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A Descriptive Study to Determine the Effect That
Training, Experience and Availability Have On Use
of Instructional Media in the Classroom by Pre-
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presented by

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A DESCRIPTIVE STUDY TO DETERMINE THE
EFFECT THAT TRAINING, EXPERIENCE AND
AVAILABILITY HAVE ON USE OF INSTRUCTIONAL MEDIA
IN THE CLASSROOM BY PRESERVICE TEACHERS

By

David M. Sibalwa

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ABSTRACT

A DESCRIPTIVE STUDY TO DETERMINE THE EFFECT
THAT TRAINING, EXPERIENCE AND AVAILABILITY HAVE
ON USE OF INSTRUCTIONAL MEDIA IN THE CLASSROOM
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This study was designed to determine the effects of training in, experience with, and availability of instructional media as they influence use in classrooms by preservice teachers.

Given the independent variables (a) experience with, (b) training (formal and informal) education in, and (c) availability of instructional media, a questionnaire was constructed to collect data on how they affect (d) use of instructional media in practice teaching. From 605 preservice teachers enrolled at MSU in 1981-82, who had completed practice teaching, 120 Michigan residents enrolled in the Spring Term were selected to complete the survey.

Data derived from 82 subjects supported three of four study hypotheses and generated two conclusions. (1) Preservice teachers' training in instructional media is important in developing skills and understanding. (2) That

this education and their experience with media items will be the major factors determining frequency of use of instructional media in student teaching.

Interactions among types of experience and availability did not affect the subjects' use of instructional media, but high experience plus formal or informal training increased media use more than any other experience-education combination. Formal coursework, alone, did not significantly affect use.

Availability was a determinant factor in using seven (of 20) media items, if subjects were experienced in their use.

In every case, preservice teachers who scored high on experience, also used instructional items more than those with little experience. A related supposition, that subjects with formal education in the use of instructional media were also more likely to have had experience with the media was not supported. On the contrary, evidence showed that equivalent instructional media experience can be acquired outside of formal coursework.

Precedent literature and this data suggest that undergraduate programs should involve preservice teachers in developing media skills, by using specific media items in their coursework. Concerns that remain indicate replication would be useful with a similar or larger sample, with

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secondary teachers, and with teachers employed in the field. It would also be useful to catalogue instructional media that have positive value in the classroom, so these may be made available to preservice teachers.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

In the world today sound effective education is recognized as an urgent necessity. Technology has provided the means for information retrieval and the dissemination of education beyond the wildest dreams of earlier generations. The key element in the efficient application of these wonders of invention and technology is the human factor.

The potential of instructional media for education has been widely discussed as they pertain to a wide range of aspects of learning, teaching and administration. Although some critics feel that education is not achieving its goals, there is evidence to believe that progress is being made.

Perhaps more can be realized in providing quality education for all, if teacher candidates on leaving teaching institutions are prepared in such a way that they have a greater degree of competency in the use of instructional media in the classroom. As McClusky (1955) put it, the first step in teaching is the communication of ideas from

teacher to learner. "Among modern basic media for transmitting ideas are the printed page, speech, demonstrations, pictures, radio and television" (p.2.).

Studies have also demonstrated the effectiveness and unique potential of such media as films, slides, tapes, disc recordings and that group of visual media known as graphics. Research has demonstrated the importance of intelligent use and the adherence to proper techniques of utilization. Most teacher training institutions provide courses and training in the use of these modern instructional media. However, experience in many of these programs has demonstrated that availability of instructional media and services are not enough to achieve general use.

Problem Statement

The purpose of this study is to determine the effect that training, experience, and availability have on the use of instructional media in the classroom by preservice teachers. An important part of this exploration is that phase of the study which involves (a) training; (b) experience with instructional media; (c) availability of instructional media; and (d) use of instructional media in the classroom during student teaching.

As evident from searching the data bases of the Educational Resources Information Center (ERIC) and Dissertation Abstracts, much research has been done in the use of instructional media. For example, Neeb (1972) did a study of instructional materials and their use by selected elementary student teachers in their student teaching. The study revealed that elementary student teachers do take and use many instructional materials in their student teaching assignments. These items carry positive value when applied to the learning environment, and student teachers secure more of their information regarding instructional materials from the methods courses, the library or resource center and the audio-visual department (p.98).

Another study which supports the use of instructional materials in schools was done by Streeter (1967), a study of the relationship among selected factors affecting media use by classroom teachers within selected school systems. The results, concisely stated, were that "a teacher's competence in media and the subject he teaches are important variables affecting frequency of media use (p.83).

The decade following the end of World War II found some educators and laymen calling attention to the possibilities of instructional technology for solving the

problems of time, space and numbers, also for improving the learning situation. However, not until 1957, did the improvement of public schools become the focal point of the entire nation (U.S.A.). This was the year that the Soviet Union launched its first satellite. Some of the more significant legislative actions were the expansion of the National Defense Education Act to include almost all areas of the public school curriculum, the Elementary and Secondary Education Act of 1965, and the Higher Education Act (NEA, 1962).

In fact of these developments, current evidence indicates a limited use of a wide variety of instructional media by a large segment of the teaching force. In 1961, Godfrey surveyed a sample of public school systems in the United States with respect to availability and use of audio-visual media. Her conclusions were:

That teachers reported a high level of technical competence and knowledge of the field through either college work or in-service training. Most of them were interested enough to suggest that schools rent or buy new materials or equipment. The basic equipment is available for their use in their own building. Yet the majority of them don't use audio-visual media extensively, nor do they plan to do so in the near future (Godfrey, 1961).

Purpose of the Study

The purpose of this study is to determine the effect that training, experience, and availability have on use of instructional media in the classroom by pre-service teachers. The study will address four questions which are thought to be important to this study. The responses to these questions will help to determine the relationships between experience with and use of instructional media and the relationship between availability and the use of instructional media.

1. Is the interaction among (a) training in; (b) experience with, and (c) availability of instructional media related to the level of instructional media use by pre-service teachers?
2. Is the level of formal coursework in instructional media related to the level of use of instructional media by preservice teachers?
3. Is the availability of instructional media in a school related to the level of its use by preservice teachers?
4. Is the level of experience with instructional media related to the level of use of instructional media by preservice teachers? (Experience with instructional media includes informal education, ability to operate equipment, or simply being a spectator).

Hypotheses

The following hypotheses, stated in the null form, were thought to be appropriate for this study because of their relationship to the specific questions of this study,

- H₀:1 Level of interaction among formal coursework, types of experience and availability does not significantly affect the use of instructional media during student teaching.
- H₀:2 Level of formal coursework and informal education in instructional media does not significantly affect the use of instructional media during student teaching.
- H₀:3 Level of availability of instructional media in a school does not significantly affect its use during student teaching.
- H₀:4 Level of experience with instructional media does not significantly affect the use of instructional media during student teaching.

Definition of Terms

To establish some degree of commonality for the study, specific terms are defined before proceeding. Unless otherwise stated, these definitions are based on the Association for Educational Communications and Technology's (AECT) Glossary of Terms (1979).

Instructional Technology--beyond any particular medium or device, instructional technology is more than the sum of its parts. It is a systematic way of designing, carrying out, and evaluating a total teaching and learning process in terms of specific objectives based upon research in human learning, communication and non-human resources, to bring about more effective instruction (Brown, Lewis and Harclerod, 1977, p. 2-3).

Educational Technology--is a complex, integrated process involving people, procedures, ideas, devices and organization, for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning.

Utilization--an education function which brings learners into contact with learning resources or instructional systems components to facilitate and assess student learning.

Audio-Visual Instruction--a subfield of instructional technology concerned with the production and utilization of materials used in formal education to promote learning through sight and/or hearing.

Instructional Media--key components in the design and use of systematic instruction. A medium, broadly conceived, is any person, material, or knowledge, skills and attitudes. In this sense, teachers, textbooks, and

even school buildings are instructional media. Instructional media are, the graphic, photographic, electronic, educational (games, filmstrips, slides, motion pictures, overhead transparencies, still pictures, programmed instruction, television, computers, etc.) or mechanical means for arresting, processing, and reconstituting visual or verbal information (Gerlach and Ely, 1971, p.282).

Definitions for the following are provided by the researcher, specifically for the purposes of this study:

Formal Education--the organized transmission of knowledge that occurs in the classroom, during presentations by teachers and students.

Informal Education--learning that takes place outside the classroom, can be self-taught or obtained simply by observing others (this includes accidental learning).

Non-formal Education--has been known as an education which does not use the banking system. What it means here is that it provides education that can be used immediately. The banking type of education is one we get from schools which use a ladder system.

Level of Experience--this is the extent to which a preservice teacher is familiar with instructional media. It can range from non-recognition of an object to skillful use of it.

Level of Availability--this is the extent to which instructional media are accessible to a preservice teacher in a student teaching assignment. Availability is high when instructional media are found in the classroom; moderate when instructional media are found elsewhere in the school building; low when they are in another district building. There is no level of availability when instructional media are not available for preservice teachers.

Relevance of the Study

The College of Education at Michigan State University is one of many schools in Michigan that train preservice teachers and send them out to do student teaching. While in training preservice teachers learn how to use many different kinds of instructional media to help them teach classes in their various major fields of study. The Educational Systems Development Program Area has the responsibility for teaching instructional media.

This study is relevant because its findings will help to show which areas in the training of teachers are being emphasized more than others. Education personnel can determine whether the findings indicate tendencies not compatible with terminal objectives established for preservice student teachers; and, adjustments can be made in the undergraduate programs. The Educational Systems

Development faculty and others can be alerted to discrepancies between the goals of instructional media coursework and the application of principles of that coursework in practice.

Specifically, this study is important for the following reasons:

1. through responses to a questionnaire, this study may identify the level of interaction among formal coursework, informal education, types of experiences and availability of instructional media during student teaching.
2. through responses to a questionnaire, this study may identify the level of formal coursework, informal education in instructional media and the use of instructional media during student teaching.
3. through responses to a questionnaire, this study may identify the level of availability of instructional media in schools and its use during student teaching.
4. through responses to a questionnaire, this study may identify level of experience with instructional media and the use of instructional media during student teaching.

Assumptions of the Study

Instructional media, when used properly, can promote good communications between instructor and learner, also between learner and learner. They are of value in the development of desirable attitudes because they may be used to arouse emotions and feelings. For example, instructional media were used successfully during World War II by the Armed Forces to develop attitudes, build morale and motivate behavior, using effective motion pictures.

The findings of a study using an adequate sample of Michigan State University preservice teachers can be generalized to all preservice teachers trained in the Michigan State University College of Education.

Limitations of the Study

This study will be limited by the following parameters for ease of management and effectiveness:

1. Subjects will be primary preservice teachers enrolled in the Michigan State University College of Education who did student teaching during the 1981-1982 academic year.
2. The number of subjects will be 120, which will give each cell 10 subjects and is a manageable number, given the limited time and financial support available.

3. Selected instructional media used in a classroom teaching will be studied--e.g., non-print media, overhead projectors, and such educational games and computer simulation.

The College of Education at Michigan State University has been selected for this study for the following reasons:

- A. It is a teacher-training college interested in research.
- B. It places approximately 600 preservice teachers in student teaching positions, in one academic year, providing a usable sample for this study.

Summary

The format for the study is presented in Chapter I, which covers the rationale, purpose, hypotheses, need for and importance of the study, definitions of terms and limitations of the study.

In Chapter II the literature concerning the study is reviewed.

In Chapter III the design of the study is presented, which includes subjects, sample, instrument, and independent variables and statistics.

In Chapter IV the methodology of the study is presented, which includes population, sample, instruments used, dependent variable, independent variables, research design and data analysis.

In Chapter V, the summary, conclusions , recommendations and suggested further studies are presented.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study is to determine the effect that training, experience and availability have on use of instructional media in the classroom by preservice teachers.

The review of pertinent literature centers on five basic areas of this research: (1) brief history of audiovisual instruction; (2) preservice teachers and teaching methods; (3) utilization of audiovisual materials in teaching situations; (4) instructional media competency; and (5) instructional planning. A summary is included.

A Brief History of Audiovisual Instruction

Audiovisual instruction may be traced through the educational history of mankind. In primitive times children learned through imitation, observation and participation, aided by necessary language explanations. Man's earliest recordings of himself and his world were picture records. According to McClusky (1955) neolithic man drew pictures to warn and to inform (p.28). Early Egyptian records were almost entirely pictorial.

In the Western Hemisphere, the Mayans and Aztecs recorded their experiences through a system of picture writing. Early Greek and Roman teachers utilized the school journey, using sand as a blackboard and real objects in their environments as instructional aids. The forerunners of modern educational scholars advocated the use of visual-sensory instruction. Famous education leaders such as Comenius, Locke, Rousseau and Petalozzi emphasized such instruction.

John Amos Comenius (1592-1670) was educated as a protestant minister in German universities. The most widely used and influential book to come from his pen was The Orbis Pictus (world of pictures) published in 1658. Used as a text, it was illustrated with one hundred and fifty pictures printed from copper cuts, each picture serving as the topic of a lesson. In 1728, the eleventh English-Latin edition was published in London and reprinted by C.W. Bordine, Syracuse, N.Y. in 1887. Comenius saw the necessity of visual-sensory instruction in the elementary school.

Let it (The Orbis Pictus) be given to children into their hands to delight themselves withal as they please with the sight of the pictures, and making them as familiar to themselves before they be put into school (McClusky, p. 28, 1958).

Pestalozzi, 1746-1827, founded experimental schools in Switzerland that were, for 25 years, a Mecca for European and American educational leaders. He was greatly influenced by Rousseau and his first educational experiments were conducted in the training of his own children on a farm.

From the above, one cannot help but wonder what these men would do and say if they were to see modern schools equipped with audio-visual materials such as models, maps, motion pictures, lantern slides and stereographs, computers and programmed instruction, the likes of which they never dreamed.

Traditional Media

The earliest medium of instruction, even before picture records, was the spoken word. In homes, churches and armies, on farms and in business and industry, as well as in the schools, the older people have always told the younger what was expected of them. Telling was formalized educationally in the lecture.

