we cannot communicate TO somebody -- we have to communicate WITH somebody. That connotes a two-way relationship with a three-part action -- to send a message, to receive a message, and finally to have the message confirmed by performance, or measurable change in behavior, if you will. Of course in the development of general or specific learning there is another aspect to this communication interchange. The message that is sent, received and confirmed can not be confined to the immediate principals -- the result must be such that the same message or any significant part of it can be received by the learner from any source, and appropriately confirmed at any time and under varying circumstances.

At the basic learners level, it is essential to keep in mind at all times that children generally, at whatever level of intelligence,

have little or no facility with abstractions. They know clearly that which they perceive, and their valid understanding of relationships is formed by seeing real things acting upon, or interacting with, other real things, real in the sense that they can see them and hear them and develop a recallable mental picture of them. Only from such perception can valid concepts develop that will allow the substitution of abstractions in more sophisticated communication. However, it is doubtful that many are ever able to do away with the need for percepts in composing thoughts and successfully relating to the variety of environments in which we all live and work.

The use of instructional communications allows us to provide maximum perceptual opportunities in an organized learning situation. It makes it possible for us, as teachers, to go systematically and sequentially from the less difficult understanding to the more difficult -- a pleasant progression from the most simple basic concepts to more complex and functional. Some will say this can be done by a competent teacher in an adequate traditional situation; but the fact is, it can't, because the teacher in the traditional situation (at whatever level) is working in isolation and is limited in innovative developments of any kind. He or she does

not have the constant sharing of ideas that go into developing immediately relevant instructional material. The traditional classroom teacher does not have the technical expertise in adjusting the learning material to the changing needs of the learner, and in basic communications, must depend to a greater degree upon verbal abstractions. This often allows concepts to be formed from a lively imagination that can be terrifying, stultifying, or fantastic.

In the valid use of instructional communications technology these possibilities are reduced to a negligible degree because of the cooperative factor that engages many minds and many talents to the evaluation and solution of a learning problem, and the systematic application of the visual and aural impact that can be carefully synchronized with verbal progression.

In the case of exceptional children (at whatever end of the intelligence spectrum) there is the additional advantage of clinical observations and records that are visual and aural, and which are more valid than notes and memories in evaluating learning achievement or behavioral changes.

There is also the potential of repeated exact exposure to certain desired perceptions that may allow the learner to better identify with the idea and learn at his own rate in a manner that will be

functional and not mnemonic in nature. None of these advantages are speculative -- they are all available to you and to whomever will properly use them.

Obviously an ideal application of instructional communications technology can not be super-imposed on an organization over night. It requires commitment on the part of the administrators, the specialists, the technicians, and the general institutional staff. It requires training. It requires a new stance in ou. relationships with our fellow professionals and para-professionals. It means working together and pooling our instructional resources and our inter-disciplinary 'know-how'. And somewhat like the lathe which is said to be the only machine which can reproduce itself, the techniques and process of instructional communications can provide the orientation, the training, and the skills to the professional people and their assistants on an in-service basis where you can learn by doing.

But when we come down to it, the administrators and the specialists are the people who must lead the way. The clinical world is changing, and the world of both basic and higher education is changing -- all more rapidly than we sometimes realize. It is my hope that we can and will lead the way. But in so doing, we

must realize that in seriously and comprehensively applying instructional communications technology to the process of creating greater learning productivity and more effective clinical evaluation that we must create a valid system of achievement measurement that is consistent with the new technology. All systems of achievement measurement which are now in general use are open to serious questioning.

There is grave doubt that standardized testing can measure anything of significance except differences between groups at various age levels in relation to achievement that is derived from a mathematical mean. There is really no such thing as an average learner or an average rate of learning. In relation to human organisms, there are too many variables -- heredity, environments (the many environments that impinge on the learner), motivation, predilection, peer influence, emotional bias, fear of embarrassment at failure, and all the others we know so well.

When we establish specific learning goals and systematically create the motivations and the opportunities for the learner to achieve such goals, the only way we can measure his achievement is by performance. If there is a measurable or observable change in goal directed behavior then we can gauge the amount of learning

productivity that has resulted. In other words, if the learner can perform -- if he can do what he has been taught to do, then we know where we stand and can move on to a new percept and the development of a new concept.

On the other hand, to the extent that the learner falls short of his goals we know that we have to adjust our pace, our content, volume and/or complexity to his needs. In the cooperative system of instructional technology, when learning is not achieved, the components of the process must be modified and adjusted to the learner's needs for learning. In measuring the learner's progress we evaluate our own instructional efforts. But what is more important, we do not let the learner remain unlearned. We use the various perspectives of our technology to allow him to perceive the basis and relationship of one concept before we move him to another progressive percept.

So, if we really adopt instructional communications technology to our teaching-learning efforts, we must reject standardized testing as anything more than a very gross comparative process, and develop new and more precise methods of measuring learning productivity and evaluating behavioral change.

The whole spectrum of technology is here, available for our use as teachers, specialists, and administrators; but we must learn to use it and deal with it progressively. If we do, we can increase the value of our services many times, and we can serve effectively a great many more children in all areas of the intellectual and psychological spectrum. But I must warn you that the movement to the comprehensive and effective use of technology must be from the top down. It must start with acceptance and support by the administrators and the specialists.