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THE COMPARATIVE EFFECTIVENESS OF TWO INSTRUCTIONAL SYSTEMS
FOR TEACHING THE COURSE "AUDIOVISUAL MATERIALS IN TEACHING"

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1970

THE COMPARATIVE EFFECTIVENESS OF TWO INSTRUCTIONAL SYSTEMS
FOR TEACHING THE COURSE "AUDIOVISUAL MATERIALS IN TEACHING"

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CHAPTER I

Introduction

During the past few years audiovisual materials have become accepted by teachers as instructional aids, purely supplemental to the efforts of the classroom teacher. The use of media in this manner did not threaten the teacher's self-image as the sole determiner of course content and methodology because the media was not designed as a self-supporting entity. The teacher made the ultimate decision as to whether or not a particular aid would be used. During World War II, the armed services placed great reliance on the effectiveness of media as teaching tools, yet they never faltered in their contention that these media were purely supplemental to teaching and were not teaching devices in themselves. However, the development of new media and new patterns for utilizing some of the older forms was soon to disrupt this arrangement.¹

¹Robert Heinich, "The Teacher in an Instructional System," cited by Frederick G. Knirk and John W. Childs (eds.) in Instructional Technology: A Book of Readings (New York: Holt, Rinehart and Winston, 1968), pp. 47-52.

Educators first saw the potential of media as self-supporting instruction with the advent of educational television. Series of filmed instruction and complete courses and segments of courses in programmed form soon followed. These materials could not be disguised for long as merely aids to the teacher as it was clearly evident that they were instruction in themselves and had been designed as such. Producers are now organizing films, tapes, printed materials and other media into such tightly integrated systems of instruction that to break into the sequence is to invite disaster.²

Two systems of this type which are in wide use are Parlons Francais for teaching French to elementary school children and the even more comprehensive La Familia Fernandez for teaching Spanish.³ That self-instructional systems such as these may soon be available in much greater numbers and for a wider range of subject areas is indicated by several recent mergers of textbook publishers with firms producing audiovisual equipment. These huge corporations have been formed solely to develop such systems and have at their disposal resources of a magnitude never before known in education.⁴ These materials, if accepted by American educators, may exert a great influence upon the form of education in the near future.

²Ibid., pp. 47-52.

³Ibid., pp. 47-52.

⁴Myron Lieberman, "Big Business, Technology, and Education," Phi Delta Kappan, Vol. XVIII, January 1967, p. 185.

The proponents of these systems are already pointing out the extent to which the teacher could be freed from the time-consuming and often mechanical role of a disseminator of information if other means of distributing facts were available.⁵ Leslie J. Briggs has expressed the idea that although many other, and possible better, means of presenting information are now available, many teachers still consider their primary function as one of "telling and showing." Briggs feels that if other means can be utilized to free the teachers from this role, a whole new range of professional activities may be made possible in education. He foresees the new role of the teacher, where legitimate use of such materials is made, as one of recognizing and rewarding creativity, answering the odd questions not covered by the material and assigning units of work based on the individual student's needs and abilities.⁶ However, there are several questions which should be answered by educators before they make the decision to accept these materials for wide usage in schools. The paramount question involves the actual worth of these media as a method of instruction. If these devices can present information as effectively as a teacher, the plans of their proponents for redefining the role and

⁵Leslie J. Briggs, "A Procedure for the Design of Multimedia Instruction," Audiovisual Instruction, March, 1967, pp. 228.

⁶Ibid., pp. 228.

activities of the instructor demand consideration. However, if these devices proved less effective than traditional methods, no amount of secondary advantages can outweigh this liability. The consequences of making an erroneous decision concerning this question could be quite drastic. If these systems are accepted as being equally as effective as traditional methods, when in actuality they are not, the students will suffer. Conversely, if these systems are rejected by educators, when in fact they are equal or superior to the traditional methods, the students will again suffer, for they will be denied the most complete and effective education possible for them. These consequences are such that educators must not risk making the decision on the basis of intuitive and subjective judgments alone. Rather, this question must be subjected to the rigorous scrutiny of controlled research methods. If the findings of this research show the methods to be of equal effectiveness or the experimental method to be more effective than the traditional, many secondary questions will arise concerning implementation of these materials into existing school organizations and the most effective methods of utilization, which will necessitate further study. However, these problems are clearly peripheral to the primary problem since they would be of little significance if the self-instructional method of instruction proves to be less effective than the traditional.

A specific need for such a study in the College of Education at the University of Oklahoma concerning the course "Audiovisual Methods in Teaching" was apparent. For the past two years, self-instructional methods had been employed to teach the operation of audiovisual equipment to all students in the teacher-education program at this institution. If self-instructional devices could teach the entire content of the course as effectively as traditional methods, it would free the instructor from his role as a presenter of information. He could then use the time saved to supervise students working on individual projects concerning the selection, utilization and production of instructional materials. To determine if such a plan was feasible the following problems were proposed for study.

Statement of the Problem

The problem of this study was to determine if students who received self-instruction in the course "Audiovisual Materials in Teaching" performed as well on objective tests as students instructed by the traditional method.

Secondary Questions Answered

In addition to the primary question, several significant secondary questions arose.

1. Did the length of the instructional session have more effect on the relative effectiveness of one method than it had on the other?

2. Was one of these methods more appropriate for use with graduate or undergraduate students than the other?

3. Were the attitudes of the students who received one type of instruction more favorable to the course as a whole than those instructed by the other method?

4. Was the relative effectiveness of either of these methods dependent upon the sex of the student?

Hypotheses

To facilitate the testing of these problems the following hypotheses were formulated.

1. Students receiving instruction by traditional methods will score significantly higher on objective tests than students receiving instruction by self-instructional methods.

2. There is no interaction between the relative effectiveness of the method of instruction and the length of the instructional sessions.

3. There is no interaction between the relative effectiveness of the method of instruction and the educational level of the students.

4. There is no interaction between the relative effectiveness of the method of instruction and the sex of the students.

5. There is no correlation between the method of instruction and the attitude of the students toward the course as a whole.

Population Defined

The population for this study was the students enrolled in Education 290, "Audiovisual Methods in Teaching," at the University of Oklahoma during the spring semester of 1969-70.

Limitations

1. This study was limited to the previously defined population.
2. Generalizations from the study were limited to the concepts involving the course content which had been previously defined.

Assumptions

1. The test items selected to evaluate the student's achievement reflected the true objectives of this course.
2. The extent of outside study was reflective of that method's propensity to motivate students to do such studying and will continue to operate in non-experimental applications of that method.

Definition of Terms

Carousel slide projector - One of several projectors for

2 X 2 slides which uses magazines or trays in which the slides are loaded in advance to facilitate projection.

Console - Instructor's control center in an electronic laboratory where a distribution panel controls the

transmission of program signals and may include facilities for two-way communication with individual students or an entire group.⁷

Continuous film loop - An eight millimeter film with the ends spliced together and packaged in such a manner that it never requires rewinding.

Cross-media approach - Methodology based on the principle that a variety of audiovisual media and experiences correlated with other instructional materials overlap and reinforce the value of each other (same as multi-media approach).⁸

Electronic Learning Laboratory - Basically, a series of tape recorders, earphones and microphones, connected by wire to a console where switches permit the instructor to communicate with (1) all students simultaneously, (2) groups of selected students, and (3) one student individually. The instructor may also distribute a single tape to all students or several different master tapes to selected individuals. In some laboratories each student may have his own individual master tape to which he listens, orally responds, and sometimes records his oral responses.⁹

⁷"Alphabetical Listing of Terminology," AV Communication Review, Vol. 11, January-February, 1963, p. 42.

⁸Ibid., p. 44.

⁹Ibid., p. 46.

Instructional aids - Devices which assist an instructor in the teaching-learning process by simply presenting supporting or supplementary material, usually intermittently. They are not self-supporting.¹⁰

Instructional media - Devices which present a complete body of information and are largely self-supporting rather than supplementary in the teaching-laboratory process.¹¹

Interaction - Interaction variations are those attributable not to either of two influences acting alone but to joint effects of the two acting together.¹²

Self-Instruction - Self-supporting instructional activities which are not supplemental to other activities and do not require the presence of an instructor.

Systems approach - An integrated, programmed complex of instructional media, machinery, and personnel whose components are structured as a single unit with a schedule of time and sequential phasing.¹³

Video tape - A tape used to record picture and sound for television by a magnetic process.¹⁴

¹⁰Ibid., p. 54.

¹¹Ibid., p. 54.