Even today, with unlimited textual material, professors still lecture and teachers spend most of their class time talking. Trow (1958) stated that some of this talk is informative, some no doubt therapeutic for the teacher, serving to relieve his feelings. No one knows how

much of this talk goes unheeded or how much is understood (p.58). Whether such talk is negative, positive or rewarding, or, as Skinner has suggested, a mere reinforcing mechanism, the teacher is out of date. Beyond talking and writing, technology has provided teachers the means for information retrieval and dissemination beyond the wildest stretches of the imagination. However, the key element in the efficient application of these wonders of invention and technology is still the human factor (p.58).

Preservice Teachers and Teaching Methods

Many people have the misconception that to become a teacher one doesn't need to learn how to teach. Trial and error practice, however, on live children is generally not acceptable in public elementary and secondary education. Willis (1969) said about teaching, "A teacher cannot consider for himself/herself what it means for children to learn under the guiding influence of a teacher" (p.39). This implies that the student of learning and teaching can be guided by others who have learned what it means for a child to learn and for a teacher to guide (p.39).

According to Willis, the idea that a teacher can learn to teach by trial and error is widely accepted in all branches of higher education, except professional education. In this view, new teachers are ready to teach as

soon as they have developed special competence in their respective subject matters. What he/she may need to know about his/her students and how they learn, about the process of teaching and its purposes, can be learned on the job. Professional educators, however, have learned otherwise (1969, p.39-40).

In the Journal of Teacher Education, Fulton pointed out that the preparation of more and better qualified teachers includes:

preparing teachers not only to teach concepts, but to teach them more effectively. Teachers must be prepared to manage classroom instruction in an environment that is beset with many external influences, some of which might be made useful to education. One of the most important of these influences is the wide use of communication media by most educational agencies. The effectiveness of such media in communicating ideas is indicated by their continued and expanded use by industry and agencies outside of education. The preparation of teachers to teach more concepts effectively within a complex culture includes those concepts relating to communicative media, more commonly called audio-visual materials (1960, p.492).

More recently, attempts have been made to stimulate teacher preparation in the use of instructional materials through legislation, revision of college curricula and a variety of inservice techniques. In 1934, the Commonwealth of Pennsylvania enacted legislation requiring all applicants

for a permanent teaching certificate to have had an approved course in visual and sensory techniques. California has had a similar requirement since 1946. At about this time, the American Council on Education further stimulated attention to audiovisual education by publishing a statement that spelled out teacher competencies in this area (ACE, p. 1-3). Subsequently, other institutions have required an audiovisual course, for graduation.

The Self-Instructional Approach

This approach, although it might occur in a laboratory, differs from the two just described in that it involves self-instructional programs on the substantive content of the media field. It was one of four methods investigated by Torkelson (1965) in an effort to establish empirical evidence of the superiority of one method of media competency development over others.

Torkelson's study covered a four-year period and compared the following methods: separate course, integration, student teaching, and self-study. During the first two years approximately 1,000 prospective teachers were instructed by one of the four methods and then tested; during the last two years, two hundred of them were visited in their own classrooms. Classroom visits were analyzed by means of the following instruments: school description,

classroom description, class visitation check list, open-end interview, course opinionnaire, course effectiveness inventory, and frequency of use inventory. Although all patterns resulted in significant mean gains from pre- to post-tests, Torkelson found none to be superior to all others on all measures.

There were, however, some interesting findings with regard to self-instruction. Following Phase One of the study, Torkelson concluded:

In terms of the teaching of equipment operation, the self-study pattern proved that this kind of perceptual motor skill can be learned through the avenue of specially prepared materials without the presence of an instructor (p.149).

If information acquisition includes a conceptualization of the interrelationships of audiovisual type materials with the teaching-learning process, self-instructional materials may have limited application (p.71).

Following phase two of the study, Torkelson further stated:

It appears significant that the teachers who had been prepared in the self-study pattern had the highest opinionnaire, classroom description, and class visitation scores. These scores reflected greater use and a more positive attitude than for the teachers who had been prepared through the other patterns (p.152).

The evidence from this experiment seems to suggest that the process of self-discovery and personal involvement in determining the merits of audiovisual materials in teaching and learning may develop the attitudes which will result in greater utilization on the teaching job (p.152).

When reviewing the advantages and limitations of self-instructional materials in his study, Torkelson concluded: "Perhaps more self direction and more depth in the actual utilization of audiovisual materials in all of the courses in teacher preparation may be the answer" (pp. 151-152).

Utilization of Audio-Visual Materials in Teaching Situations

The main reason for using audio-visual materials in teaching is to improve the communication of ideas. When communication is improved, it makes learning more effective. Dickey points out that,

teaching and learning would be measureably improved if each teacher would take only a moment or two each day to determine whether or not he was really communicating effectively with his students (1956, p.180).

The root of the word "communication" means "to make common" and this is the basis for using audio-visual materials. Many times teachers fail to communicate their ideas

effectively through the spoken word or by means of textbook material. Dickey supports his earlier statement by adding that, "When pictures or other media are employed the meanings and ideas become more understandable to pupils" (1956, p. 181).

Communication may be precisely perceived when concrete and specific objectives are involved, but may break down when the words or symbols are not on the level of concrete or specific experience. At this point, audiovisual materials become a real tool to learning, illustrating concepts and supplementing other materials when concreteness is not possible in textual material.

In a study by Dickey (1956) a test given to high school seniors included two very similar items. In the first question, the students were asked to find the cost of seven theater tickets if one ticket cost sixty-seven cents (tax included). The second question was more general and asked, "how much X tickets would cost if one ticket cost Y cents." Although every one of the seniors solved the first problem, they experienced difficulty with the second question, largely because they could not conceptualize something which was not concrete. It was at this point that visual aids were employed to show the students, through blackboard illustrations, what X and Y meant (p. 181). Dickey added that,

. . . sound ideas for the use of audiovisual materials would rule out the indiscriminate showing of films or listening to the radio. Only when audiovisual materials are related to the materials under consideration and only when the materials can add something to the learning experience should they be used. Learning theories stress the importance of need-centered learning activities which will assist the learner to deal more effectively with the problem (p. 182).

The quote above makes the point that the availability of audiovisual materials should never be the determinant aspect of the learning activity. Their selection is an important responsibility of the teacher. One of the major points to be remembered by the preservice teacher is that films, recordings, or other prepared audiovisual materials should be previewed before presentation. Only through such procedure can the teacher relate the materials to the lessons under consideration and be certain that the materials are appropriate in every respect. Appropriateness, however, need not rule out homemade or extemporaneous materials.

. . . too often it appears that the teacher feels that films are the only audiovisual materials which are available for use. In reality there are hundreds of different materials and media. The effective teacher considers all possible devices and then selects the one which seems most useful and effective. For example, a geometry teacher in explaining a point regarding the volume of a circular object may find that the blackboard with its flat surface is not satisfactory for making his point clear. One resourceful teacher merely reached down and lifted the wastebasket to his desk and used this object

for his explanation. This common object proved to be just as useful and effective in his teaching situation as any visual aid could possibly have been (Dickey 1956, p. 182).

Whatever medium is employed, whether it be films, recordings, radio, television, mock-ups, drawings, or something else, the student teacher needs to relate it carefully to the regular teaching presentation. A preview, preparation of the class for the audiovisual materials, actual presentation and the followup are all essential steps if optimum benefit is to be gained from audiovisual teaching techniques.

Dickey's view of the knowledge and skills which are necessary if teachers are to utilize audiovisual materials most effectively, includes:

1. An understanding of the psychology of learning and its relationship to audiovisual materials;
2. An understanding of the fact that audiovisual materials and techniques are applicable in all areas of the curriculum and at all levels;
3. A recognition that audiovisual materials cannot replace the teacher but will only aid in making communications more effective;
4. A knowledge of the types of audiovisual materials in the teacher's particular area of interest;
5. A knowledge of sources of free and inexpensive materials;
6. Skills in the operation and care of the most common pieces of audiovisual equipment; and

7. Skills in the use of the materials themselves
(1956, p. 183).

Audiovisual materials courses are means of helping preservice teachers learn valuable ways of communicating in teaching. Preservice teachers should take any opportunities available to familiarize themselves with the latest and best instructional aids.

Audiovisual materials help to improve communication in teaching learners, improve communication between learners and improve communication with teachers. As Dale (1956) pointed out, all teaching can be greatly improved by the use of audiovisual materials because they can help make the learning experience memorable. All teaching, when audiovisual materials are used intelligently, can promote the most effective kind of learning in adults as well as children.

The contributions of each instructional medium to classroom teaching will be considered in this section. Though no attempt is made to list all the contributions made by each instructional medium, specific instructional media utilizations are cited as they contribute to an understanding of the researcher's position.

The Saginaw School Study

Hill (1977) did a film study demonstrating the effects of positive reinforcement for teaching social behavior to

inner-city kindergarten children in the Saginaw (Michigan) school district. It is important to remember that this study took place precisely at the beginning of school in the fall, before behavioral patterns were firmly established by children. Three specific behaviors examined were: (a) taking turns; (b) following directions; and (c) group problem-solving. Adult attention was directed toward those children exhibiting desired behavior and withheld as an immediate consequence of undesired behavior.

Hypotheses tested were:

- (1) The number of times children take turns will increase when positive reinforcement is immediately directed toward the children exhibiting desired behavior.
- (2) The number of children following directions will increase when positive reinforcement is immediately directed toward the children exhibiting the desired behavior.
- (3) The number of children participating in group problem solving sessions will increase when positive reinforcement is directed to the children exhibiting the desired behavior.

Procedure

A film was used to carry out the procedures. Filming took place in an inner-city kindergarten classroom and was an 18 minute study divided into three main segments. The first segment took place in the first week of school. It showed the children:

- (1) playing alone or parallel to other children;
- (2) incapable of taking turns and following directions in groups;
- (3) unable to participate in group problem-solving; and
- (4) unable to work and play cooperatively in problem-solving.

The second segment of the film demonstrated the use of positive reinforcement as a means of helping children to acquire specific social behaviors; it showed how quickly children responded to adult attention that was directed to those engaged in desirable behavior. Furthermore, the children were told what behavior is expected of them and the teacher referred to the specific behavior when calling attention to the children. The third segment of the film showed the children engaged in desirable social behavior as a result of their own motivation and self-control. Children were shown sharing ideas and activities with each other, playing and problem-solving in groups cooperatively.

Research Outcomes

1. The number of times children took turns did significantly increase when positive reinforcement was immediately directed toward the children exhibiting the desired behavior.
2. The number of children following directions did increase significantly.

3. The number of children participating in group problem-solving did increase significantly when positive reinforcement was directed toward the children exhibiting the desired behavior.

The above study shows that the film is a valuable tool to use in investigating the kind of learning children experience. Also the investigative film is an excellent source for preservice and inservice teachers.

The Hagerstown Instruction Television System

The instructional television system in Washington County, Maryland was started in September 1956 to serve schools in the immediate area of Hagerstown, Maryland and Washington County. Wade (1967) noted Washington County wanted to improve classroom instruction, notably by sharing its best teachers and by offering specialized teachers; by expanding in-service teacher training to meet some of the growing problems of school overcrowding (for example, by teaching classes in large groups where appropriate and by sharing teachers over large numbers of pupils). The Ford Foundation and Industries Associated provided funds to buy the equipment. During the first year of broadcasting, about 6,000 students were served, as the program grew, the number of students served reached 20,853 in 1965 and 22,000 in 1972-73.

The system broadcasts about seventy hours a week, fifteen of them elective. The largest number of television

courses were in seventh, eighth and ninth grades. Wade reported that classroom teachers were assigned to television teaching on the basis of "rapport with teachers in the classroom--attendance record--dramatic flair--ability to handle criticism, and special preparation in the field." The television assignment is for one or two years, then the teacher returns to classroom teaching. Most television programs are live programs.

In 1965, the Ford Foundation (International Research Associates) conducted a survey of teachers' attitudes. Their findings indicated that the degree of favorableness toward television declined noticeably from elementary through high school. That is to say, the higher the grade, the less favorable the teacher was toward television classes.

The Washington County Board of Education reported achievement results for students learning from instructional television during its first year of utilization (1956-57). Fifth grade students gained an average of 1.9 grade equivalents on a national test. Achievement gains for urban and rural students in mathematics in grade 3, 4, 5 and 6 exceeded the national norm of 1.0 grade equivalents. Also, within Hagerstown, students in a given grade had higher average test scores than their predecessors at that grade level who had less exposure to television. For example, students in rural schools in grade 5 scored 5.34 in May 1958, with

television; 5.71 in May 1959, with one year of television; and 6.11 in May 1961, with three years of television.

The Washington County Instructional Television Committee conducted an attitude survey of parents, teachers and students toward the television teaching system. Although the sampling methods used were not clear, the results they published in the local papers were negative. For example, 2,439 students felt that they learned more from the television teachers; 2,111 of 3,360 felt that television did not motivate them to learn, and 2,201 of 3,244 students felt that they would rather learn without television. A total of 180 responses was obtained from the general public. Nearly 60 percent of this sample felt that television, could be a benefit to student learning, if costs would remain the same. Approximately 50 percent of elementary and secondary teachers responding to the survey felt that instructional television did not improve quality of instruction.

Jamison, Kless and Wells concluded that because of the relatively low number of students involved in the system and the rather high costs of programming, the costs of the Hagerstown television project have remained high. The length of experience of the Hagerstown project showed the declining relative price of equipment as a result of extended equipment life, an important advantage of technology in the past.