¹²J. P. Guilford, Fundamental Statistics in Psychology and Education, 4th Ed. (New York: McGraw-Hill Book Co., 1965), p. 285.

¹³AV Communication Review, op. cit., p. 77.

¹⁴Ibid., p. 78.

Design of the Study and Procedures Followed

This study was designed to determine the relationship between certain independent variables and the dependent variable -- achievement -- in the course "Audiovisual Materials in Teaching" as measured by objective tests. It was proposed that this could be accomplished by utilizing a control group in which all variables except those under consideration were held constant. Among the independent variables which were controlled and tested for effect on the dependent variable were the method of instruction, the length of instructional sessions, the educational level of the students, and the sex of the student. Independent variables not controlled but randomized to confound their effects included intelligence, motivation inherent to the individual student, background experiences, and physical impairments. To facilitate the execution of this plan certain procedures were followed in treatment of the subjects, collection of the data, and the statistical treatment of the data.

As this study was limited to the students enrolled in Education 290, "Audiovisual Materials in Teaching," at the University of Oklahoma during the spring semester of 1969-70, certain limitations as to sampling procedures were imposed by the restricted source of subjects available for selection. However, the experimenter was cognizant of these limitations and attempted to negate their effects by random assignment and control wherever possible. Two sections of

this course were available for experimental purposes during the semester. One section, which was referred to as section A, met in the morning three times per week in sessions lasting approximately 50 minutes. The other section, which was referred to as section B, met in the evening once a week for a session which lasted approximately 150 minutes. The make-up of section B was slightly different than the morning section as it contained a larger proportion of graduate students. Sections A and B were divided into two groups after which the two sections were divided into four groups. One of the morning groups and one of the evening groups were selected to serve as the experimental groups, hereafter referred to as AE and BE. The remaining groups were designated as control groups and referred to as AC and BC.

A basic assumption of this study was that no significant difference existed between the control and experimental groups' knowledge of the subject matter prior to taking the course. To test the validity of this assumption a pre-test was given all the students and the mean score of each experimental group was compared with that of its corresponding control group.

The course "Audiovisual Materials in Teaching" is a three credit hour elective course, which may be taken by juniors, seniors and master's candidates. Its primary purpose is to acquaint pre-service and in-service teachers with some basic teaching tools, e.g., the operation of

audiovisual equipment and the selection, production and utilization of audiovisual materials. In addition to education majors the course is a recommended elective for librarians and public health personnel. The course is involved with varied levels of behavior as it contains concepts in the psychomotor, cognitive and affective domains of learning.

The content of the course was basically the same as that in the textbook A-V Instruction: Media and Methods, third edition, by James W. Brown, Richard B. Lewis and Fred F. Harclerod. Every effort was made to eliminate differences in content as a variable between the two methods. The control groups were taught by the same person who developed the self-instructional materials to further reduce variation.

The control groups were taught in the traditional method, that is, a modified lecture approach utilizing demonstrations, instructional aids, laboratory experiences, directed readings and other techniques. Although on occasions the same materials were used with both groups, those which were used with the control groups were restricted to those which had been used previously in teaching the course and none of the materials prepared specifically for use in the experiment were used with the control groups. Media were used with the control group only as a supplement to other instructional activities but were used in the experimental groups as self-supporting instruction.

The experimental groups received all their instruction through some form of media used for self-instruction, as there was no live teacher present. The basic medium was 2 X 2 slides coordinated with audio tapes used in a learning laboratory in which each booth had been equipped with a carousel-type slide projector. The sound was transmitted through headphones and each student was able to stop his program for note-taking or back it up to replay a portion of it independently of the other students. Other media were used to supplement these tape and slide series when the concept seemed more suited to another form of media. Among these other media were video tapes, sound films, continuous film loops, printed materials and study displays which consisted of models and realia. Certain aspects of the course were handled through self-instructional laboratory experiences and outside readings were assigned for several lessons.

The experimental group was monitored by a laboratory assistant who assisted with the operation of equipment and other procedural matters. He gave them assistance with the content of the course. However, if a student felt a need for such help he conferred with the instructor.

During the course each student was given two one-hour examinations and at the end of the course a two-hour comprehensive test and an anonymous evaluation of the course were administered. The items for all tests including the pre-test were selected from a body of items previously

administered to similar groups and analyzed as to level of difficulty, discriminating power and reliability. The face validity of the items was judged by a panel of persons who had previously taught this course and were currently employed in audiovisual education.

Treatment of the Data

The raw data collected in the experiment are presented in tabular form in Appendix K. The statistical significance of this data was evaluated by a t-test to determine if the mean achievement scores for groups receiving different treatments differed significantly at the .05 level of probability and by treatment by levels analysis of variance to test for interactions between the following combinations of variables: treatment X length of learning session, treatment X educational level, and treatment X the sex of the students. At the conclusion of the course the students responded anonymously to an opinionaire concerned with their attitudes toward the course and toward the method by which they were instructed. Their responses are listed in tabular form and subjectively analyzed in Chapter IV of the study.

Organization of the Study

The report of the study was organized into five chapters. The first chapter is a description of the study, including the background, significance, need, assumptions and limitations of the study. It also contains the statement

of the problem, the hypotheses used to test the problem, a description of the procedures followed in the collection of the data, the research design of the study, the statistical treatments used in analysis of the data, and the definitions of terms used in the study.

Chapter II consists of a review of selected research studies which are relevant to this study. The procedures which were followed in setting up the experiment and collecting the data were reported in Chapter III and Chapter IV contains the treatment and analysis of the data. The summary of the study, conclusions based on the findings and recommendations relevant to the findings were included in Chapter V.

CHAPTER TWO

A REVIEW OF SELECTED LITERATURE

This investigation was primarily concerned with exploring the feasibility of teaching an entire course on audiovisual methods and materials in instruction to college students by self-instructional methods. Self-instruction, as the term is used in this report, refers to a much broader scope of activities than the term programmed instruction. While the broader term includes programmed instruction, it also includes other activities in which a student receives instruction without the direct assistance of an instructor. This would not be classified as programmed instruction since some criteria of programmed instruction such as failing to provide immediate overt reinforcement were not met. Therefore, the researcher has limited the studies reviewed in this chapter to selected studies which meet one of the following criteria: (1) those studies in which it was attempted to teach either an entire course or a large segment of a course by self-instructional means, (2) those studies which attempted to teach some phase of audiovisual education

by self-instructional methods or, (3) studies which did not fit in either of the above categories, yet made findings which were in the researcher's judgment directly relevant to the present study.

Self-Instruction for Large Quantities of Content

Douglas Porter¹ has conducted an experiment which dealt with factors of particular relevance to the study of self-instruction sustained over an extended period of time. In this experiment a simple write-in teaching machine of the type commonly referred to as "cheat-proof" was used to teach spelling to elementary school age children in the second and sixth grades. The students in the experimental group were completely dependent upon the teaching machines for instruction as they were not even given spoken instructions. The content was held constant between the experimental groups and the control groups which were taught by the traditional means. The same words were taught to both groups. The results of the study indicated that the experimental groups showed significantly more gain than the control as measured in grade-level equivalents. To check the possibility of a novelty effect, the experimenter compared the scores made by the experimental groups during the first half of the year with those made during the second half and found no

¹Douglas Porter, "Some Effects of Year Long Teaching Machine Instruction," in Automated Teaching: The State of the Art, ed. by Eugene Galanter, (New York: John Wiley and Sons, 1959), pp. 85-90.

apparent difference. One finding of the study which may have particular relevance and far-reaching implications for the use of self-instruction with slow learners was that Porter could find no correlation between achievement scores and intelligence scores in the experimental groups while there was a significant positive relationship between these two factors in the control group. No relationship was found in either group between achievement and the sex of the student or between achievement and the student's attitude toward the method of instruction.

Walter L. Thatcher² at San Diego City College conducted an experiment in teaching technical mathematics by self-instructional methods. During two semesters, eleven classes were used as experimental and control groups and the mean growth of each class was calculated by determining the difference in each student's final and pre-test scores. The data collected indicate that programmed self-instructional materials were as effective for teaching the subject of technical mathematics to this particular population as were the traditional methods and allowed a significant time saving. As a recommendation for future activity, the experimenter suggested that other types of audiovisual materials be used with the teaching machines to create a self-tutoring laboratory.

²Walter L. Thatcher, A Report on an Experiment in Related Technical Mathematics Involving Self-Instructional Materials, (San Diego, Calif.: San Diego City College, June, 1962), ERIC #001402.

Niphon Kantasewi and David R. McClay³ conducted an experiment at Pennsylvania State University to compare the effectiveness of several self-instructional schemes for teaching introductory college bacteriology with the effectiveness of the previously used lecture method. They conducted the experiment over two terms, using 235 students divided into these groups: (1) conventional, (2) programmed instruction alone (first term only), and (3) programmed instruction plus problems (second term only), and (4) programmed instruction plus discussion. They administered three tests to each group and no significant difference in the performance of the groups was revealed. However, greater variability was found among the scores from the self-instructional groups than within the conventional groups. From these results it was concluded that programmed materials were as effective as conventional lectures for teaching an introductory course in biological sciences to college students. A 1966 study which was conducted at the University of Akron by Theodore Mueller and Robert Harris⁴ investigated the effectiveness of a self-instructional scheme for teaching first year college French. The self-instructional system consisted of the use of

³Niphon Kantasewi and David R. McClay, Experiments in the Use of Programmed Materials in Teaching an Elementary Course in the Biological Sciences, (University Park, Penn.: Pennsylvania State University), 1964, ERIC #018566.

⁴Theodore Mueller and Robert Harris, First Year College French Through an Audio-Lingual Program, (Akron, Ohio: The University of Akron), 1966, ERIC #011737.

programmed instructional materials supplemented by a weekly discussion session with an instructor. The performance of these self-instructional groups was compared with that of groups which received traditional classroom instruction to determine: (1) if the self-instructional method would be more effective than the traditional for teaching first year college French, (2) if a significant reduction in the drop-out rate could be achieved, and (3) whether student interest in the further study of French could be maintained. The results of this study indicated: (1) the students from the experimental group did as well as the control group over the course content in general and significantly better in their mastery of the spoken language and in their variety and accuracy of grammatical structures, (2) the achievement of low aptitude students compared favorably with that of their more gifted counterparts, (3) a smaller percentage of the students in the self-instructional group dropped the course, and (4) a greater percentage of the experimental group than the control group continued in and completed their second year of French.

Albert Valdman⁵ made a review of the studies conducted between 1960 and 1966 which dealt with the use of programmed materials for teaching foreign language. From

⁵Albert Valdman, "Programmed Instruction and Foreign Learning: Problems and Prospects," The Florida F L Reporter, Vol. V, Number 1, Winter 1966-67, ERIC #011743.

the review and analysis of these studies he drew these conclusions: (1) total dependence upon programmed instruction appeared to be productive only in instances where the terminal behavior to be achieved was very limited, (2) that programmed materials were most effective when used in modules at early levels for teaching specific features of pronunciation, grammar, or vocabulary, (3) partial programming has emerged as a possible solution to the difficulties inherent in programming languages, and (4) that live teaching and programmed instruction, when properly integrated, can be complimentary.

Self-Instruction for Audiovisual Education

Although there had been no study prior to the present one dealing primarily with the effectiveness of self-instructional methods for teaching the total content of an audiovisual methods and materials course, one aspect of the course, that concerned with teaching the operation of audiovisual equipment, has been thoroughly researched. J. D. Allred⁶ cites several studies which indicate that self-instructional methods have definite merit for teaching these psychomotor skills. It was the judgment of the researcher of the present study that although the scope and objectives of these studies were quite different from those of the present study, they are

⁶J. D. Allred, "A Study of the Comparative Effectiveness of Three Methods of Teaching the Operation of Selected Audiovisual Equipment," (unpublished Doctoral Dissertation, The University of Oklahoma, 1967).

closely enough related to the present investigation, both through method and content to warrant their inclusion in this chapter.

Dell McDonald Colwell⁷ at the State University of South Dakota conducted an extensive study to determine if the operation of audiovisual equipment could be taught as effectively by self-instructional methods as by the conventional method of demonstration and practice. The study was also concerned with determining if the assistance of an instructor when desired would be more beneficial than the self-instructional materials alone. The questions were tested by dividing 65 students into three groups: a control group taught by the conventional method; an experimental group which, in addition to the self-instructional materials, was given assistance by the teacher when desired, and another experimental group which was totally dependent upon the self-instructional materials. The results of this experiment indicated that the students could successfully master the operation of audiovisual equipment through independent self-instruction and that the effectiveness of the self-instructional materials was similar whether used alone or with the assistance of a teacher.

⁷Dell McDonald Colwell, "The Effectiveness of Self-Instructional Techniques in Teaching Selected Phases of An Introductory Course in Audio Visual Education," (unpublished Doctoral Dissertation, State University of South Dakota, 1963), cited by Allred, op. cit., pp. 28-30.

T. M. Reeves and G. M. Torkelson⁸ in a study conducted at Pennsylvania State University compared four procedural patterns for teaching the operation of audiovisual equipment. The four patterns were (1) a separate course for teaching the operation of audiovisual equipment, (2) a course in which the operation of equipment was integrated with subject methods, (3) an arrangement by which learning the operation of audiovisual equipment was connected with student teaching, and (4) self-instructional method for teaching these skills. In the self-instructional system the students learned to operate the equipment by following step-by-step procedures. The results of the study indicated that the students who learned by self-study operated the equipment with less error and greater confidence than those taught by the conventional laboratory course. It also indicated that the self-study method required less time than the others tested.

Walter J. Mars⁹ reported a study conducted at the University of Syracuse in which students were taught the operation of four pieces of audiovisual equipment by a self-instructional method which utilized a system of continuing

⁸T. M. Reeves and G. M. Torkelson, "Self-Instruction in Audio Visual Education: A Title VII Progress Report," Audio Visual Communication Review, 8, (July-August, 1960), pp. 202-206.

⁹Walter J. Mars, "Student Teachers Teach Themselves," Educational Screen and Audio Visual Guide, (October, 1963), pp. 566-567, cited by Allred, op. cit., pp. 18-20.

reinforcement. This reinforcement was designed to force the student to operate one piece of equipment in order to obtain instructions on the operation of the next. Thus, the successful operation of a piece of equipment rewarded the student not only with the knowledge that that piece was functioning but also with the information needed to proceed to the next step. Upon completion of the self-instructional sequence enough of the students achieved competence to warrant further refinement of the program and the development of completely automated sequences to teach the operation of other machines.

Donald W. Johnson,¹⁰ working at the University of Colorado, conducted an experiment which tested the effectiveness of linear programs for teaching the operation of audiovisual equipment. The linear programs were in the form of an illustrated manual which covered the operation of six different types of audiovisual equipment. The experiment utilized a control group which received instruction by the conventional demonstration and practice method. The students were tested by a timed performance test, the results of which indicated (1) that it is possible to teach the operation of audiovisual equipment without an instructor as the experimental self-instructional group performed as well or better

¹⁰Donald W. Johnson, "A Study of the Comparative Effectiveness of Programmed Self-Instruction Versus the Demonstration-Laboratory Method in Teaching the Operation of Six Types of Audio-Visual Equipment" (unpublished Doctoral Dissertation, University of Colorado, 1964), cited by Allred, op. cit., pp. 25-27.

than students taught by the conventional method, (2) a positive relationship seemed evident between the amount of time spent in practice and the level of performance, and (3) most of the students preferred programmed self-instruction to the conventional demonstration-practice method.

Gerlach and Flanagan¹¹ at Arizona State University reported a study in which eight milimeter film loops were used to teach audiovisual skills. They reported a considerable time saving over the conventional demonstration-practice method and a favorable reaction to the self-instructional method by the undergraduate students who used this method.

David H. Curl¹² at the University of Connecticut reported the development of a self-instructional system which utilized eight milimeter motion pictures and 35 milimeter slides to teach the operation of seven different types of audiovisual equipment. The students were not given a performance test over the operation of the equipment. Therefore the findings were limited to what could be determined from questions over equipment operation and laboratory procedures which were included in the course examinations.

¹¹Vernon S. Gerlach and Athol C. Flanagan, "A Unique Partnership Via 8 mm," Educational Screen and Audio Visual Guide (October, 1964), pp. 588-590, cited by Allred, op. cit., pp. 22-23.

¹²David H. Curl, "Automated Equipment Operation Training," Audio Visual Instruction (September, 1965), pp. 546-565, cited by Allred, op. cit., pp. 24-25.

Allred's¹³ study conducted at the University of Oklahoma compared two self-instructional methods and the each-one-teach-one method to determine which method could teach the skills of audiovisual equipment operation to undergraduate education students most effectively. He did not find any significant difference in the two self-instructional methods; however, both self-instructional methods were found to be more effective than the each-one-teach-one method at the .01 level of significance. This study found that the self-instructional methods exhibited three distinct advantages: (1) the students learned to operate the equipment at their individual rate of progress without being bound to the pace of a group; (2) the students learned the operation of this equipment in a shorter period of time than that required by the each-one-teach-one method, and (3) the students learned these skills without the assistance of an instructor thereby freeing at least one person for other tasks and activities.