Although the project was expensive, the recommendations of the 1973 evaluation committee suggested that the

system continue but should be modified to increase effectiveness and reduce negative reactions. The recommendations included:

1. The use of "direct" televised instruction for art, music and language for elementary levels and as a supplement for other elementary subjects.
2. The use of instructional television as a supplement only for secondary courses.
3. The introduction of new "direct" instructional television use only when:
 - a. There is evidence of a positive effect upon learning;
 - b. An investigation has been made to determine if other materials may be leased or purchased; and
 - c. A continuing evaluation for modification or cancellation of the course has been established.
4. The use of videotapes to allow time for editing and improvements prior to presentation.
5. An investigation of the cost and feasibility of other instructional media to provide classroom teachers with wide variety of resources.
6. The establishment of a system to rotate television teachers back to the classroom.
7. The replacement of classroom receivers on a regular basis with consideration given to the use of color receivers; and,

8. The development by the studio teacher of a test of the performance of students, to be used as a measure of effectiveness.

The foregoing description of existing programs and experiments shows that instructional media used as supplements to classroom teaching are effective. The media worked as well as other classroom teaching. Used in the right place, in the right way, for an appropriate purpose, instructional media will improve classroom teaching and learning experiences. Furthermore, instructional media can introduce demonstrations otherwise impossible in the classroom, take the students to a part of the world they would not otherwise experience, bring into the classroom a distinguished visitor or authority with special expertise. They can also offer a change of pace from the routine of everyday teaching.

Tape-Recorded Lectures in the College Classroom

In August 1961 Popham did a study which assessed students' reactions to a tape-recorded lecture versus conventional methods. Students were to rate the instructional method used for:

- (a) its effectiveness in facilitation learning;
- (b) its effectiveness in promoting interest in the subject matter area; and
- (c) its effectiveness in facilitating enjoyment of the course itself.

The investigation consisted of 36 subjects enrolled during 1971 in an evening class of principles in secondary education. It was a requirement in the college credential sequence leading to California certification for secondary school teachers. In the first meeting, the subjects were informed about the experiment in which they would be involved. The subjects then made choices whether to be taught by an instructor or enroll in a tape-taught course. In the tape-taught course, a graduate assistant was assigned to lead the discussions. He was supposed to play the role of a group leader.

During class the tape-taught subjects listened to a recorded lecture for 60 to 70 minutes. A ten minute recess was taken and subjects discussed the topic for an hour and 30 minutes. The conventionally taught section was conducted as a standard lecture-discussion; subjects met for the same length of time and dealt with the same topics as their tape-taught counterparts. No books were allowed in either group. The measure utilized for the experiment was a 100-item examination covering the basic content of the course in principles of secondary education.

Research Outcome

There were no significant differences between the two groups in respect to sex, age, previous teaching experience

or number of units completed in professional education courses.

The subjects in the tape-taught course expressed:

- (a) better organization of lecture material than in a typical class;
- (b) superior opportunity to take lecture notes;
- (c) post-lecture discussion situation induced greater need for self-study; and
- (d) relaxed atmosphere yielded by instructor's absence promoted free expression of ideas.

Subjects in the conventional course expressed the following comments:

- (a) the instructor could not clarify lecture material;
- (b) the danger of a few students dominating discussion period;
- (c) occasional monotony of lecture tape; and
- (d) no opportunity to discuss.

Simulation Games

The basis for using simulations or games as an instructional tool is that by abstracting phenomena from the real world, students are provided with a more simplified and comprehensive universe. Gultzhov (1962) said,

Games offer opportunities to apply and experiment with knowledge gained from reading and other experiences. Another advantage of simulations is that students can gain insight and understanding into behavioral aspects of others in which they share experiences with their classmates (p. 154).

This approach, however, is not without its critics. Questions have been raised as to whether student interest can be maintained and whether the emotional aspects of real-life situations can be simulated. The study below supports simulation games.

In 1974 a simulation study was conducted by Buckley at the University of Maryland and Howard University. The study was designed to measure change in the level of college students' knowledge about and attitudes toward the political system after active participation in a simulation of state and local governmental processes.

The game was created to integrate classroom activities with assigned readings at the beginning of the term; students selected roles which they were to develop and play consistently throughout the semester. While the roles chosen were representative of actions found in state and local communities (for example, business and civic group leaders) students were free to choose experimental, ideological, and positional frameworks to serve as cues to how they should participate.

The simulation consisted of a series of activities. The first activity performed by the political actors was to create a political community with basic rules. Once the types of locality (for example, city, county) and charter (for example, optional, home rule) were agreed upon, a charter convention was "called" to form the legal framework under which the locality was to operate. The third task was to recruit, elect, and appoint the public officials responsible for conducting state and local government processes. The next activity was to pass laws for the state and community. During this activity, bills were introduced, testimony was heard, legislative votes were taken, and executive concurrence was given or withheld. The fifth function simulated was rule execution in which such proposals as citizen participation were debated. The semester ended with a county meeting to adjudicate conflicts which arose during the course of the term. Two weekly newspapers with differing ideological perspectives, served as the principal network for both informational sources and linkage systems.

Data Collection

In order to measure the extent of change in knowledge and attitudes, students completed the same interview schedule at the beginning (pretest) and at the end (post-test) of each semester.

The questionnaire was composed of items which pertained to: students' educational and personal background; political participation, media usage; interest in state and local government; political efficacy, attitudes toward and trust of political party, electoral and governmental systems and public officials, and knowledge of state and local governmental processes. The attitudinal questions utilized were modification of those developed by other researchers, particularly Dennis (1966, 1970) and Hess and Torney (1965, 1967).

The data derived from the interview schedules were utilized to test the following hypotheses:

- HO:1 No differences in political knowledge about and attitudes toward sub-national political systems will occur after students have participated in state and local governmental simulations.
- H1:2 Students who have participated in state and local government simulations will demonstrate an increase in political knowledge about and positive attitudes toward sub-national political systems.

Specifically, it was hypothesized that participation in state and local political games would result in students having:

- (1) higher level of support for the political party;

- (2) a higher level of acceptance of the political party as a cue source in voting;
- (3) a higher level of political participation in governmental processes;
- (4) increased levels of media consumption;
- (5) a higher level of interest in state and local government;
- (6) a lower level of political cynicism; and
- (7) more knowledge about state and local political processes.

Table A presents the questions comprising the three attitude scales and the factor loadings for each of the attitude measures.

Six indices were created by addition of scores to individual questions. First, a participation index was constructed of questions dealing with twelve different political activities and responses were weighted, with those activities demanding the greatest expenditure of energy receiving the highest scores. Second, political knowledge was measured by twenty test questions with multiple choice answers about state and local governmental processes. Scores ranged from 1-10. Third, the media index consisted of items pertaining to the frequency of student usage of television, magazines and newspapers for political information. Scores ranged from 0-3.

Table A. Party System Support, Voting Cue, and
Lack of Cynicism Scales

Questions	Factor Loadings
<u>Party System Support</u>	
1. Our system of government would work a lot better if we could get rid of disagreements between the parties altogether	.53784
2. The parties do more to confuse the issues than to give a clear choice on them	.66187
3. More often than not, political parties create conflicts where none really exists	.57167
<u>Voting Cue</u>	
1. The best rule in voting is to pick the man regardless of his party label	.45087
2. The most important thing to consider when voting is the political party to which each person running belongs	.66586
3. It is good to stick with your party through thick and thin	.57809
<u>Lack of Cynicism</u>	
1. How much of the time can you trust the government to do what is right?	.55096
2. There are some big powerful men who run the government and they do not care about us ordinary people	.45063
3. I do not think people in the government care much about what people like me think	.47042
4. Would you say that the government is pretty much run by a few big interests looking out for themselves or that it is run for the benefit of all the people?	.52835

The Sample

The questionnaire was administered to 136 students enrolled in four state and local government sources at the two universities. The sample was composed of seventy-nine Howard University and fifty-seven University of Maryland students. Their ages ranged from eighteen to forty-eight with the mean being twenty-one. The members of the classes represented a wide variety of academic disciplines, although a large portion (49.3 percent) were declared government majors.

Methodology

A quasi-experimental design was utilized. Quasi-experimentation refers to studies which attempt to compromise between the practical limitations of conducting empirical research and the rigorous demands of true experimentation.

T-tests and a tailed test for significance were utilized to measure and evaluate the differences between the students' scores on the presimulation test and their scores on the post-test taken at the end of each semester.

The findings are presented in Table B.

Table B. Results of Government Simulation Study

	Local Interest		N
	Before	After	
Total Sample	4.102	5.904 _a	136
<u>SUBGROUPS</u>			
Few Government Courses	3.872	5.802 _a	86
Many Government Courses	4.583	5.875 _b	48
Male	3.791	5.934 _a	91
Female	4.861	6.023	43
Non-Government Major	3.844	5.768 _a	69
Government Major	4.388	6.045 _a	67
Howard	3.861	5.544 _a	79
Maryland	4.509	6.404 _a	57
Underclass	3.841	5.909 _b	44
Upperclass	4.256	5.856 _a	90

a. significant at .001

b. significant at .01

c. significant at .05

Findings

The simulation did not appear to affect attitudes toward the political party system in general or increase identification with parties as vote cue sources. As the scores on the media index indicate, students frequently utilized the media as sources of political information. The range of possible scores on the index was from 0 to 9: the pretest mean of 6.28 and the post-test was 6.611 (the difference of means being significant at the .05 level).

Interest in local government also showed significant gains. The mean before simulation experience was 4.13 and the mean after was 5.90.

Conclusions

As the study was conducted to ascertain whether or not the use of a simulation as a classroom method may (a) increase interest in state and local government and politics (b) increase knowledge about subnational political processes and (c) increase political activity, the findings demonstrated support for all the hypotheses. The significant increases in students' scores on state and local interest, knowledge, and participation indices indicates that simulation can provide a valuable learning experience. Perhaps an equally important outcome was that students had fun in participating in the learning experience.

Effectiveness of the Overhead Projector in
Teaching Specific Subjects

In September 1967, Perlberg and Resh investigated the use of overhead projectors with two bodies of students at the Technion-Israel Institute of Technology, selected at random. One class was studying descriptive geometry and the other studying hydrology. Each class was divided into experimental group (A) and control group (B). The lecturers involved had not previously used any such instrument in their lectures.

Methodology

The investigation covered a period of one term, 14 weeks, divided into two periods, the pre-experimental period (0) and the experimental period (1). Both groups in each class had the same lectures, the sole distinction being that in group (A) the overhead projector (OP) was used in period (1). The average mark of the student over the whole term was used as the achievement criterion.

Although the division into groups was done randomly, when the comparative achievements of the student were analyzed statistically, it was assumed in advance that the two groups were not homogeneous in their levels of achievements. Thus the testing was based on comparative statistical analysis of each student's achievements throughout the period,

and a comparison of achievement in both groups in the two period.

It should be noted that the first lecture was given the experimental group, and the lecturer recapitulated from time to time, using suitable transparencies. A general review was given in both groups prior to the term examination. In addition, both groups were given a mid-term quiz based on the material covered in the control group, which was identical to that covered by the other group, except for additional explanations made possible by the time saved in substituting projected finished or half-finished sketches for blackboard drawings.

(a) Class I - Descriptive Geometry

This class was made up of first-year students. The conventional teaching method included blackboard use, with large drafting instruments.

Another aid, used by the lecturer with the experimental group, was a transparent drafting board, equipped with adjustable T-squares and mounted on the projector, which enabled him to draw freely and accurately on the transparency.

(b) Class II - Hydrology

This class was made up of third year students. The conventional teaching method adopted in the control group consisted of lectures accompanied by occasional writing and drawing on the blackboard.

In the experimental group, the overhead projector was used with a large number of black and white or color transparencies to illustrate details referred to during the lectures and to enrich the lectures by means of visual examples which could not otherwise have been effectively presented.

(c) The Students' Attitude

In order to ascertain the students' attitudes towards the overhead projector, an attitude questionnaire was drawn up in which participants were required to estimate to what extent the overhead projector contributed to understanding of the subject matter, to facilitating note-taking, to concentration, and to retention.

Results

Results in the descriptive geometry class showed that relative improvement in two experimental groups was significant. There was greater power of concentration when compared with the control group, which dropped significantly. In both groups, relatively greater improvement was noticeable among the poorer students than among the better ones.

Results in the hydrology class showed that the difference between the experimental group and the control group was not significant. In the control group, some decline in the level of achievement of the better students was noticeable.

A significant majority of the students in both experimental groups favored using the overhead projector. However, no significant correlation was found between their attitudes and achievements.

Used appropriately, any medium of instruction can be effective. A film worked well in the Saginaw School District in Michigan for reinforcing social behavior taught to inner-city pre-kindergarten children. Instructional media systems worked well in Washington County, Maryland in 1956. The use of tape-recorded lectures in an evening class was beneficial in California. A study of effects of simulation in state and local government course was effective in increasing positive attitudes toward and information about government. Use of the overhead projector was found to increase achievement in descriptive geometry classes, but not in hydrology classes. These studies have demonstrated the use of a wide variety of media. Other things being equal, the ideal medium for supplementary use is one over which the classroom preservice teacher has the most control. This is to say, supplementary instruction should be introduced into a given classroom when the class is ready for it. The preservice teacher should be able to repeat it, stop it in the middle, delay it for a question or combine it with such other classroom experience as the situation seems to require.

Peterman (1982) studied selected research on the application of educational media in primary and secondary schools. His study reveals important findings which support the previous studies. He drew general conclusions from the selected research abstracts in six media formats as follows:

- (1) The use of classroom media (each of the six formats reviewed*) can assist students to attain cognitive, effective, and psycho-motor learning activities.
- (2) Classroom media can be as effective as (and in many cases more effective than) traditional non-mediated classroom instructional methods.
- (3) In most cases, the use of classroom media can help bring about as much or more learning in less time, with less cost, than is required by traditional instructional methods.

The Selection of Audiovisual Materials for Use in Education

It is important from the standpoint of methods of teaching to recognize that instructional media aid successful teaching at levels from the nursery school through graduate school and in adult education. Therefore, this part of the literature review concerns the selection of appropriate audiovisual materials for use in schools.

In 1955 McClusky pointed out that an audiovisual program which is based on any one type of aid--such as the

motion picture--is unsound. He listed the following consideration in selecting materials for use in schools:

1. The needs, abilities and interests of the pupils.
2. The furtherance of educational objectives and the aims sought in the local course of study.
3. The relative cost of the aid.
It is unwise to select an expensive type of audiovisual aid when a less expensive type would serve as effectively, if not better.
4. The resources of the local environment:
 - (a) A survey of the resources in the school and community should be made.
 - (b) Don't overlook the common place aids, which are often more valuable than the more expensive technical ones.
 - (c) Field studies are possible in every community.
 - (d) The sources of other educational agencies in the community should be tapped. Industries, zoos, museums, farms, governmental agencies, transportation units, welfare agencies, churches, parks, and the like, abound with instructional materials.
5. The sources of other departments of instruction in the school or educational institution.

Instructional Media Competence

In consideration of each contribution to media competence no attempt is made to list all the competencies

recommended by each writer, but specific competencies are cited as they relate or contribute to the understanding of the writer's position. McMahan (1968) indicated that a substantial increase in the use of audiovisual materials after World War II focused attention on teachers' needs to acquire media competency. As a result, a number of surveys were made to ascertain what general and specific competencies media specialists felt teachers should develop.

In an article called "What Constitutes Teacher's Competence in Audiovisual Communication?," published in Phi Delta Kappan (1959), Fulton and White reported the general consensus that selection and utilization competencies could be divided under four headings:

- (a) selection-evaluation of materials;
- (b) utilization of appropriate instructional materials;
- (c) production of simple instructional materials; and,
- (d) preparation and use of physical facilities.

In 1957 a study was conducted by Pascol in California which established the priority of competencies in selection and utilization of media. Pascol's 1959 report listed eight competencies rated by instructors of audiovisual courses and directors of audiovisual programs. Utilization and selection of media were identified as most crucial.

However, as time went on, competency lists began to focus on the relationship of media to the total instructional program. The participants at the 1958 Lake Okoboji Audiovisual Leadership Conference, for example, recommended that teachers have a working knowledge based on certain, "philosophical and psychological factors underlying use of audiovisual materials in the teaching/learning process" (Allen, 1958, p.29). Those selected for special emphasis:

1. Knowledge and understanding that the accepted principles of use of audiovisual materials are based on sound research.
2. Communication theory and learning theory underlying the use of audiovisual materials and equipment in the classroom.
3. Understanding the relationship of audiovisual materials to the curriculum (p.29).

Topics discussed in a Meirhenry publication included an opening paper by Heinich which dealt with instructional systems, media teacher, configurations, and the changing relationship between teachers and audiovisual materials. While the concept of audiovisual materials as an "aid" under complete control of the teacher is firmly entrenched in public education, Heinich argues it is important for teachers to handle both media materials normally under the control of the classroom teacher such as television teacher, writer of programmed instruction,

etc. In addition, he declares, "every student in pre-service training should be required to teach a substantial piece of his major field in mediated form (Heinich, 1966, p.7).

Norberg put more emphasis upon theory and research. He emphasized that teachers need not be capable of carrying on independent experimental research but must be able to interpret and apply the findings of educational experimentation from a background in a discipline that contributes to a liberal professional type of teacher education program. Norberg (1966) says,

The audiovisual process is a problem in presentation of instructional materials; thus, the theoretical background should be drawn from learning theory but also from communication theory and perception theory, at least; and the media dialogue probably ought to be philosophical rather than oriented any specific discipline (1966, p.59).

Gerlach presented a more practical approach, emphasizing the importance of stating the learning task in behavioral terms and basing selection of audiovisual materials on what one is trying to accomplish. Stimulus-response oriented, he advocates that a teacher be able to define the stimuli he wants to present and the reinforcing stimuli that follow emission of the desired response. Then, to select the appropriate medium, the teacher must

also be familiar with the various stimulus characteristics of various media (1966, pp.7-15).

Curl (1966) was more interested in the utilization of self-instruction systems for teaching the operation of audiovisual equipment. He stressed how rapidly knowledge about machines becomes obsolete and the importance of keeping teacher education programs up-to-date. While he places little emphasis on specific competencies, he presents a table and discussion that illustrate the five stages in the changing roles of teachers, from those who use little or no media to those who are manager of the learning situation and rely almost exclusively on one medium. This perspective is necessary as a rationale for understanding the recommendation of certain competencies, e.g., ability to work with mediated teachers, and the use of self-instructional systems in education (pp. 104-124).

Kemp, who is interested in production of audiovisual materials, suggests that certain specialized production skills, such as modern building, plastic embedding and sand table construction, be taught best as part of subject matter methods courses. He also recommends a basic and manipulative skills course be available to those in general teacher education programs (1966, pp. 127-166).

Meierhenry (1966), in a final chapter to his collection of studies on media competency, summarizes the work

of various contributors by presenting a list of media competencies classified as production and/or operational skills. A succinct summary, it is presented here in full.

Conceptual and/or Operational Processes (Cognitive)

1. To develop instructional objectives in behavioral terms followed by specification and arrangement of instructional stimuli upon which the desired behavior is contingent.
2. To gain knowledge about and experience with media so that their respective characteristics might be known. Such knowledge should help the designer of the instructional sequence to make acceptable intuitive judgments as to which medium used alone or in combination with other media will most effectively and efficiently produce desired behavior change. What extant media are not available or where they do exist but require additional elaboration, experience in designing media in order to achieve the desired results should be provided.
3. To try out analyses critique and modify unit prepared and used with one or more learners processing the psychological characteristics for which the unit was prepared.
4. To have experience with instructional systems involving man-machine relationship. Television is likely the best medium for most prospective teachers although programmed instruction or learning laboratories might be more suitable for certain content areas.
5. Actual experience with the total range of instructional resources which are available in both substantive as well as professional areas of teacher education

programs. The first-hand encounters with the media will enable each prospective teacher to judge the effectiveness of each media.

Theory (affective)

1. To understand the explosive growth of modern technology, particularly in communications and the storage and retrieval information area.
2. To be conversant with the impact of new technology upon education.
3. To understand the implications of learner-centered and response-oriented instruction.
4. To have a thorough grounding in the psychology of learning, including orientation to various theoretical perspectives and corresponding lines of research in instructional techniques.
5. To understand the concepts of operations research and systems analysis as they have developed in the scientific study and management of military and industrial applications in education.
6. To be acquainted with the various and conflicting strand of perception theory and to have some grasp of the bearing of perception theory and research upon instructional procedures.
7. To be acquainted with communication theory, its relationship to perception theory and use as a tool in the analysis of instructional problems.
8. To be acquainted with the broad scope of instructional research as related to the use of media and its prominent underlying theoretical constricts (pp.225-229).

Instructional Planning

This part of the literature review will concern ways of providing teachers with knowledge of how to plan good instruction. Merrill (1972) has stated that a school can be thought of as containing at least two types of environments, an interpersonal environment and an instructional environment. It is possible to identify two different types of teacher skills, interaction skills with which a teacher interacts with a single student or group of students and planning or design skills with which a teacher structures the interactions to bring about some specified objective. Combining these two types of skills with the two types of environments, one can identify four different areas for teacher training, e.g., (1) instructional planning, (2) instructional interaction, (3) interpersonal planning and (4) interpersonal interaction.

According to Merrill these four areas of instruction have been largely ignored or otherwise inadequately handled by many teacher training programs, mostly due to the fact that insufficient knowledge has existed in this area. "Therefore, one of the reasons for developing the instructional quality profile was to provide teachers with knowledge about how to plan good instruction" (Reigebeth, 1967, p.7). He considered that instructional materials a teacher uses in his or her class (e.g. textbooks, films, workbooks) much of the subject matter

considered important by the teacher will not be presented adequately enough for many students to understand it in the manner desired.

The following are some of the major problems related to instruction planning:

1. The instruction in the textbook is often not appropriate for learning a topic in the way that a teacher thinks it should be understood. For instance, the textbook may facilitate remembering a principle. Given such mismatches between the teacher interactions or objectives and the realities of the textbook, teachers could provide supplemental knowledge or experience or practice to effect the kind of learning intended. For instance, providing examples of the way a principle explains actual events of phenomena may help students learn how to apply the principle, rather than merely to remember it.
2. Even when there is no mismatch between the teacher's intentions and the realities of the textbook, slower students may need additional kinds of knowledge, experience or practice in order to understand a topic. For instance, if a student does not understand what a metaphor is, the teacher could use a variety of techniques to draw the student's attention to those characteristics that make a set of words a metaphor.
3. Teachers test sometimes assess students' ability to recall knowledge rather than assessing their ability to apply or use that knowledge, even though the teachers' intentions were otherwise. For instance, in order to measure a student's understanding of a concept, the teacher might ask for the definition of the concept, rather than requiring the student to classify unfamiliar examples and non-examples of the concepts.

Such instructional planning can be more effective if it is begun by preservice teachers while they are still learning how to teach and able to break down methods into their component building blocks for analysis.

In recent years audiovisual research has increased and such leaders as Finn (1956), Hoban (1956) and Carpenter (1960) have theorized that the systems approach is an appropriate method of dealing with complex learning situations. As Trzebiatowski (1967) concluded in his study, the potential of the systems approach in higher education supports this point of view. It is important to understand the degree to which systems capabilities match situation requirements.

Summary

In summary, the literature has laid the groundwork for the entire research. It has briefly described the history of audiovisual instruction, tracing it through the educational history of mankind. It has shown how some leaders in education have contributed to the development of instructional media.

This chapter has covered methods of teaching which can benefit preservice teachers before they join the teaching profession. Research done by scholars in teaching methods has been quoted and provides sufficient information on which to base this study.

Sometimes teachers fail to communicate their ideas properly through spoken word or by means of textbooks. Audiovisual materials can provide a real tool for learning by illustrating concepts which cannot be comprehended through textbook and lecture only. Research on how audiovisual materials help to enhance learning has been quoted in this chapter.

Media competence for teachers has been dealt with to show how media can help preservice teachers in teaching. Research done in this area has been cited to provide background for this study.

The final selection of this literature review has described the selection of appropriate teaching materials and the importance of keeping teachers informed as to recent developments in materials of instruction.

Instructional planning and change processes have been discussed to show ways of planning and change that can take place with the use of instructional media in classrooms.

CHAPTER III

METHODOLOGY

The purpose of this study is to determine the effect that training, experience, and availability have on use of instructional media in the classroom by preservice teachers. This study is a descriptive research utilizing a survey designed to gather appropriate information about the dependent variable, use of instructional media in the classroom. The three independent variables appear in the following sequence:

1. experience with instructional media
2. training in instructional media, and
3. availability of instructional media to preservice teachers during student teaching.

The study addresses four main questions:

1. Is the interaction among (a) training in, (b) experience with instructional media, and (c) availability of instructional media related to the level of instructional media use by preservice teachers?

2. Is the level of formal coursework or informal education in instructional media related to the level of use of instructional media by preservice teachers?

3. Is the availability of instructional media in a school related to the level of its use by preservice teachers?

4. Is the level of experience with instructional media related to the level of use of instructional media by preservice teachers? (Experience with instructional media includes informal education, ability to operate equipment, or simply being a spectator.)

The following null hypotheses are tested:

- H₀₁: Level of interaction among formal education, types of experience and availability does not significantly affect the use of instructional media during student teaching.
- H₀₂: Level of formal coursework or informal education in instructional media does not significantly affect the use of instructional media during student teaching.
- H₀₃: Level of availability of instructional media in a school does not significantly affect its use during student teaching.
- H₀₄: Level of experience with instructional media does not significantly affect the use of instructional media during student teaching.

Population and Sample Selection

Population

The population for this study was comprised of 605 primary preservice teachers who did student teaching during

the 1981-82 academic year, and who were enrolled in the College of Education at Michigan State University.

Sample Selection

The subjects used in the sample were selected from those who had been student teachers and who were enrolled in the College of Education at Michigan State University in the Spring Term 1982. It was felt these subjects could be easily contacted, in person, by the researcher while they were on campus. Also, by letters including a questionnaire for those who had left campus. By the time the questionnaire was prepared, however, most subjects had left campus so the sample was narrowed to Michigan residents to facilitate mail contact. Subjects were selected because:

1. they had done most of their formal coursework prerequisite to student teaching.
2. they had done student teaching in the 1981-82 academic year
3. they were registered as students in the Spring Term, 1982
4. they were residents of Michigan
5. they had done student practice teaching in primary schools

Since most subjects had already left campus for summer vacation, they were contacted by mail at their home addresses. Questionnaires were mailed on June 4, 1982. A deadline of July 15, 1982, for return of the

questionnaire, was given in a cover letter included with the questionnaire and a return envelope (See Appendix B).

Instrument

A questionnaire (Appendix D) was designed for collecting data on the independent variables of (a) level of experience with, (b) formal and informal instruction in, and (c) availability of instructional media as they affect the dependent variable, use of instructional media, in the practice teaching experience.

The questionnaire was comprised of four parts:

Part I--Level of use with instructional media among preservice teachers as it relates to the classroom.

Part II--Level of instruction in media, in both formal and informal education.

Part III--The level of availability of instructional media in the school.

Part IV--Level of experience with instructional media.

The questionnaire was developed using these four areas as criteria guides. They were also used as major headings under which the details of each of the areas were examined.

The data collection instrument was pilot tested in April 1982, using fifteen preservice teachers who had

done observation in primary schools. During the pilot study it was discovered that some subjects were not familiar with some technical terms on the questionnaire that were later clarified. Others had difficulty with headings and instructions. Otherwise, the instrument satisfactorily measured what the researcher intended it to measure. It was also determined that the questionnaire took only twelve minutes for average readers to complete.

Headings and instructions on the questionnaire were revised so that instructions were made clear. The revised and validated questionnaire was sent to the sample of 120 preservice teachers with a cover letter (Appendix B) explaining the purpose of the study.

After a period of two weeks those preservice teachers who had not responded were sent cards reminding them to return the questionnaire before the deadline of July 15, 1982. A list of their names was provided by the director of teacher education.