Further Research in Self-Instruction

A study of particular relevance to the present investigation because of the similarity between the modes of presentation utilized the two studies was conducted at Harvard University by John B. Carroll.¹⁴ In this study Carroll

¹³Allred, op. cit.

¹⁴John B. Carroll, Programmed Self-Instruction in Mandarin Chinese, (Cambridge, Mass.: Harvard University, 1963). ERIC #002374.

conducted an experiment to determine whether spoken and written foreign language skills could be taught by programmed self-instruction using 35 milimeter film and magnetic tape as the instructional media. Two experiments were conducted using the phonemes of mandarin Chinese as the subject matter which took into account language aptitude, program performance and criterion performance. The results of these experiments indicated: (1) the structure of the program allowed high ability students to learn efficiently, but demanded much time and attention from low aptitude students, (2) the rate of learning was highly correlated with aptitude for learning a foreign language, and (3) students appeared to progress twice as fast as they would under conventional intensive classroom instruction.

Another experiment which tested the effectiveness of a self-instructional system which utilized 35 milimeter slides and audio tape as the media was conducted by Edwin K. Hill¹⁵ at Washington State University. In this study the tape-slide series were used in conjunction with related laboratory exercises and a workbook in which the students were asked to respond to a wide variety of questions and problems. The results of the study indicated: (1) the system functioned independent of instructor assistance a

¹⁵Edwin K. Hill, The Development and Testing of an Experimental Polysensory Self-Instructional System Designed to Help Students Acquire Basic Electrical Occupational Competence, (Pullman, Wash.: Washington State University, 1968). ERIC #021141.

major position of the time, and (2) low, average and high ability students learned equally well from the system.

One of the earlier pioneers in the field of self-instruction and the man generally credited as the inventor of the teaching machine, Sidney L. Pressey¹⁶ conducted a study in which the author's basic premise was that learning theory and programming practices may sometimes be stressed to the point that learning is hindered and that learning would be more efficiently accomplished if the emphasis were placed on simply trying to present the ideas as clearly and effectively as possible. To test this hypothesis the author reduced a programmed set of 1,100 words to six concise paragraphs which totaled only 260 words in length. The subject taught was simple reflexes and the original programmed set was from the book Analysis of Behavior by Holland and Skinner.¹⁷ To test the materials, students in a required education course were divided into four groups: (1) a control group which was given no instruction; (2) a group which used the original programmed text; (3) a group which used the six paragraphs, and (4) a group which used the six paragraphs supplemented by six elucidative questions. The results were (1) the section using the programmed set made a significant

¹⁶Sydney L. Pressey, A Puncture of the Huge Programming Boom?, (Tucson, Ariz.: University of Arizona, April, 1963). ERIC #001415.

¹⁷James G. Holland and B. F. Skinner, The Analysis of Behavior, (New York: McGraw-Hill Book Company, Inc., 1961).

gain over the control group; (2) the group using the six paragraphs without questions learned, what the authors termed, "a great deal," in one-tenth the time needed by the group using the original program, and (3) the group using the questions and paragraphs did slightly better than the group using the paragraphs alone.

Summary of Literature Search

Research has been reviewed which indicates that self-instructional methods and materials have generally been found as effective for imparting extensive bodies of knowledge as the traditional classroom lecture-discussions methods. These experiments were conducted in a variety of subject areas as diverse as technical mathematics and mandarin Chinese and with students who ranged from the second grade through college age levels. Secondly, research was reviewed which indicated that self-instructional methods have been proven effective for teaching one facet of the course with which the present investigation is concerned, the operation of audio-visual equipment. Third, research was presented which indicates that 35 millimeter slides coordinated with audio-tape, the primary medium for the present study, have been found an effective form of self-instructional materials. Finally Pressy's study was reviewed which indicated that self-instructional materials other than pure programmed instruction were a legitimate area for research as they seemed to offer

possibilities for making self-instruction more efficient.

The next chapter, Chapter III, is a detailed description of the procedures followed in conducting the present study.

CHAPTER THREE

PROCEDURES FOR THE EXPERIMENT

Due to the nature and scope of the experiment, the procedures established and followed were both detailed and extensive. The procedures included those relating to the construction and validation of the testing instruments, those by which the students were divided in groups and pre-tested, those followed in the treatment of each group and the preparation of the instructional materials for use with the experimental group, and finally the procedures which were used for collecting both the objective and subjective data. Chapter III is a detailed account and description of those procedures, beginning with the preparation of the testing instrument.

The search of the literature did not reveal any clues to suggest that a test instrument suitable for use in this experiment already existed. Therefore, the experimenter assumed that he would have to construct and validate the testing instrument. He began this process by preparing a pool of approximately 300 multiple choice test items

covering the content of the course, "Audiovisual Materials in Teaching." While most of the items were constructed specifically for use in the experiment, many of the items had previously been used in course examinations. These items were then divided into tests and at the appropriate times were administered to the students enrolled in the course during the fall semester 1969-70. The results of this testing allowed an item analysis to be run on each item, and those items which were obviously discriminating falsely were eliminated. An estimate of the reliability of the instruments was then calculated using the Kuder Richardson formula 21 which is:¹

$$\text{rel.} = 1 - \frac{M(N-M)}{N(S^2)}$$

The results of this computation indicated that the instruments already had an acceptable level of reliability. It was judged by the experimenter that further refinements should raise the reliability higher than at the time it was measured rendering the instruments satisfactory for the purposes of this experiment.

At this point, the researcher using student comments reevaluated the clarity of each item, reworded several items and eliminated those which he judged to be hopelessly ambiguous, misleading or trite. The pool of 272 items which

¹Short Cut Statistics for Teacher Made Tests, (Princeton, New Jersey, Educational Testing Service, 1960), pp. 26-29.

remained were then sent out to a panel of judges for further validation.

Five men, who had experience teaching the course with which the experiment was concerned or the equivalent course at another institution and who were at the time professionally engaged in audiovisual education, were asked by letter to assist in this task. A sample of the letter sent to each judge asking his assistance can be found in Appendix A. All five judges selected cooperated with the experiment by performing two judgment tasks on each item. The first task related to the face validity of each item which each judge scored on a five-point scale with one being least valid and five being most valid. The second task was concerned with the clarity and objectivity of the items and consisted of the judges making suggestions relevant to the wording and construction of each item.

The results of the validity scale were then evaluated and 13 more items which were judged to have poor validity were eliminated. The wording of the remaining items was once more reworked, using the suggestions made by the judges and from the remaining items a pre-test, two periodic examinations, and a comprehensive final were constructed. These instruments are located in Appendices B, C, D, and E.

The author then prepared a brief opinionnaire to gather data concerning the students' attitudes toward the

course, suggestions for its improvement, and any other comments they wished to offer. Another form was prepared and used with the experimental groups as a supplement to the first form. This supplemental form served to collect data from the members of the self-instructional group concerning their attitudes toward the experiment in general and the different forms of media used in the experiment. It also allowed them to make any comments they desired regarding the self-instructional procedures and elicited suggestions for the improvement of these procedures. These instruments are located in Appendix L.

During the first class session, the instructor administered a pre-test to the students, obtained each student's schedule for the semester, and collected personal data from each student. The remainder of the period was then used to discuss the course objectives and get acquainted with the students. The pre-test is located in Appendix B of the paper, the schedule forms in Appendix F, and the personal data sheet in Appendix G. Before the next class meeting the students were divided into control and experimental groups on the basis of when they could attend class. The pre-test scores of the groups were computed to determine that no significant difference existed between the traditional and experimental groups knowledge of audiovisual methods and materials prior to taking the course. At the second class meeting the purposes and procedures of the experiment were discussed with

the students and they were informed as to which group they had been assigned. Pictures of the students were taken with a Polaroid camera to assist the instructor in learning the students' names. The students were then given instructions as to when and where they would meet the next time and were dismissed. The preceding procedures were those followed by the morning class; the procedures for the evening class differed only in that everything except group assignment was done at the first meeting. The students were informed of their group assignment during the first part of the second evening session and the experimental students were removed from the group to begin the experiment.