Of the 120 questionnaires distributed for this study 83 or 69.2 percent were completed and returned to the researcher. Out of 83 completed and returned questionnaires, 82 or 68.3 percent were used in this study. One questionnaire was discarded because two of four pages were not completed.

Variables

Dependent Variable

The dependent variable in this study was the degree of use of instructional media items. In Part I of the questionnaire, the subjects could respond with: "high use," which was given a numerical value of 3, "moderate" = 2, "low use" = 1, or "no use" = 0. This variable was assumed to be continuous in nature.

Independent Variables

The independent variables in this study were level of training in instruction media (T), level of experience with instructional media (E), and availability of instructional media (A). These levels were measured in Parts II, III, and IV of the questionnaire.

Training in instructional media (T). Responses were divided into three levels: "formal coursework," "informal education," and "none." The responses were used to separate subjects into three levels of education (training), depending on their response to each question in Part II (see Appendix H).

Experience with instructional media (E). Responses were divided into four levels of experience: "high," "moderate," "low," and "no experience." Subjects who indicated "high" experience were put into a high experience group, those who indicated "moderate," "low," or "no

experience" were put into a low experience group (See Appendix I) because the number of responses in each cell was too small for sufficient data.

Availability of instructional media (A). The subjects were divided into two levels on the availability variable, high and low. Those who indicated "high" availability were put into that group, those who indicated "moderate" availability or "low" availability were put into the "low" group. Thirty who indicated "N/A" (not available) were excluded from analysis because they could not respond to Part I--Use of Instructional Media.

The responses to each instructional media variable are found in Table I.

Research Design

The research employed a 3 x 2 x 2 factorial design for instructional media items. This design was chosen for its parsimony, that is, major effects and interactions can be tested with one analysis of variance procedure for each of the 20 dependent (criteria) variables.

The following main effects and interaction were tested using:

Main Effects

E = Level of experience with instructional media (low or high)

T = Level of education (training) in instructional media (formal, informal, or none)

TABLE 1. Number of subjects responding at each level and each independent variable

Items	Education			Availability		Experience		
	Formal	Informal	None	High	Low	High	Low	
1. Workbooks	26	54	2	76	5	76	5	
2. Chalkboards	14	67	1	80	2	76	6	
3. Dry Mount Press	6	15	57	3	26	7	22	
4. Educational Games	26	50	6	21	57	58	20	
5. Simulation Games	31	22	18	17	46	43	20	
6. Wall maps	20	56	6	52	26	43	35	
7. Specimen	19	30	32	12	43	25	30	
8. Audio recorders, playback	23	55	4	45	32	60	17	
9. Radio programs, live or taped	4	27	50	8	38	5	41	
10. Phonograph	13	64	5	61	20	60	21	
11. Opaque projector	41	27	13	14	60	25	49	
12. Overhead projector	44	33	5	25	56	39	42	
13. Slide projector	36	37	9	38	36	16	58	
14. Filmstrips	41	40	1	23	59	11	71	
15. 66mm movie projector	50	25	7	15	60	61	14	
16. 8mm motion picture camera	19	18	43	3	40	8	35	
17. Computer instructional games	20	28	34	7	53	23	37	
18. Instructional TV	7	27	48	4	49	10	43	
19. Portable TV, equipment & video tapes	10	27	45	4	51	13	42	
20. TV broadcasts	5	29	48	3	40	7	36	

A = Level of availability of instructional media (low or high)

Interaction

E x T

E x A

T x A

E x T x A

Data Analysis

The first step in the data analysis was to transfer the questionnaire data to standard computer cards for analysis. All analyses were made using subprograms of the CDC 6000 and CYBER 70 Version of the Statistical Package for Social Science (SPSS) Computer programs.

The second step was to obtain frequencies on all variables in Parts I, II, III, and IV to determine the correctness of data and the number of subjects responding at each level to each item. The subprogram FREQUENCIES was used to produce these frequencies.

The subprogram BREAKDOWN was then used for each cell of the 3 x 2 x 2 Research Design to calculate the means and standard deviations of the dependent variables. It was found that for each item there were unequal n's between cells and, in some cases, empty cells. The original 3 x 2 x 2 Research Design called for a factorial Analysis of Variance to test for statistical differences

for main effects and interactions. The factorial Analysis of Variances were calculated using the subprogram ANOVA. The unequal n's found in cells in this factorial design precluded the use of the usual factorial ANOVA procedure that the SPSS refers to as the "Classical Approach" (p. 405), which is designed for equal cell frequencies. Instead, the regression approach to ANOVA was used, as an option for factorial designs with unequal cell frequencies. The use of this option was necessary because unequal cell frequencies result in correlations among the dependent variables (Overall and Spiegel, 1969, p. 311). When two or more independent variables are correlated, it is difficult to know which is influencing the other and to what extent. In the regression approach, as the effect of each independent variable or ^{each} interaction is assessed, adjustments are made for its correlation with all other types of effects. This renders each effect independent from any other effect in the analysis, making clear the extent of influence of an independent variable or interaction of independent variables on a criterion.

Main effects could be tested for experience (E), education (training (T), and availability (A) for all instructional media items. However, because of the empty cells or cells with frequency of 1, not all interactions could be tested.

TABLE 2. Effects tests for each dependent variable

Dependent Variable	Main Factors			Interactions			
	E	T	A	ExT	ExA	TxA	ExTxA
1. Workbooks	x	x	x	-	-	-	-
2. Chalkboard	x	x	x	-	-	-	-
3. Dry Mount Press	x	x	x	-	-	-	-
4. Educational Games	x	x	x	-	-	-	-
5. Simulation Devices	x	x	x	-	-	-	-
6. Wall Maps	x	x	x	-	-	-	-
7. Specimen	x	x	x	-	-	-	-
8. Audio Recorder, playback (reel to cassette)	x	x	x	-	-	-	-
9. Radio programs (live or taped)	x	x	x	-	-	-	-
10. Opaque projector	x	x	x	-	-	-	-
11. Overhead projector	x	x	x	-	-	-	-
12. Filmstrip	x	x	x	-	-	-	-
13. 16 mm movie projector	x	x	x	-	-	-	-
14. 8 mm movie	x	x	x	-	-	-	-
15. Instruction Television	x	x	x	-	-	-	-
16. Television Broadcasts	x	x	x	-	-	-	-
17. Computer Instruction and games	x	x	x	x	x	x	-
18. Slide projector	x	x	x	x	x	x	*
19. Portable Television Equipment and Video Tapes	x	x	x	x	x	x	-
20. Phonograph	x	x	x	x	x	x	x

Note: x indicates effect was tested.

- indicates no effect on test.

The possible tests for each instructional media item are shown in Table 2.

Summary

The study design was developed to collect data from a sample of 120 preservice teachers regarding their experience with (E) and training in (T) instructional media, its availability (A), and their use of such instructional media in classrooms during student teaching assignments. The data were collected by a mailed questionnaire, designed and pilot-tested by the researcher for this purpose. Eighty-two responses were used in this study. In the following chapter, the responses and analyses of the data will be detailed in presenting the study findings.

CHAPTER IV

ANALYSIS AND RESULTS

Introduction

The purpose of this study is to determine the effect that training, experience and availability have on use of instructional media in the classroom by preservice teachers. Analyses of responses from the returned questionnaires are presented in this chapter. Each dependent variable was analyzed by ANOVA, using its respective independent variables. The three independent variables appear in the following sequence: experience with instructional media (E), education (training) in instructional media (T), and availability of instructional media (A) to preservice teachers during student teaching.

The findings are presented in the order of the hypotheses tested and tables have been constructed showing each analysis. A brief summary of results concludes the chapter.

Hypothesis One

The first hypothesis tested for each of the 20 items was stated in the null form.

H₀₁: Level of interaction among formal course-work, types of experience and availability does not significantly affect the use of instructional media during student teaching.

Because of unequal frequencies in the factorial design, not all cells had sufficient numbers to test the effects of the independent variables. Of the 20 instructional media items, only six could be tested for interaction affects: portable television as shown in Table 3 and 4; slide projectors as shown in Table 5; wall maps as shown in Table 6; computer instruction as shown in Table 7; specimens as shown in Table 8, and phonograph as shown in Table 9. Of these, only portable television showed significant interaction. The ANOVA results and the n , $\bar{x}$, and standard deviation (SD) are presented in Tables 3 and 4.

The interaction of education (training) with experience (T x E) was significant for the use of portable television equipment and video tapes. To identify the interaction between education (training) and experience more specifically, Scheffe Post Hoc tests were performed on the means of all the T x E cells. The results of these tests are shown in Table 4. The subjects who reported having high experience and formal or informal education (training) used the portable television equipment and video tapes significantly more than subjects having any other combination of education (training) and experience. Since this 2-way interaction was found to be

TABLE 3. Anova of use of portable television equipment and video tapes in classrooms by student teachers

Source	df	MS	F	p
Education (T)	2	1.769	5.199	.009**
Availability (A)	1	.245	.719	.401
Experience (E)	1	14.326	42.094	.001***
TXA	2	.425	1.250	.269
TXE	2	1.195	3.510	.038*
Residual	47	.340		

<u>Portable Television</u>	<u>n</u>	<u>$\bar{x}$</u>	<u>SD</u>
Experience--low			
none	22	.091	.294
informal	16	.4375	.629
formal	4	.250	.500
Experience--high			
none	3	.667	.577
informal	6	2.000	1.095
formal	4	2.000	.817

*p < .05

TABLE 4. Results of Scheffe Post Hoc Tests on differences between use of portable TV equipment and video tapes cell means

Experience	Low	Low	Low	High	High	High
Education	None	Formal	Informal	None	Formal	Informal
Mean	.091	.150	.438	.667	2.000	2.000
Low None		.159	.347	.576	1.909*	1.909*
Low Formal			.188	.417	1.750*	1.750*
Low Informal				.229	1.562*	1.562*
High None					1.333*	1.333*
High Formal						0.000

*p < .05.

TABLE 5. Analysis of variance for use of slide projector in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	1.577	2.775	.071
Availability (A)	1	.000	.001	.981
Experience (E)	1	8.626	15.061	.001 *
TxA	2	.848	1.481	.235
TxE	2	.632	1.103	.338
AxE	1	.225	.392	.533
Residual	64	.573		

Experience	n	$\bar{x}$	SD
Low Experience	36	.139	.425
High Experience	38	1.500	1.033

*p < .05

TABLE 6. Analysis of variance for use of wall maps in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	.268	.418	.660
Availability (A)	1	.005	.007	.932
Experience (E)	1	9.452	14.743	.001*
TxA	2	.113	.176	.839
TxE	2	.109	.171	.844
AxE	1	.038	.060	.808
Residual	68	.641		

Wall Maps Use	n	$\bar{x}$	SD
Experience			
Low Experience	35	.457	.505
High Experience	43	1.954	.925

* $p < .05$

TABLE 7. Analysis of variance for use of computer instruction or games in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	.001	.002	.998
Availability (A)	1	.294	.508	.478
Experience (E)	1	9.110	15.729	.001 *
TxA	2	.189	.327	.723
TxE	2	.886	1.530	.226
AxE	1	.085	.147	.703
Residual	50	.579		

Experience	n	$\bar{x}$	SD
Low Experience	37	.378	.681
High Experience	23	2.217	.902

* $p < .05$

TABLE 8. Analysis of variance for use of specimens in the classroom during student teaching

Source	df	MS	f	p
Education (T)	2	.190	.351	.706
Availability (A)	1	.239	.442	.510
Experience (E)	1	10.733	19.160	.001 *
TxA	2	.087	.160	.852
TxE	2	.610	1.130	.332
AxE	1	.351	.650	.424
Residual	45	.540		
Experience		n	$\bar{x}$	SD
Low Experience		52	.365	.658
High Experience		27	1.889	.801

*p < .05

TABLE 9. Analysis of variance for use of phonograph in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	.278	.352	.704
Availability (A)	1	1.390	1.762	.189
Experience (E)	1	19.940	25.278	.001 *
TxA	2	.222	.281	.756
TxE	2	.636	.806	.451
AxE	1	1.165	1.477	--
TxAxE	2	.354	.449	--
Residual	69	.789		

Experience	n	$\bar{x}$	SD
Low Experience	21	.381	.746
High Experience	60	2.100	.915

*p < .05

significant for portable television equipment and video tapes, Hypothesis 1 is rejected for that instructional media item and supported for all others.

Hypothesis Two

The second null hypothesis states that:

H₀2: Level of education (training) in instructional media does not significantly affect the use of instructional media during student teaching.

All of the 20 instructional media items were tested for the mean effect of training. Of all the ANOVAs calculated for the dependent variables, only two showed significance at the level of formal coursework: Use of portable television equipment and video tapes, and use of television broadcasts.

The significance of the level of education for portable television equipment and video tapes was of an interactive nature with experience and has been presented in Tables 3 and 4 and discussed under Hypothesis 1.

The ANOVA results and the n , $\bar{x}$, and SD for use of Television Broadcasts are presented in Table 10. A significant F for the three levels of education (training) indicates only that at least two of the education (training) groups differ from the others. Again, Scheffe Post Hoc tests were used to find out which groups were different.

The Scheffe Post Hoc tests showed that the subjects who indicated that they had no education (training)

TABLE 10. Analysis of variance of use of television broadcasts in the classroom by student teachers

Source	df	MS	f	P
Education (T)	2	1.233	4.146	.024*
Availability (A)	1	1.598	5.373	.26
Experience (E)	1	19.876	66.839	.001**
Residual	38	.297		

	n	$\bar{x}$	SD
<u>Education</u>			
None	18	.167	.515 ^a
Informal	23	.869	1.099 ^a
Formal	2	.500	.707
<u>Availability</u>			
Low	40	.525	.933
High	3	1.000	1.000
<u>Experience</u>			
Low	36	.250	.500
High	7	2.143	1.069

^aScheffe Post Hoc Tests showed those means to be significantly different from each other.

*p < .05

in instructional media reported significantly lower use ($\bar{X} = .167$) of television broadcasts than subjects who indicated informal education ($\bar{X} = .969$).