For the semester in which this experiment was conducted, a total of 92 students enrolled in two sections of Education 290, "Audiovisual Materials in Teaching," at the University of Oklahoma. As was explained in the first chapter, one section of this course met at 8:00 in the morning, three days per week of 50 minutes per session; the other section met once per week at 4:15 in the afternoon for approximately 150 minutes per session. Of these 92 students, 87 remained in the experiment, either in the experimental or control groups, for the duration of the course. Two students, one control and one experimental, quit attending class and were subsequently dropped from the experiment; three exchange students with significant language problems, after meeting with a self-instructional group once, asked to be excluded

from the experiment and to be allowed to receive both the traditional and experimental treatments to offset their language handicap. After due consideration this request was granted. Of the remaining 87 students, 21 were graduates and 76 were undergraduates; 23 were men and 64 women.

In the morning section there were 33 participants, 8 graduates and 25 undergraduates. Thirteen of the students were men and 20 were women. This section was divided into a control group of 20 students and an experimental group of 13 students. In the control group 5 students were graduates and 15 undergraduates; 10 were men and 10 women.

In the afternoon section originally 57 participants were in both groups. The students who were eliminated brought the number completing the experiment down to 54. Of the 54 completing the course 14 were graduates and 40 undergraduates; 10 were men and 44 were women. Twenty-three of these students were placed in experimental groups. Of the 23 students in the afternoon experimental group, 7 were graduates and 16 undergraduates; 5 were men and 18 women. Of the 31 evening students who served as a control group, 7 were graduates and 24 undergraduates; 6 were men and 25 women.

A total of 51 students served in control groups. Of these 12 were graduates and 39 undergraduates; 16 were men and 35 women. The total number of students serving in experimental groups was 36. Of these 10 were graduates and 26 undergraduates; 8 were men and 28 women. It was recognized

by the author that a larger proportion of graduate students and men would have been beneficial to the study. However, this is an inherent limitation of experiments conducted in field situations and a factor which was beyond the control of the experimenter.

When the experimenter set up the procedures to be followed in the treatment of the control groups; it was his purpose to replicate the instruction for this course as it would normally be given when no experiment was being conducted. Therefore, his task was concerned with standardizing the content and methodology rather than formulating new instructional procedures for the control groups. These groups received instruction in a traditional classroom on the second floor of the education building. The only features of this room which might be considered atypical were that it was equipped with full-closure venetian blinds for darkening the room and a 23-inch television monitor which is connected with the college's instructional television studio by coaxial cable. Neither of these adaptations had been made specifically for this experiment, as both adaptations were made before the experiment was planned.

The instructional method which was used with the control groups was a combination lecture-demonstration approach supplemented by appropriate laboratory experiences in the operations of audiovisual equipment and the production of instructional materials. According to standard procedure

large amounts of audiovisual materials were used with the control group. However, the audiovisual materials used with the control group were used to supplement the live instructor, whereas the materials used with the experimental group were used instead of an instructor. None of the materials prepared specifically for use with the experimental groups were used with the control groups. Both the control and experimental groups used A-V Instruction: Media and Methods, third edition by Brown, Lewis and Harclerod² as a textbook and as a supplement they used the book Programmed Text on the Operation of Selected Audio Visual Equipment, by J. D. Allred and W. R. Fulton.³ The content of the course was basically that which is outlined in Syllabus for Education 290: AV Instruction: Media and Methods, by W. R. Fulton,⁴ and the experimenter made every effort to hold this content constant between the different groups.

The experimental groups received all of their instruction through some form of media used for self-instruction. The basic medium for this experiment was 2 X 2 slide series, coordinated with audio tapes. These tape-slide series were

²James W. Brown, Richard B. Lewis, and Fred F. Harclerod, A-V Instruction: Media and Methods, (3rd ed., New York: McGraw-Hill Book Company, 1969).

³J. D. Allred and William Ray Fulton, Programmed Text on the Operation of Selected Audio Visual Equipment, (Norman, Okla.: College of Education, University of Oklahoma, 1969).

⁴William Ray Fulton, Syllabus For Education 290: AV Instruction: Media and Methods, (Norman, Okla.: College of Education, University of Oklahoma, 1969).

disseminated in an electronic learning laboratory in which several of the carrells had been modified for the experiment by the addition of a carousel-type slide projector. Several arrangements for placing the slide projectors within the carrells were tried. It was decided that the arrangement which best facilitated viewing and note-taking involved enlarging the carrells by the addition of a 12-inch extension shelf. This extension provided the students with a suitable writing surface and allowed the projectors to be moved further from the front of the carrells. This additional projection distance and the use of 3-inch projection lenses rather than the standard 4-inch lens allowed the projection of an image 10 inches wide on a screen fastened to the front of the carrell. The remote control for the projector was mounted on the writing surface with a temporary adhesive which allowed each student to position it according to their own preference. The only other modification made to the projectors or carrells was the addition of a sheet-metal baffle to direct the hot air from the fan cooling the projection lamp away from the student.

The sound was transmitted to the students through headphones and each student had complete control over his program, being able to stop it for note-taking or back it up to replay a portion of it independently of the other students. A few students complained that the headphones were uncomfortable; however, when they were allowed to use

some older headphones which had softer cushions the problem was corrected.

A 16 milimeter motion picture projector was installed in the laboratory and wiring installed which allowed the students to hear the sound from the film over their headphones. In addition to the slide-tape series and 16 milimeter films several video tapes were used during the course. To replay these tapes a video-tape recorder and a 23-inch television monitor were placed in the laboratory and the students received the sound portion of these programs through their headphones. The use of headphones for all the media which employed sound practically eliminated noise in the laboratory area and increased the flexibility of the procedures by allowing different lessons to be used simultaneously without interference.

Other self-instructional activities were conducted in an automated AV equipment laboratory and a workroom equipped for the production of instructional materials. The equipment laboratory contains four types of motion picture projectors, a tape recorder, slide and filmstrip projectors, an overhead projector, an opaque projector, and a phonograph which the students learned to operate by using a programmed text. In the work area the students learned to operate an office copier, a dry-photo copier, a drymount press and a spirit duplicator. Using this equipment they each produced five different types of overhead transparencies,

drymounted and laminated a picture from a magazine and prepared a spirit master from which they made several duplicate copies. Several black and white pictures of the self-instructional areas are located in Appendix H.

The various types of media were integrated into this course in such a manner that one form of media were utilized to provide instructions for the use of the others. For instance, a video tape was used to teach the students the operation of the tape recorder and slide projectors contained in the carrells and slide and tape series used with these machines provided instruction for the production activities. The self-instructional lessons consisted of the following media: (1) 24 slide-audio tape series which included 657 35 milimeter slides, (2) 6 video tapes, which were produced in the College of Education, (3) 11 commercially produced 16 milimeter sound motion pictures, (4) 2 commercially produced 8 milimeter continuous loop films, (5) 35 milimeter filmstrip coordinated with an audio tape, and (6) the previously mentioned programmed text.⁵ These basic materials were supplemented by reading assignments, displays of realia and miscellaneous activities which were assigned to the students through the self-instructional lessons and printed instructions. The printed assignments may be found in Appendix I.

The self-instructional lessons were written and the non-commercial materials for them were produced by the experimenter during the year preceding the experiment.

⁵Allred and Fulton, op. cit.

The experimental groups were monitored by a laboratory assistant, who assisted them with mechanical difficulties and other procedural matters. This person did not give the students assistance with any problem involving the course content; however, if a student felt a need for such help, he was allowed to confer with the course instructor. Several such conferences were requested during the early part of the course as a noticeable degree of apprehension in the experimental groups was evident. The students who requested the conferences were not seeking information concerning the course content. Instead they were seeking reassurance that they were receiving all the information given the control group and that their grades were not likely to suffer as a result of the experimental treatment. After taking the first examination and receiving assurance that they had performed satisfactorily, students gained confidence, the apprehension dissipated, and the demand for individual conferences declined to extinction.

No attendance records as such were kept for the experimental groups; however, each student maintained a time-card on which he recorded his time upon entering and leaving the self-instructional laboratory. The information gathered from these records was reported in the "subjective findings" portion of Chapter IV. A copy of this time-card is located in Appendix J.

During the course three objectives tests in addition to the pre-test were administered to provide the objective

data for the study. The first of these examinations was a brief, 45-item, multiple choice examination administered during the regular instructional time after only four weeks of instruction. This examination was given for two purposes other than providing data for the study. One of these purposes was to allow the students to learn what type test items were used while discovering what kinds of information the experimenter considered important. The second of these purposes was to provide the students with feedback regarding their success in the course up to that point. Thus, they might adjust their studying procedures if needed, while enough of the course remained for them to benefit from these adjustments. As has been mentioned previously this test served to reduce the anxiety of the experimental students by demonstrating to them that the self-instruction they were receiving allowed them success. The second test and the final examination of 100 items each were longer than the first and were administered to all of the students simultaneously at times other than the regular class times.