Based on the significance of level of education on the use of Television Broadcasts, Hypothesis 2 is rejected for that instructional media item.

Hypothesis Three

The third null hypothesis stated that:

H₀ 3: Level of availability of instructional media in a school does not significantly affect its use during student teaching.

When the results of the ANOVAs on all of the dependent variables were examined, six were found to show significance: instructional television, 8 mm movie picture camera, 16 mm movie projector, filmstrips, overhead projector, and opaque projector.

The effects of availability on the above six instructional media items are shown in Tables 11, 12, 13, 14, 15, and 16, respectively. In each case, those who indicated high availability reported significantly higher use of the instructional media item than those who indicated low availability.

Based on the effects of availability on the six instructional media items, Hypothesis 3 was rejected for each item.

TABLE 11. Analysis of variance of use of instructional TV in the classroom by student teachers

Sources	df	MS	f	P
Education (T)	2	.251	.619	.542
Availability (A)	1	3.991	9.865	.003*
Experience (E)	1	15.695	38.795	.001*
Residual	48	.405		

<u>Availability</u>	n	$\bar{x}$	SD
Low Availability	50	.320	.844
High Availability	4	2.00	.817

<u>Experience</u>			
Low Experience	72	.097	.342
High Experience	10	1.800	1.398

*p < .05

TABLE 12. Analysis of variance of use of 8mm motion picture camera in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	.150	.416	.663*
Availability (A)	1	3.687	10.211	.003*
Experience (E)	1	6.412	17.757	.001**
Residual	36			

<u>Availability</u>	n	$\bar{x}$	SD
Low Availability	40	.225	.619
High Availability	3	2.00	1.732
<u>Experience</u>			
Low Experience	72	.069	.256
High Experience	8	1.500	1.414

* $p < .05$

TABLE 13. Analysis of variance of use of 16mm movie projector in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	.362	.578	.564
Availability (A)	1	3.446	5.507	.022*
Experience (E)	1	31.475	50.298	.001**
Residual	70	.626		

<u>Availability</u>	n	$\bar{x}$	SD
Low Availability	61	1.902	1.106
High Availability	15	2.667	.617
<u>Experience</u>			
Low Experience	20	.400	.681
High Experience	21	2.377	.891

* $p < .05$

TABLE 14. Analysis of variance of use of filmstrips in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	.425	.648	.526
Availability (A)	1	2.755	4.197	.044*
Experience (E)	1	20.405	31.091	.001**
Residual	77	.656		

<u>Availability</u>	n	$\bar{x}$	SD
Low Availability	60	1.917	.979
High Availability	23	2.304	.876
<u>Experience</u>			
Low Experience	11	.727	.786
High Experience	71	2.211	.827

* $p < .05$

TABLE 15. Analysis of variance of overhead projectors in the classroom during student teaching

Source	df	MS	f	P
Education (T)	2	1.387	2.122	.127
Availability (A)	1	2.997	4.584	.035*
Experience (E)	1	41.736	63.853	.001**
Residual	76	.654		

<u>Experience</u>	n	$\bar{x}$	SD
Low Experience	43	.186	.500
High Experience	39	1.769	1.087
<u>Availability</u>			
Low Availability	56	.714	1.057
High Availability	26	1.462	1.174

*p < .05

TABLE 16. Analysis of variance of use of opaque projectors in the classroom during student teaching

Source	df	MS	f	p
Education (T)	2	.083	.203	.817
Availability (A)	1	1.618	3.938	.050*
Experience (E)	1	22.105	53.812	.001**
Residual	69	.411		
		n	$\bar{x}$	SD
<u>Experience</u>				
Low Experience		56	.125	.384
High Experience		25	1.480	.963
<u>Availability</u>				
Low Availability		61	.443	.786
High Availability		14	1.214	1.122

* $p < .05$

Hypothesis Four

The fourth and last null hypothesis stated that:

- H₀ 4: Level of experience with instructional media does not significantly affect the use of instructional media during student teaching.

The ANOVA for each instructional media item showed level of experience to be related to the use of the item. Tables 3 through 23 show the ANOVA results and the n, $\bar{x}$, and SD for each media item.

It must be noted that in use of portable television (see Tables 3 and 4), experience interacted with education in its relationship to use. Those subjects who indicated high experience and informal education (training) or high experience and formal education (training) reported significantly more use than any of the other experience-education combinations.

Except for Portable Television, in every case those who indicated high experience reported significantly higher use of the respective instructional media items than those who indicated low experience.

Of the 20 media items that showed a significant relationship between level of use and level of experience (low, high) there were twelve that were significant only for experience: slide projector (Table 5), wall maps (Table 6); computer instruction and games (Table 7), specimens (Table 8), phonograph (Table 9), workbooks

TABLE 17. Analysis of variance of use of workbooks in the classroom during student teaching

Source	df	MS	f	p
Education (T)	2	.662	1.990	.144
Availability (A)	1	.025	.068	.794
Experience (E)	1	16.518	49.678	.001 *
Residual	76	.333		

Workbook Use

Experience	n	$\bar{x}$	SD
Low Experience	5	.800	2.842
High Experience	16	.837	.567

* $p < .05$

TABLE 18. Analysis of variance for use of chalkboard in the classroom while student teaching

Source	df	MS	f	p
Education (T)	2	.014	.089	.915
Availability (A)	1	.327	2.093	.152
Experience (E)	1	5.446	34.890	.001*
Residual	77	.156		

Experience	n	$\bar{x}$	SD
Low Experience	6	1.833	.983
High Experience	76	2.921	.371

* $p < .05$

TABLE 19. Analysis of variance for use of dry-mount press in the classroom during student teaching

Source	df	MS	f	p
Education (T)	2	.417	1.638	.215
Availability (A)	1	.276	1.085	.0308
Experience (E)	1	6.936	27.214	.001 *
Residual	24	.255		

Dry Mount Use

Experience	n	$\bar{x}$	SD
Low Experience	22	.091	.294
High Experience	7	1.571	.976

* $p < .05$

TABLE 20. Analysis of variance for use of educational games during student teaching

Source	df	MS	f	p
Education (T)	2	.880	1.656	.598
Availability (A)	1	.000	.001	.115
Experience (E)	1	19.037	35.842	.001 *
Residual	73	.531		

Educational Games Use			
Experience	n	$\bar{x}$	SD
Low Experience	20	1.050	.759
High Experience	58	2.276	.720

* $p < .05$

TABLE 21. Analysis of variance for use of simulation devices in the classroom while student teaching

Source	df	MS	f	p
Education (T)	2	.405	.518	.660
Availability (A)	1	1.999	2.556	.932
Experience (E)	1	9.673	12.373	.001 *
Residual	58	.782		

Simulation Devices Use			
Experience	n	$\bar{x}$	SD
Low Experience	35	.457	.505
High Experience	43	1.954	.925

* $p < .05$

TABLE 22. Analysis of variance for use of audio recorder playback in the classroom while student teaching

Source	df	MS	f	p
Education (T)	2	.196	.253	.777
Availability (A)	1	.034	.044	.835
Experience (E)	1	21.175	27.357	.001 *
Residual	72			

Experience	n	$\bar{x}$	SD
Low Experience	17	1.00	.935
High Experience	60	2.283	.846

* $p < .05$

TABLE 23. Analysis of variance for use of radio programs
in the classroom while student teaching

Source	df	MS	f	p
Education (T)	2	.192	.886	.420
Availability (A)	1	.229	1.058	.310
Experience (E)	1	5.979	27.650	.001 *
Residual	41	.216		

Experience	n	$\bar{x}$	SD
Low Experience	41	.122	.331
High Experience	5	1.400	1.140

* $p < .05$

(Table 17), chalkboard (Table 18), dry mount press (Table 19), educational games (Table 20), simulation devices (Table 21), audio recorder playback (Table 22), and radio programs (Table 23). The remaining eight items showed a significant relationship between level of use and level of experience, and by one of the other independent variables.

Based on these results showing a significant relationship between experience with instructional media and use, H_04 can be rejected for all media items.

Summary

Four hypotheses were presented concerning the main effects and interaction of level of education (training), level of availability, and/or level of experience on the use of instructional items. Due to unequal numbers of subjects or total absence of subjects in some cells of the 3 x 2 x 2 factorial design, only six instructional media items could be tested for two-way or higher instruction effects. Use of portable television and video tapes was the only instructional media item that showed a significant two-way interaction between level of experience and level of education. Post Hoc Scheffe tests showed that those reporting high experience and formal, or informal education (training), reported higher use of portable television and video tapes than any other experience and education (training) interaction groups.

Use of television broadcasts was found to be significantly related to level of education. Those with informal education (training) reported significantly higher use than those with no education (training).

The use of six instructional media items was found to be significantly related to level of availability: instructional television, 8 mm motion pictures; 16 mm movie projector; filmstrip, overhead projector, and opaque projector. In each case, those who indicated high availability reported significantly higher use of those instructional media items than those who reported low availability.

Lastly, the level of use of all instructional media items was significantly related to high experience. Those who indicated high experience reported significantly higher use of instructional media items than those who indicated low experience. Only one hypothesis, H_{04} , regarding main effects of experience could be rejected for all instructional media items.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study is to determine the effect that training, experience, and availability have on use of instructional media in the classroom by preservice teachers.

Study Subjects

The population for this study was 605 primary preservice teachers who did student teaching during the 1981-1982 academic year, and who were enrolled during Spring Term 1982, in the College of Education at Michigan State University. The sample consisted of 120 primary preservice teachers. This group was selected for study because of their formal coursework and practical experiences as student teachers in schools.

The subjects were contacted in two ways: (1) person-to-person while they were still on campus, and (2) by letters including a questionnaire and self-addressed stamped, envelopes with a request to complete the questionnaire and return it by July 15, 1982.

Design

The collection of data for the study was done by a questionnaire survey on the variables of (a) experience with instructional media, (b) formal and informal instruction in instructional media, and (c) availability of instructional media, as they affect the (d) use of instructional media.

The study addressed the hypotheses stated below in null hypothesis form.

Hypotheses

- H_O1: The level of interaction among types of experience and availability does not significantly affect the use of instructional media during student teaching.
- H_O2: Level of formal education in media does not significantly affect the use of instructional media during student teaching.
- H_O3: Level of availability of instructional media in school does not significantly affect the use of instructional media during student teaching.
- H_O4: Level of experience with instructional media does not significantly affect the use of instructional media during student teaching.

The questionnaire data were manually tabulated and transferred to standard computer cards for analysis. All analyses were made during subprogram of the CDC 6000 and CYBER 70 version of the Statistical Package for the Social Sciences (SPSS).

Conclusions

This study was generated during the researcher's graduate study in Educational Systems Development at Michigan State University. Three of the four hypotheses stated were supported by the data.

The first conclusion was that interaction among types of experience and availability does not affect the use of instructional media during student teaching. Portable television experience interacted with education in its relationship to use. Subjects who had indicated high experience with formal education and high experience with informal education reported significantly more use than any of the other experience-education combinations. This is supported by findings of the study that indicate interaction among types of experience and availability and the use of instructional media.

The second conclusion concerns formal education in instructional media and its effect on the use of instructional media by preservice teachers during student teaching. Of all the analyses of variance calculated for the dependent variables, only two indicated the significance of formal course work: use of portable television and use of television broadcasts. This conclusion is based on the findings summarized in Tables 2 and 4.

The third conclusion concerned the level of availability of instructional media in schools and its effects

on the use of instructional media. When the results of the analyses of variance were examined, they were found to be significant for seven of the media items: television broadcasts, instructional television, 8mm motion picture camera, filmstrips, overhead projector, and opaque projector. Those subjects indicating high availability of these items reported significantly higher use of them than those indicating low availability of these media in their teaching assignments. The conclusion was based on findings summarized in Tables 2, 4, and 5 to 11.

The fourth hypothesis was that experience with instructional media does not significantly affect the use of instructional media during student teaching. Factorial analyses indicated that level of experience with various media was significantly related to the use of those items in the classroom.

In every case, those indicating high experience reported significantly higher use of the instructional items than those indicating low experience. Based on the findings for experience with instructional media, H_{04} was rejected because it does make a difference whether a pre-service teacher has had experience with instructional media in formal or informal education.

A related supposition is that preservice teachers who have had formal education in the use of instructional media are likely to have had more experience with

instructional media than those who have not had such training. On the contrary, the evidence shows that equivalent instructional media experience can be acquired outside of formal coursework. The data reported in Tables 5 through 11 support this finding.

The level of availability of instructional media does not make a significant difference in the use of such media, if preservice teachers are not experienced in the use of the various instructional media items. The literature review showed that actual experience with the total range of instructional resources, available in both substantive, as well as professional areas of teacher education, is important. First-hand encounters with instructional media enable prospective teachers to judge their effectiveness.

The conclusions of this study can be concisely stated. Preservice teachers' education (formal or informal) in instructional media is important in developing skills and understanding. This education and their experience with media items will be the major factors determining the frequency with which they will use instructional media in their student teaching.

Recommendations

The recommendations set forth in this study are based on two assumptions. According to literature reviewed

in Chapter II, instructional media, if properly used, can play a vital role in the teaching process. Second, that education, availability, and experience in instructional media use should be a part of all preservice teachers' programs, as indicated by the research quoted and the findings of this study. Given these two assumptions, the following recommendations are derived from the results of this study:

1. The undergraduate program in instructional media should involve preservice teachers in developing skills in using instructional media.
2. The undergraduate program in instructional media should involve instructors and preservice teachers in demonstrating how to use specific instructional media in classrooms.

The findings of this study suggest a number of future studies. They are listed below.

1. This study should be replicated with a similar sample to determine whether the results would be similar. Variations might be of value if the sample were to be increased in number, or the design of the study were to include teachers employed in the field.
2. A similar study involving secondary preservice teachers would also be of value.

3. A replication of this study using students from other teacher-training institutions could be conducted.

4. A study could be conducted to determine the number of times each type of item was used by preservice teachers, and its availability in their schools.

5. The study could be replicated by looking at the sex of the preservice teachers and the ages of those who did student teaching in a given academic year.

6. A study similar to this study could be conducted to exclude those preservice teachers who transferred to Michigan State University from another university.

7. A study could be conducted to determine which instructional media carry positive value in the classroom, so these may be catalogued and made available for preservice teachers. This list should, then, be updated continuously to include new and innovative instructional media as they become available.

8. A survey could be conducted to determine a priority listing of instructional media and methods in pre- and post-teachers training, as evaluated by deans and assistant deans of Colleges of Education in the U.S.A.

A Final Note

This study attempted to provide information relative to training, experience, and availability as they affect

use of instructional media in the classroom by preservice teachers. Findings showed that training and experience help a teacher to use instructional media in teaching, if they are available. However, this information, in no way, is to be considered a conclusive or final statement on training, experience and availability of instructional media as they affect use.

APPENDICES

APPENDIX A

LETTER TO DR. HENRIETTA BARNES

APPENDIX A

1424 B. Spartan Village
East Lansing, MI 48823
June 11, 1982

Dr. Henrietta Barnes
Office of Teacher Education
Erickson Hall
Michigan State University
East Lansing, MI 48823

Dear Dr. Barnes:

I am writing to request your permission and assistance in surveying primary preservice teachers for my doctoral research on instructional media. I will need to contact 120 preservice teacher-candidates who did their student teaching during the 1981-1982 academic year.

The purpose of my study is to examine the relationship (if any) between experience with and the availability and use of instructional media in classrooms by preservice teachers.

I hope my request will meet with your favorable consideration and would like to talk with you as soon as possible so that I can send out my questionnaires in the next week or two. The University of Zambia expects me back before the end of this year and I shall have to move quickly to get back on their faculty with my Ph.D. intact. May I call you about this Tuesday or Wednesday?

Thank you.

Sincerely yours,

David Sibalwa
David Sibalwa
(Telephone: 355-0989)

APPENDIX B

MEMO FROM DR. HENRIETTA BARNES

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION • DEPARTMENT OF TEACHER EDUCATION

EAST LANSING • MICHIGAN • 48824

June 18, 1982

M E M O R A N D U M

TO: David Sibalwa
FROM: Henrietta Barnes *HB*
RE: Questionnaire to Former Student Teachers

We have reviewed your proposal to send a questionnaire to student teaching candidates who took Education 436 during the 1981-82 academic year. Since this population has already completed Ed 436, we do not have to submit your request through the normal channels, and you are free to contact the individuals.

The Department of Teacher Education and the Office of Student Teaching do not intend to endorse your study, nor do we wish you to mention our names in any of your correspondence with these students. However, Pat Bunce in our Student Teaching Office will assist you with procuring the names of the students who took Ed 436 this year. Please see her at your convenience.

Should you have any questions about our decision, please let me know.

HLB/bar
cc: PBunce

APPENDIX C

COVER LETTER

Dear _____

I am a graduate student at Michigan State University in College of Education. My area of specialization is instructional media and technology. As part of my doctoral studies I am conducting field research to be reported in my dissertation.

My study examines experiences with and use of instructional media in the classroom by preservice teachers. Your help is needed because you have done student teaching and may have used some educational media during your practice teaching.

Will you please complete the enclosed questionnaire and return it by mail, in the self-addressed envelope provided, within five days after you have received it?

Your cooperation in this study will be greatly appreciated. There is no need to sign your name. If you would be interested in the results, however, I'll be glad to let you know them if you'll include your name and address on a separate sheet.

Thank you.

Sincerely yours,


David M. Sibalwa

APPENDIX D

INSTRUCTIONAL MEDIA QUESTIONNAIRE

APPENDIX D
INSTRUCTIONAL MEDIA QUESTIONNAIRE

PART I. Use of Instructional Media in Student Teaching

Below please indicate, by circling the appropriate number, your use of these particular instructional media in the classroom during your student teaching. "High" use is three or more times per month, "moderate" use is two times per month, "low" use is one time per month and "none" is never used.

Items	Responses			
	High Use (3)	Moderate Use (2)	Low Use (1)	Not Used (0)
<u>Example:</u>				
Transparency duplicator	3	2	1	0
1. Workbooks	3	2	1	0
2. Chalkboards	3	2	1	0
3. Dry-mount press	3	2	1	0
4. Educational games (printed)	3	2	1	0
5. Simulation devices	3	2	1	0
6. Wall maps	3	2	1	0
7. Specimen	3	2	1	0
8. Audio recorder-playback (reel or cassette)	3	2	1	0
9. Radio programs, live or taped	3	2	1	0
10. Phonograph	3	2	1	0
11. Opaque projector	3	2	1	0
12. Overhead projector	3	2	1	0
13. Slide projector	3	2	1	0
14. Filmstrips	3	2	1	0
15. 16 mm. movie projector	3	2	1	0
16. 8 mm. motion picture camera	3	2	1	0
17. Computer instruction or games	3	2	1	0
18. Instructional TV	3	2	1	0
19. Portable TV equipment & video tapes	3	2	1	0
20. TV Broadcasts	3	2	1	0

PART II. Level of Media Education

Indicate, by circling the appropriate number, how you learned to use any of the following instructional media while a student. Circle "2" under Formal Coursework if learned to use these media in formal coursework; circle "1" under Informal Education if learned outside coursework; circle "0" under none if you have not learned or you have no knowledge of the specific instructional media.

Items	Responses		
	Formal Coursework (2)	Informal Education (1)	None (0)
<u>Example:</u>			
Diazo printer/duplicator	2	1	0
1. Workbooks	2	1	0
2. Chalkboards	2	1	0
3. Dry-mount press	2	1	0
4. Educational games (printed)	2	1	0
5. Simulation devices	2	1	0
6. Wall maps	2	1	0
7. Specimen	2	1	0
8. Audio recorder-playback (reel or cassette)	2	1	0
9. Radio programs, live or taped	2	1	0
10. Phonograph	2	1	0
11. Opaque projector	2	1	0
12. Overhead projector	2	1	0
13. Slide projector	2	1	0
14. Filmstrips	2	1	0
15. 16 mm. movie projector	2	1	0
16. 8 mm. motion picture camera	2	1	0
17. Computer instruction or games	2	1	0
18. Instructional TV	2	1	0
19. Portable TV equipment & video tapes	2	1	0
20. TV broadcasts	2	1	0

PART III. Availability of Instructional Media

Please indicate to what degree these specific instructional media were available to you in your student-teaching assignment. Responses are as follows: High Availability--found in the classroom; Moderate Availability--found in the school; Low Availability--found outside the school; Not Available--not found.

Items	Responses			
	High (3)	Moderate (2)	Low (1)	N/A (0)
<u>Example:</u>				
Laminator Machine	3	2	1	0
1. Workbooks	3	2	1	0
2. Chalkboards	3	2	1	0
3. Dry-mount press	3	2	1	0
4. Educational games	3	2	1	0
5. Simulation devices	3	2	1	0
6. Wall maps	3	2	1	0
7. Specimen	3	2	1	0
8. Audio recorder-playback	3	2	1	0
9. Radio programs, live or taped	3	2	1	0
10. Phonograph	3	2	1	0
11. Opaque projector	3	2	1	0
12. Overhead projector	3	2	1	0
13. Slide projector	3	2	1	0
14. Filmstrips	3	2	1	0
15. 16 mm. movie projector	3	2	1	0
16. 8 mm. motion picture camera	3	2	1	0
17. Computer instruction or games	3	2	1	0
18. Instructional TV	3	2	1	0
19. Portable TV equipment & videotapes	3	2	1	0
20. TV broadcasts	3	2	1	0

PART IV. Experience with Instructional Media

Please indicate by circling the appropriate number, the level of your experience with any of the following instructional media during student teaching. "High Experience" means that you successfully operated the equipment regularly; "Moderate Experience" means you used the equipment several times; "Low Experience" means you did not use media equipment during student teaching.

Item	Response			
	High Experience (3)	Moderate Experience (2)	Low Experience (1)	No Experience (0)
<u>Example:</u>				
35 mm. single lens reflex camera	3	2	1	0
1. Workbooks	3	2	1	0
2. Chalkboards	3	2	1	0
3. Dry-mount press	3	2	1	0
4. Educational games (printed)	3	2	1	0
5. Simulation devices	3	2	1	0
6. Wall maps	3	2	1	0
7. Specimens	3	2	1	0
8. Audio recorder-playback (reel to cassette)	3	2	1	0
9. Radio programs, live or taped	3	2	1	0
10. Phonograph	3	2	1	0
11. Opaque projector	3	2	1	0
12. Overhead projector	3	2	1	0
13. Slide projectors	3	2	1	0
14. Filmstrips	3	2	1	0
15. 16 mm. movie projector	3	2	1	0
16. 8 mm. motion picture camera	3	2	1	0
17. Computer instruction or games	3	2	1	0
18. Instructional TV	3	2	1	0
19. Portable TV equipment and videotapes	3	2	1	0
20. TV broadcasts	3	2	1	0

APPENDIX E

PART II LEVEL OF MEDIA EDUCATION

APPENDIX E PART II LEVEL OF MEDIA EDUCATION

Items	Formal Course	Informal Education	None
1. Workbooks	26	54	2
2. Chalkboards	14	67	1
3. Dry-Mount press	6	15	57
4. Educational Games	26	50	6
5. Simulation Devices	31	32	18
6. Wall Maps	20	56	6
7. Specimen	19	30	32
8. Audio recorder playback	23	5	4
9. Radio programs live or taped	4	27	50
10. Phonograph	13	64	5
11. Opaque Projector	41	27	13
12. Overhead Projector	44	33	5
13. Slide projector	36	37	9
14. Filmstrips	41	40	1
15. 16mm movie projector	50	25	7
16. 8mm motion picture camera	19	18	43
17. Computer instruction & games	20	28	34
18. Instructional TV	7	27	48
19. Portable TV equipment & video tapes	10	27	45
20. TV broadcasts	5	29	48

APPENDIX F

**PART III AVAILABILITY OF INSTRUCTIONAL
MEDIA**

APPENDIX H: PART I: USE OF INSTRUCTIONAL MEDIA IN STUDENT
TEACHING

Items	High	Moderate	Low	N/A
1. Workbooks	70	2	6	5
2. Chalkboards	74	5	4	
3. Dry-mount press	1	3	9	64
4. Educational games	26	28	24	5
5. Simulation devices	14	23	19	23
6. Wall maps	14	16	27	26
7. Specimen	6	18	16	40
8. Audio recorder playback	34	17	23	8
9. Radio programs live or taped	1	2	9	70
10. Phonograph	28	16	21	17
11. Opaque projector	5	6	17	54
12. Overhead Projector	12	15	12	44
13. Slide projector	9	9	21	44
14. Filmstrips	33	25	19	6
15. 16mm movie pro- jector	36	17	14	15
16. 8mm motion pic- ture camera	3	1	6	72
17. Computer In- struction or Games	12	8	13	50
18. Instruction TV	5	2	6	70
19. Portable TV equip. and video tapes	4	3	15	61
20. TV Broadcasts	3	4	7	69

APPENDIX G

**PART IV: EXPERIENCE WITH INSTRUCTIONAL
MEDIA**

BIBLIOGRAPHY

BIBLIOGRAPHY

Allen, W. H. "Research Verified the Value of Audio-Visual Materials." National Education Association Journal 41 (1952): 49.

_____. "Research on New Educational Media: Summary and Problems." AV Communication Review, 7 (1959). 83-97.

_____, ed. A Summary of the Lake Okoboji Audio-Visual Leadership Conferences, 1955-1959. Iowa City, Iowa: State University of Iowa, Extension Division, 1960.

American Association for Colleges of Teacher Education. Professional Teacher Education--A Programed Design Developed by the AACTE Teacher Education and Media Project. United States Office of Education, Department of Health, Education and Welfare, Educational Media Branch, Contact No. OE 3-16-006. AACTE, 1968.

_____. Standards for the Accreditation of Teacher Education. (2nd draft). Washington, D.C.: AACTE, 1968.

Arnsperger^P, V. C. Measuring the Effectiveness of Sound Motion Pictures as Teaching Aids. New York: Columbia University, Teachers College, 1933.

Barson, J. A Procedural and Cost Analysis Study of Media in Instructional Development. United States Office of Education Grant No. OE-3-16-030, Michigan State University, 1965.

_____. Instructional Systems Development Project, final report. United States Office of Education Grant No. OE-5-16-025, Michigan State University, 1967.

Bellach, Arno A., ed. Theory and Research in Teaching. New York: Columbia University, 1963.

- Bloom, B.; Englehart, M.D.; Furst, E.J.; Hill, W.H.; and Krathwohl, D.R. Taxonomy of Educational Objectives--Handbook I: Cognitive Domain. New York: Longmans Green, 1956.
- Brickell, H.M. Organizing New York State for Educational Change. Albany, N.Y.: State Education Department, University of the State of New York, 1961.
- Briggs, L.J.; Champeau, P.L.; Gagne, R.M.; and May, M.A. Instructional Media: A Process for the Design of Multi-Media Instruction, A Critical Review of the Research, and Suggestions for Future Research. Pittsburgh: American Institutes for Research, 1967.
- Briggs, L.J. Sequencing of Instruction in Relation to Hierarchies of Competence. Pittsburgh: American Institutes for Research, 1968.
- Bruner, J.S. Toward a Theory of Instruction. Cambridge, Mass.: The Belknap Press of Harvard University Press, 1967.
- Buckley III, J.S., and Levitt, M.J. A Study of Effects of Simulation in State and Local Government Courses Simulation and Games, June 1976.
- Carpenter, C.R. "Approaches to Promising Areas of Research in the Field of Instructional Television." In New Teaching Aids for the American Classroom. Edited by W. Schramm. Stanford, Ca.: Institute for Communication Research, 1960.
- _____. "A Constructive Critique of Educational Technology." AV Communication Review, 16 (1968): 21.
- Combs, A.W. The Professional Education of Teachers. Boston: Allyn and Bacon, 1965.
- Curl, D.H. "Self-Instructional Laboratories for Teaching Operation Skills." In Media Competencies for Teachers. Edited by W. C. Meierhenry. National Defense Education Act, Title VII, United States Office of Education Contract No. 5-0730-2-12-6, University of Nebraska, 1966.