Treatment of the Data

The raw data collected in the experiment are presented in tabular form in Appendix K. The statistical significance of this data was evaluated by a t-test to determine if the mean achievement scores for groups receiving different treatments differed significantly at the .05 level of probability and by treatment by levels analysis

of variance to test for interactions between the following combinations of variables: treatment X length of learning session, treatment X educational level, and treatment X the sex of the students. At the conclusion of the course the students responded anonymously to an opinionnaire concerned with their attitudes toward the course and toward the method by which they received instruction. Their responses are listed in tabular form and subjectively analyzed in Chapter IV of the investigation.

The next chapter, Chapter IV, contains the statistical treatment and analysis of the objective data gathered from the examinations and an analysis of the subjective findings made regarding the attitudes and time requirements of the students.

CHAPTER IV

ANALYSIS OF THE DATA

Statistical Data

After the data had been gathered according to the procedures described in Chapter III, the means, variances, and standard deviations of each of the four groups were calculated. A t-test to check the homogeneity of the variances was then computed between the daytime experimental group and the evening experimental group, and between the daytime control group and the evening control group. The results of these tests revealed that the variances of the groups were homogeneous, allowing the scores of the daytime experimental group to be combined with those of the evening experimental group, and those of the daytime control group with those of the evening control group. These scores were combined in this manner to increase the power of the test between control and experimental. The power of the test was then calculated to determine that the probability of a type II error was not significant.

After the homogeneity of variance had been established, the four groups were combined into two and the means, variances, and standard deviations for the combined groups were calculated. The results of this computation are shown in Table 1.

TABLE 1
MEANS, VARIANCES, AND STANDARD DEVIATIONS
FOR EXPERIMENTAL AND CONTROL GROUPS

Treatment	$\bar{X}$	S^2	s.d.
Experimental	213.11	256.10	16.00
Control	205.75	421.02	20.52

A t-test was then computed on the above data, using this formula

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

This computation revealed that $t = 1.88$ in favor of the experimental group, which was not significant at the .05 level of probability with 85 degrees of freedom.

The first hypothesis was stated in Chapter I in this manner.

Students receiving instruction by traditional methods will score significantly higher on objective tests than students receiving instruction by self-instructional methods.

This hypothesis was clearly rejected as the students receiving traditional instruction did not score higher than those using self-instruction.

The next three hypotheses were concerned with the possibility of interaction between the method of instruction and the independent variables: the length of the instructional sessions, the educational level of the students, and the sex of the students. In Chapter I the independent hypotheses were stated in this manner:

There is no interaction between the relative effectiveness of the method of instruction and the length of the learning session.

There is no interaction between the relative effectiveness of the method of instruction and the educational level of the students.

There is no interaction between the relative effectiveness of the method of instruction and the sex of the students.

These hypotheses were tested by a treatment X levels analysis of variance according to procedures described by Lindquist.¹ The results of this analysis of variance are shown in Table 2.

TABLE 2

TREATMENTS X LEVELS ANOVA

Source	d.f.	SS	MS	F	P
Method of					
A Instruction	1	1145.03	1145.03	.021	N.S.
Level of					
B Education	1	261.44	261.44	.005	N.S.

¹E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education, Houghton Mifflin Company, Boston, 1953, pp. 221-229.

TABLE 2--Continued

Source	d.f.	SS	MS	F	P
C Sex	1	2077.95	2077.95	.039	N.S.
D Length of Sessions	1	1315.87	1315.87	.025	N.S.
A X B	1	5286.98	5286.98	.099	N.S.
A X C	1	3470.47	3470.47	.065	N.S.
A X D	1	4232.55	4232.55	.079	N.S.
With Cells	71	379,2726.72			
Total	86				

The first of the secondary hypotheses stated:

There is no interaction between the relative effectiveness of the method of instruction and the length of the learning session.

The analysis of variance for the hypothesis is summarized in the seventh row of Table 2 and shows that no significant interaction existed between the method of instruction and the length of the learning session. In other words, whether students received instruction for 150minute session per week or for three 50 minute sessions per week did not make a significant difference in the test scores for either instructional group.

The second of the secondary hypotheses stated:

There is no interaction between the relative effectiveness of the method of instruction and the educational level of the student.

The analysis of variance for this hypothesis is summarized in the fifth row of Table 2 and shows that no significant interaction existed between the educational level of the

students and the method of instruction. In other words, neither of the methods of instruction was more appropriate for use with graduate students or upper division undergraduates than the other.

The third of the secondary hypotheses stated:

There is no interaction between the relative effectiveness of the method of instruction and the sex of the students.

The analysis of variance for this hypothesis is summarized in the sixth row of Table 2 and shows that no significant interaction existed between the method of instruction and the sex of the students. In other words, the analysis of variance revealed that neither of the instructional methods was more appropriate for use with males or females.

Subjective Findings

The time from the cards of the experimental students was totaled, converted into clock hours, and averaged. This procedure showed that the daytime experimental students averaged spending slightly less than 28 clock hours receiving instruction, while the evening experimental students averaged slightly over 26 hours, and the control groups spent slightly over 33 hours in class. While this shows a slight time saving for the experimental students, it was not as great as might have been expected on the basis of the length of the taped lessons, allowed to run straight through without stopping or repetition. The experimenter observed that the vast majority of the self-instructional students used surplus time for

repeating parts of the lesson for the day or reviewing previous lessons, rather than leaving early

In addition to the findings concerned with the achievement of the students and the time requirements of the different methods, the experiment was also concerned with some subjective matters from an opinionnaire such as the attitude of the students toward the course as a whole and their attitudes concerning the particular type of instruction they had received. In order to gather this information a brief anonymous opinionnaire consisted of two parts, one which was answered by all of the students and one to which only the experimental students responded. A copy of this instrument is included in Appendix L of the study.

A question asked the experimental students was:

If you were to take this course again, knowing what you now know, and were given a free choice, which method of instruction would you choose?

☐ traditional ☐ self-instructional

The response to this item was overwhelmingly in favor of the self-instructional method as only one student stated a preference for the traditional method.

The second question was to be answered by only those students who expressed a preference for the traditional approach. It was written in an attempt to gauge the intensity of this preference and was worded in this manner:

Given these choices which would you choose?

☐ traditional, at a time inconvenient for you



self-instructional at a time more
convenient for you

The student who chose the traditional approach on the first question, chose the self-instructional alternative on the second. This indicated that although the traditional approach was favored, the preference was not strong enough to warrant an inconvenience.

The third question asked the experimental students:

What did you like about the self-instructional
method?

The students responses to this item involved three major factors: (1) student-controlled pacing, (2) the informal atmosphere, and (3) confidence in the self-instructional approach as a teaching method. The most frequent response to this question was that they liked the self-instructional method because they could control the rate of presentations and were not bound to the speed of the group. Other responses closely related to this one were that they appreciated being able to make up any lesson they missed, could back the lesson up to repeat difficult points, and could review any of the lessons at their convenience. Comments they made concerning the informal atmosphere of the self-instructional approach were that they enjoyed the change of pace from lecture classes and felt the free atmosphere and informal approach allowed them to know the other students better than in traditional classes. They also made several statements which indicated that, by the time of the final, they

had gained considerable respect for the self-instructional lessons as a means of instruction. These comments indicated that they believed: (1) the audiovisual materials helped focus their attention and facilitate note-taking, (2) the self-instructional lessons were more efficient than traditional because the information was concentrated and time wastage was minimized, (3) the taped lessons were more consistent and comprehensive than live lectures, and (4) they gained confidence from knowing the information was available and could be repeated until it was learned.

The fourth item elicited suggestions from the experimental students concerning the improvement of the self-instructional method. Their responses to this item were (1) they would like more laboratory work, (2) they would like more variety by more thoroughly interspersing the tape-slide lessons with other activities, and (3) they would like to have several discussion sessions with the teacher built into the self-instructional system. Other suggestions which were made less frequently included: (1) provision of more knowledge of their purposes, (2) provision of printed handouts of the lessons' high points to reduce the necessity for note-taking, and (3) more comfortable earphones.

The fifth item listed seven activities which were used in the self-instructional method and asked the students to rank them numerically according to their preference. Their response to this item showed they clearly preferred

the tape and slide sets and laboratory activities over the other activities, with the tape and slide sets receiving a few more first place ranking than the laboratory work. When asked by the next item to tell what they had particularly liked about the activity which they ranked first, the students who listed the tape-slide set said they liked the self-pacing and logical progression of the lessons. Those students who ranked the laboratory activity first said they preferred this activity because the direct experience aided understanding; it was more active, and it allowed immediate application of what had been learned.

In addition to the information gathered concerning the attitudes of the experimental students toward the self-instructional method, the experiment was also concerned with their attitudes toward the course in general and in comparing their attitudes with those of the control group. To gather this information all students were asked this question:

1. In comparison with the other college courses you have taken, how would you rate the overall quality of Ed. 290?

☐	☐	☐	☐	☐
Superior	Above Average	Average	Below Average	Inferior

The responses of the students to this item are revealed in Table 3.

TABLE 3
RESPONSES TO ITEM ON OVERALL QUALITY

Method	Superior	Above Average	Average	Below Average	In- ferior
Experimental	8	25	2	0	0
Control	7	34	11	1	0

These data indicated that most of the students had a favorable attitude toward the course in general regardless of the method by which they were instructed, with the experimental students being slightly more favorable than the control.

Another item used to determine the attitude of the students toward the overall course was worded in this manner:

2. Assuming that this course would be taught
in exactly the same manner as when you were
enrolled, would you recommend it to a friend?

☐
Yes

☐
No

All of the experimental students responded in the affirmative and only one control student answered no, again indicating that the students of both groups were generally satisfied with the instruction they had received.

It has often been argued by the opponents of self-instruction that instructional media and self-instruction are leading to the depersonalization of education. To determine if the students felt that the instruction they had received in this course was more depersonalized than the instruction

they had received in other courses at this institution, they were asked this question:

3. In comparison with the other courses you have taken at OU, do you feel that Ed. 290 was:

☐	☐	☐	☐	☐
a great deal less deper- sonalized	slightly less deper- sonalized	about the same	slightly more deper- sonalized	a great deal more deper- sonalized

The students responded in the manner indicated in Table 4.

Table 4

STUDENTS RESPONSES TO DEPERSONALIZATION ITEM

Method	A great deal less	Slightly less	About the same	Slightly more	A great deal more
Experi- mental	19	10	3	2	2
Control	40	8	4	0	1

These data indicated that most of the students perceived the course as less depersonalized than most of the courses they had taken at this university. The experimental students perceived the instruction they received as being slightly more impersonal, than did the control group who received traditional instruction in relatively small classes. However, the experimental students still considered the instruction they had received in this class as being less depersonalized than the instruction they had received in most of the other courses they had taken at this university.

The objectives for this course include not only teaching cognitive information and the development of certain psychomotor skills, but also the development of attitudes favorable toward the use of instructional media in teaching. To determine if the students felt that their attitudes had changed in this direction, the following question was asked:

4. In your opinion, how has your attitude toward the use of instructional media changed since you enrolled in this course?

☐ I am a
great deal
more in
favor of it

 ☐ slightly
more in
favor

 ☐ no
change

 ☐ slightly
more op-
posed

 ☐ a great deal
more opposed
to it

The students' responses to this item are shown in Table 5.

TABLE 5

SHIFT OF ATTITUDES CONCERNING INSTRUCTIONAL MEDIA

Method	A great deal more in favor	Slightly more in favor	No change	Slightly more op- posed	A great deal more opposed
Experi- mental	28	6	2	0	0
Control	44	7	3	0	0

These data indicated that most of the students were a great deal more in favor of instructional media after taking the course, regardless of which method of instruction they had received.

The next chapter, Chapter V, is a summary of the findings of the study and includes the experimenter's conclusions and recommendations for implementation and further study.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The problem of this study was to determine if students who received self-instruction in the course "Audiovisual Materials in Teaching" would perform as well on objective tests as students instructed by the traditional method. In addition to the primary question, several secondary questions were answered by the study. These questions were:

1. Did the length of the instructional session have more effect on the relative effectiveness of one method than it did on the other?
2. Was one of the methods more appropriate for use with graduate or undergraduate students than the other?
3. Was the relative effectiveness of either of these methods dependent upon the sex of the student?
4. Were the attitudes of the students who received one type of instruction more favorable to the course as a whole than those instructed by the other method?

To test these questions an experiment was conducted during the spring semester of the 1969-70 school year which

involved 87 audiovisual students in the control and experimental groups. The statistical significant of the data was analyzed by a t-test and treatments X levels analysis of variance as was described in Chapter IV. The analysis of the data revealed the following findings as answers to the preceding questions.

Findings and Interpretations

The data on page 45 indicate that students can learn the content of the course "Audiovisual Materials in Teaching" as well through self-instruction as through the traditional lecture-demonstration approach. In answer to the secondary questions, it was established that whether students received instruction for one 150-minute session per week or for three 50 minute sessions per week did not make a significant difference in the test scores for either group. It was also determined that neither of the methods was more appropriate for use with graduate students or upper-division undergraduates than the other one. Likewise, it was found that neither of the methods was more appropriate than the other for use with males or females.

Concerning the attitudes of the students toward the course, it was indicated that most of the students had a favorable attitude toward the course at its conclusion, regardless of which method of instruction they had received. It was also found that the experimental students were

overwhelmingly in favor of the self-instructional method for teaching this course. The subjective data also indicate that the majority of both groups of students perceived the course as being less depersonalized than most of the courses they had taken at this university. The self-instructional students considered the instruction they received as slightly more depersonalized than did the students who received traditional instruction. However, the experimental students still considered the instruction they had received as being less depersonalized than the instruction they had received in most of the other courses they had taken at this institution. Finally, most of the students, regardless of which type of instruction they had received, believed the course improved their attitude toward instructional media.

Conclusions

On the basis of the above findings the experimenter has drawn the following conclusions:

1. The College of Education of the University of Oklahoma, or another college with a similar student population, could implement self-instructional methods for teaching the basic audiovisual course.
2. This instruction could be offered in either three 50-minute sessions per week, or in one 150-minute session per week.
3. This instructional method is equally suitable for graduate students or upper division undergraduates.

4. This instructional method is equally suitable for either males or females.

5. Students, taught by the self-instructional method, are overwhelmingly in favor of this method of teaching the course and do not, consider it more depersonalized than the other college courses they have taken.

Recommendations

On the basis of the findings of this study, it is recommended that the College of Education of the University of Oklahoma adopt the self-instructional method as the standard procedure for offering the course, "Audiovisual Materials in Teaching." Such action would help the college meet the needs of the students concerning course availability, as it would allow full scheduling of this course with little additional capital outlay. It would have the further advantage of freeing the instructor from the task of disseminating information, allowing him to spend more time supervising individual projects and providing individual instructional guidance for the students. Further recommendations for the implementation of this system and for further study are as follows:

1. It is recommended that an instructor always be retained as an integral part of the self-instructional system to serve primarily as an instructional counselor and identity figure.

2. It is recommended, on the basis of the preferences stated by the experimental students, that the lessons presented by video tape in the experiment be converted to tape-slide lessons.

3. It is recommended that more laboratory work in the areas of production and utilization of audiovisual materials should be conducted as part of the course. This laboratory work should be thoroughly interspersed among the tape-slide lessons to provide more variety, make the learning more active, and reduce the boredom of excessive routine.

4. It is recommended that periodic discussion sessions with the instructor be built into the self-instructional system.

5. It is recommended that, in the event that the above recommendations should be effected, a replication study should be conducted to determine if the findings of the present study are replicated with the modified materials.

6. It is also recommended that a retention study be conducted which would be primarily concerned with determining if there is a significant difference in the amount of information retained by the two treatment groups after a significant period of time has elapsed since instruction.

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APPENDIX A
LETTER TO THE JUDGES

December 23, 1969

Mr. Charles Andrews
Audio-Visual Department
Southeastern State College
Durant, OK 74701

Dear Charles:

I imagine that you can guess I am needing some help by the fact that I am writing to you. For my dissertation I must establish the validity of some test items to be used in the experiment. I had hoped that the project would be funded by an HEW grant in order that I might pay the test judges. However, my proposal was rejected and therefore I am being forced to call on my friends for this assistance. If you can help me with this task, I will be truly grateful. However, if you are unable to help I understand completely. If you do have time to help me I would like for you to read each of the test items and rate its validity on a scale from one to five, with one being least valid and five being most valid. Write the number which you rate each item in the left-hand column of the paper beside the question number. It is my intention that this scale will reflect only the validity or importance of the test items. If you have suggestions concerning the wording or some other facet of the test construction please make a note of these on the test paper.