- Diamond, R. M. "Reply to Questions about Systems." Audiovisual Instruction 10 (1965): 366-70.
- _____. "A Rationale for Decision: Selecting the Right Tool for the Job." In Research and Utilization of Educational Media for Teaching the Deaf. Edited by R. E. Stepp. University of Nebraska, Department of Educational Administration, 1966.
- Dickey, A. Basic Principles of Student Teaching. New York: American Book Co., 1956.
- Finan, J. L. "The System Concept is a Principle of Methodological Decision." In Psychological Principles in System Development. Edited by R. M. Gagne. New York: Holt, Rinehart, and Winston, 1962.
- Finn, J. "AV Development and the Concept of Systems." Teaching Tools 3 (1956): 1963-64.
- Flanders, N. A. Teacher Influence--Pupil Attitudes and Achievement. United States Office of Education, Department of Health, Education, and Welfare, Project No. 397, University of Minnesota, 1960.
- Fulton, W. R., and White, F. A. "What Constitutes Teacher Competence in Audio-Visual Education?" Phi Delta Kappan 40 (1959): 159.
- Fulton, W. R. "Audio-Visual Competence and Teacher Preparation." The Journal of Teacher Education 11 (1960): 493.
- Fulton, W. R., and Rupiper, O. J. Selected Vicarious Experiences Versus Direct Observation Experiences of Preservice Teachers in the Foundation Areas of Professional Preparation at the University of Oklahoma. National Defense Education Act, Title VII, Project No. 102, University of Oklahoma, 1961.
- Gage, N. L. "Paradigms for Research on Teaching." In Handbook of Research on Teaching. Edited by N. L. Gage. Chicago: Rand McNally, 1963.
- _____. "Theories of Teaching." In Theories of Learning and Instruction, 63rd Yearbook of the National Society for the Study of Education, Part 1. Edited by E. Hilgard. Chicago: NSSE, 1964.

- Gagne, R. M.; Mayor, J. R.; Garstens, H. L.; and Paradise, N. E. "Factors in Acquiring Knowledge of a Mathematical Task." Psychological Monographs: General and Applied 76 (1962) (Whole No. 526).
- Gagne, R. M. The Conditions of Learning. New York: Holt, Rinehart, and Winston, 1965.
- Gardner, J. W. Self-Renewal. New York: Harper and Row, 1963.
- Gerlach, V. "Selecting an Instructional Medium." In Media Competencies for Teachers. Edited by W. C. Meierhenry. National Defense Education Act, Title VII, United States Office of Education Contract No. 5-073-2-12-6, University of Nebraska, 1966.
- Godfrey, P. E. Audio-Visual Programs in the Public Schools. Office of Education, Contract No. SAE-9026, Preliminary Results, 1961.
- Good, C. V. Essentials of Educational Research. New York: Appleton-Century-Crofts, 1966.
- Goodlad, J. I. "The Future of Learning and Teaching." AV Communication Review 16 (1968): 5-6.
- Griffiths, D. C. "Administrative Theory and Change in Organizations." In Innovation in Education. Edited by M. B. Miles. New York: Columbia University, Teachers College, Bureau of Publications, 1964.
- Heinich, R. "Systems Applications in Education." In Summary Report, 13th Lake Okoboji Educational Media Leadership Conference. Iowa City, Iowa: University of Iowa and Department of Audiovisual Instruction, 1967.
- Hill, M. H. "A Film Study Demonstrating the Effect of Positive Reinforcement for Teaching Social Behavior to Inner City, Pre-Kindergarten Children." Ph.D. dissertation, Michigan State University, 1977.
- Hite, H. "A Study of Teacher Education Methods for Audio-Visual Competency in Washington--1939-1947." Ph.D. dissertation, Washington State University, 1951.

- Hoban, C.F. "A Systems Approach to Audio-Visual Communication in Summary Report." In 2nd Lake Okoboji Audio-Visual Leadership Conference. Iowa City, Iowa: University of Iowa and Department of Audio-Visual Instruction, 1956.
- _____. "Implications of Theory for Research and Implementation in the New Media." Paper presented at the meeting of the Conference on Theory for the New Media, East Lansing, Michigan, March, 1962.
- Hyer, A.L. "Mainlines for 1959." Audiovisual Instruction, 3 (1959): 40.
- Imbrock, P.H. "Pre-service Education of Teachers in the Use of Audio-Visual Materials of Instruction." Unpublished Dissertation, Columbia University, 1950.
- Jamison, D.F.; Klees, J.S.; and Wells, J.S. The Cost of Educational Media Guide for Planning and Evaluation. Los Angeles: Sage Publications, Inc., 1978.
- Kemp, J.E. "Identification of Pre-Service and In-Service Teacher Competencies in the Area of Audiovisual Production Techniques." In Media Competencies for Teachers. Edited by W.C. Meierhenry. National Defense Education Act, Title VII, United States Office of Education Contract No. 5-073-2-12-6, University of Nebraska, 1966.
- Kersh, B.Y. Classroom Simulation: A New Dimension in Teacher Education. Monmouth, Oregon: Oregon State System of Higher Education, 1965.
- Kerlinger, F.L. Foundation of Behavioral Research. New York: Holt, Rinehart and Winston, 1966.
- Krathwohl, D.R.; Bloom, B.S.; and Masia, B.B. Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook II: Affective Domain. New York: David McKay Co., 1964.
- LaGrone, H.F. A Proposal for the Revision of the Pre-Service Professional Component of a Program of Teacher Education. Washington, D.C.: American Association for Colleges of Teacher Education, 1964.

- Leeper, Robert, ed. Strategy for Curriculum Change. Washington, D.C.: Association for Supervision and Curriculum Development, 1965.
- Lionberger, H.F. "Diffusion of Innovations in Agricultural Research and in Schools." In Strategy for Curriculum Change. Edited by R.R. Leeper. Washington, D.C.: Association for Supervision and Curriculum Development, 1965.
- Lumsdaine, A.A. "Instruments and Media of Instruction." In Handbook of Research on Teaching. Edited by N.L. Gage. Chicago: Rand McNally, 1963.
- Macdonald, J.B., and Leeper, R.R. Theories of Instruction. Washington, D.C.: Association for Supervision and Curriculum Development, 1965.
- Mager, R.F. Preparing Objectives for Programmed Instruction. San Francisco.
- Meierhenry, W.E., Ed. "Learning Theory and Audiovisual Utilization." AV Communication Review 9 (1961).
- _____, Media Competencies for Teachers. National Defense Education Act, Title VII, United States Office of Education Contract No. 5-073-2-12-6, University of Nebraska, 1966.
- McClusky, D.F. Audio-Visual Teaching Techniques, W.M.C. Dubuque, Iowa: W.M.C. Brown Company, 1955.
- McMahan, M.E. "A Study of the Feasibility of a System of Preservice Teachers Education in Media." Ph.D. Dissertation, Michigan State University, 1968.
- Merrill, E.C., Jr. Professional Student Teaching Programs. New York: Interstate Printers and Publishers, Inc., 1967.
- Michigan State University Catalog. East Lansing, MI.: Michigan State University, 1966.
- Miles, M.B., ed. Innovation in Education. New York: Columbia University, Teachers College, Bureau of Publications, 1964a.
- _____. "On Temporary Systems." In Innovation in Education. New York: Columbia University, Teachers College, Bureau of Publications, 1964b.

- Miller, E.E. "Instructional Systems Development." Ph.D. Dissertation, Michigan State University, 1967.
- Neeb, L.E. "A Study of Instructional Materials and Their Use by Selected Elementary Student Teachers in Their Student Teaching Assignments." Ph.D. Dissertation, Michigan State University, 1972.
- Norberg, K. "Theoretical Background Required by Teachers in the Use of Newer Media." In Media Competencies for Teachers. Edited by W.C. Meierhenry. National Defense Education Act, Title VII, United States Office of Education Contract No. 5-073-2-12-6, University of Nebraska, 1966.
- Norman, H.; Nie, C.; Hadlin Hull, Jean G.; Steibrenner, Karen; and Bent, Dale H. Statistical Package for the Social Sciences. New York: McGraw-Hill, Inc., 1975, pp. 311 and 405.
- Oliver, G.G. A Study of Pre-Service Teacher Education in the Use of Media of Mass Communication for Classroom Instruction. National Defense Education Act, Title VII, Project No. 130, College of Education, University of Georgia, 1962.
- "Pascol Report." Audio-Visual Instruction 4 (1959): 6-7.
- Perlberg, Arye and Resh, Michael. "Evaluation of the Effectiveness of the Overhead Projector in Teaching Descriptive Geometry and Hydrology." Journal of Educational Research, 16:1 (Sept. 1967).
- Peterman, W. Thomas. "A Compendium of Selected Cases on the Application of Educational Media in the Classroom." Ph.D. Dissertation, Michigan State University, 1982.
- Popham, J.W. "Tape-Recorded Lectures in the College Classroom." San Francisco State College. Department of Health, Education and Welfare, U.S. Office of Education, August 1961.
- Pressy, S.L. "Development and Appraisal of Devices Providing Immediate Automatic Scoring of Objective Tests and Concomitant Self-Instruction." Journal of Psychology 29 (1959): 417-447.

Publication Manual of the American Psychological Association (1967 Revision). Washington, D.C.: APA, 1967.

Rogers, E. M. Diffusion of Innovations. New York: Free Press of Glencoe, 1962.

Sanders, Norris M. Classroom Questions--What Kinds? New York: Harper and Row, 1966.

"School for the Sixties, A Summary of the Report of the N.E.A. Project on Instruction." Washington, D.C.: National Education Association, 1962.

Schueler, H., and Lesser, G. S. Teacher Education and the New Media. Washington, D.C.: American Association for Colleges of Teacher Education, 1967.

Schuller, C. F. "Systems Approaches in Media and Their Application to Individualized Instruction at the University Level." Paper presented at Bucknell University, February, 1968.

Shane, G. H. "Future Shock and the Curriculum." Phi Delta Kappan, 49 (1967): 67-71.

Silvern, L. C. "Reply to Questions about Systems." Audio-visual Instruction, 10 (1965): 366-70.

Stepp, R. E., ed. "Research and Utilization of Educational Media for the Hearing Impaired." Symposium for Administrators of Schools for the Deaf, Lincoln, Nebraska, May 1965.

Streeter, C. E. "A Study of Relationships Among Selected Factors Affecting Media Use by Classroom Teachers Within Selected School Systems." Ph.D. dissertation, Michigan State University, 1967.

Suchman, J. R. The Elementary School Training Program in Scientific Inquiry. United States Office of Education, Title VII, Project No. 216. University of Illinois, 1964.

Symonds, P. M. What Education Has to Learn from Psychology. New York: Columbia University, Teachers College, Bureau of Publications, 1965.

Taba, H., and Hill, J. Teacher Handbook for Contra Costa Social Studies, Grades 1-6. Hayward, Ca.: Rapid Printers and Lithographers, 1965.

Thelen, H. A. "Programed Instruction: Insight vs. Conditioning." Education 83 (1963).

Torkelson, G. M. An Experimental Study of Patterns for Improving the Preparation of Pre-Service Teachers in the Use of Audiovisual Materials and of Effects on Pupils. National Defense Education Act, Title VII, Project No. 079m, Grant No. 7-48-0720-034, The Pennsylvania State University, 1965.

_____. "Competencies Needed by Teachers in the Use of Newer Media and Various Approaches to Achieving Them." In Media Competencies for Teachers. Edited by W. C. Meierhenry. National Defense Education Act, Title VII, United States Office of Education, Contract No. 5-0730-2-12-6, University of Nebraska, 1965.

Traverse, R. M. W., ed. Research and Theory Related to Audiovisual Information Transmission. Office of Education Contract No. 3-20-003, 1964.

Trow, C. T. Teacher and Technology. New York: Appleton-Century-Crofts, 1963.

Trzebiatowski, G. L. "An Evaluation of the Instructional Systems Approach in Higher Education." Ph.D. dissertation, Michigan State University, 1967.

Wade, S. "Hagerstown: A Pioneer in Closed Circuit Television." Article in New Educational Media in Action, Vol. 1, UNESCO, 11 EP, Paris, 1967, pp. 59-82.

Wallen, N. E., and Traverse, R. M. W. "Analysis and Investigation of Teaching Methods." In Handbook of Research on Teaching. Edited by N. L. Gage. Chicago: Rand McNally, 1963.

Washington County Instructional Television Evaluation Committee. The Report of the Washington County Instructional Television Evaluation Committee. Washington County, Maryland: County Commissioners, 1973.

Washington County Board of Education. Circuit Television Report. Hagerstown, Maryland: Washington County Board of Education, 1963.

- Wendt, P. R., and Butts, G. K. "Audiovisual Materials." Review of Educational Research, 32 (1962): 141-156.
- Wiles, K. "Proposals of Strategies: A Summary." In Strategy for Curriculum Change. Edited by R. L. Leeper. Washington, D.C.: Association for Supervision and Curriculum Development, 1965.
- Willis, D. L. "Learning and Teaching in Methods Courses." The Journal of Teacher Education 19 (1968).
- Witt, P. W. F. "Technology, Teaching, and Human Values." Paper presented at the Sixth Joint Conference of the Michigan Audiovisual Association, Michigan Association for Supervision and Curriculum Development, and Michigan Association of School Librarians, Lansing, Michigan, November 1968.
- Wittich, W. A., and Fowlkes, J. Audiovisual Paths to Learning. New York: Harper, 1946.
- Wittich, W. A., and Schuller, C. F. Audiovisual Materials: Their Nature and Use. New York: Harper, 1967.
- Verduin, J. H. Conceptual Models in Teacher Education. Washington, D.C.: American Association of Colleges for Teacher Education, 1967.

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