Sincerely yours,

Jack W. Paschall
Special Instructor

JWP:lmc

APPENDIX B

PRE-TEST

- _____ 1. Which part of the communication model is most closely associated with encoding messages?
 - a. sender
 - b. channel
 - c. receiver
 - d. none of these

- _____ 2. Which part of the communication model is most closely associated with decoding messages?
 - a. sender
 - b. channel
 - c. receiver
 - d. none of these

- _____ 3. A psychological barrier which is inherently associated with the lecture method of teaching is:
 - a. physical discomfort
 - b. excessive verbalism
 - c. daydreaming
 - d. referent confusion

- _____ 4. Which of these means of learning is the most concrete?
 - a. lecture
 - b. direct experience
 - c. television
 - d. motion pictures

- _____ 5. When projecting a film in the usual manner the feed reel on a 16 mm projector turns:
 - a. clockwise
 - b. counter-clockwise
 - c. the opposite direction than the take-up reel
 - d. none of the above

- _____ 6. Before manually threading a 16 mm projector how much film should be removed from the reel?
 - a. 8 inches
 - b. 16 inches
 - c. 3 to 4 feet
 - d. is of no importance

- _____ 7. Which would you not check if a projector fails to produce a picture?
 - a. projection lamp
 - b. exciter lamp
 - c. power cord
 - d. classroom circuit breaker

- _____ 8. Which of the following functions primarily as a shock absorber on a motion picture projector?
 - a. feed sprocket
 - b. upper loop
 - c. pressure plate
 - d. lower loop

- _____ 9. Which of the following affects the synchronization between the sound and picture on a sound motion picture?
 - a. exciter lamp
 - b. tone control
 - c. lower loop
 - d. sound drum

- _____ 10. Which motion picture film size is most commonly used in education?
 - a. 8 mm
 - b. 16 mm
 - c. 35 mm
 - d. 70 mm

- _____ 11. When projecting a motion picture if there appears to be a line at either the top or bottom of the image on the screen the operator should:
 - a. clean the lens
 - b. adjust the focus
 - c. adjust the framer
 - d. rethread the projector

- _____ 12. As the teacher faces the class, the transparency is placed on the stage of the overhead projector in such a manner that the teacher views it:
 - a. upside down and reversed
 - b. upside down and not reversed
 - c. rightside up but reversed
 - d. in the normal reading position

- _____ 13. Which of these is an advantage of super 8 mm over 16 mm?
 - a. better color film
 - b. larger picture area
 - c. quieter operation
 - d. more economical

- _____ 14. Motion picture films have been proven effective to:
 - a. teach skills
 - b. develop attitudes
 - c. transmit knowledge
 - d. all of the above

- _____ 15. Which of these practices has been proven the most beneficial?
 - a. note-taking during films
 - b. humorous episodes inserted in films
 - c. an introduction of the films by the instructor
 - d. none of the above have proven beneficial

- _____ 16. Which of these machines requires the darkest room for satisfactory operation?
 - a. 2 X 2 slide projector
 - b. opaque projector
 - c. motion picture projector
 - d. overhead projector

- _____ 17. A filmstrip combined with a recorded narration is called a:
 - a. visual recording
 - b. sound filmstrip
 - c. video tape
 - d. victrola

- _____ 18. Which of these processes is the least messy?
 - a. wet-mounting
 - b. dry-mounting
 - c. rubber cement-mounting
 - d. they are equally messy

- _____ 19. Which of these should be used only to represent the parts of a whole or 100%?
 - a. bar graph
 - b. line graph
 - c. pictorial graphs
 - d. pie or circle graphs

- _____ 20. Which type graph is most useful for plotting trends?
 - a. bar graph
 - b. line graph
 - c. circle or pie graph
 - d. pictorial graph

- _____ 21. Hook and loop boards are particularly advantageous for use with:
 - a. flannel cut-outs
 - b. magnetic materials
 - c. heavier objects
 - d. none of these

- _____ 22. Which of the following is not recommended use for bulletin boards?
 - a. to stimulate student interest
 - b. to encourage student participation
 - c. to present highly detailed information
 - d. to teach students to communicate ideas visually

- 23. Color is most important on globes and maps because:
 - a. of its aesthetic value
 - b. it helps distinguish features
 - c. it is highly decorative to a room
 - d. none of the above

- 24. Simulators such as those used in drivers training are examples of a:
 - a. Diorama
 - b. model
 - c. mock-up
 - d. specimen

- 25. A display which provides a realistic environmental re-creation is the:
 - a. bulletin board
 - b. Diorama
 - c. clingboard
 - d. peg board

- 26. Branching programs usually utilize:
 - a. a constructed response
 - b. a multiple choice response
 - c. a true-false response
 - d. a written response

- 27. The most valid criticism levied against current programmed learning materials is:
 - a. they don't allow students to move at varying speeds
 - b. they are too verbal
 - c. they are too complicated for practical use
 - d. they are too concentrated

- 28. Which is a legitimate activity for following up community study?
 - a. further study in areas of special interest
 - b. building models and displays
 - c. participation in civic projects
 - d. all of the above

- 29. The media center could be described as:
 - a. a traditional school library
 - b. an extension of the classroom
 - c. an audio-visual materials collection
 - d. a regional library

- 30. Most broadcast educational television stations receive some programs from:
 - a. NBC
 - b. FCC
 - c. NET
 - d. NRA

APPENDIX C
FIRST EXAMINATION

1. Instructional media relies most heavily upon:
 - a. mechanical design
 - b. learning theory
 - c. photography
 - d. graphic art
2. All ideas must be transmitted by:
 - a. symbols
 - b. thoughts
 - c. complete sentences
 - d. words
3. Which of these is a channel of communication?
 - a. speech
 - b. writing
 - c. sign language
 - d. all of them
4. Which part of the communication model is most closely associated with encoding messages?
 - a. sender
 - b. channel
 - c. receiver
 - d. none of these
5. Which part of the communication model is most closely associated with decoding messages?
 - a. sender
 - b. channel
 - c. receiver
 - d. none of these
6. When the receiver gives the sender an indication of the success of the communication, this response is called:
 - a. symbols
 - b. channels
 - c. reinforcement
 - d. feedback
7. The sender can then give approval, corrections, or additional information. This is called:
 - a. symbols
 - b. channels
 - c. reinforcement
 - d. feedback
8. Which of these is an important consideration when selecting symbols and channels for communications?
 - a. the operational level of the learner
 - b. the complexity of the concept
 - c. the abstractions of the media
 - d. all of these

9. What are unwanted stimuli which compete for the attention of the learner called?
 - a. noise
 - b. feedback
 - c. reinforcement
 - d. none of the above
10. A psychological barrier which is inherently associated with the lecture method of teaching is:
 - a. physical discomfort
 - b. excessive verbalism
 - c. daydreaming
 - d. referent confusion
11. Which psychological barrier is caused by the learner using a faulty frame of reference?
 - a. physical discomfort
 - b. excessive verbalism
 - c. daydreaming
 - d. referent confusion
12. Which is the most abstract?
 - a. the written word, automobile
 - b. a picture of a car
 - c. a toy car
 - d. they are equally abstract
13. Which of the following is not a psychological barrier to teaching?
 - a. day-dreaming
 - b. feedback
 - c. referent confusion
 - d. imperception
14. If the word "seahorse" causes a child to visualize a horse, he is experiencing:
 - a. day-dreaming
 - b. feedback
 - c. referent confusion
 - d. imperception
15. When a student finds his own thoughts and fantasies most interesting than the class activity he is experiencing:
 - a. excessive verbalism
 - b. day-dreaming
 - c. referent confusing
 - d. imperception

16. Which of these barriers to communication is often a product of the others listed?
 - a. physical discomfort
 - b. excessive verbalism
 - c. day-dreaming
 - d. none of these
17. Which of these means of learning is the most concrete?
 - a. lecture
 - b. direct experience
 - c. television
 - d. motion pictures
18. Which of these means of learning is the least concrete?
 - a. lecture
 - b. direct experience
 - c. television
 - d. motion pictures
19. When projecting a film in the usual manner the feed role on a 16 mm projector turns:
 - a. clockwise
 - b. counter-clockwise
 - c. the opposite direction than the take-up reel
 - d. none of the above
20. When threading a 16 mm film the sprocket holes of the film should:
 - a. be away from the operator
 - b. be toward the operator
 - c. varies from machine to machine
 - d. is of no importance
21. Before manually threading a 16 mm projector how much film should be removed from the reel?
 - a. 8 inches
 - b. 16 inches
 - c. 3 to 4 feet
 - d. is of no importance
22. Which of these is a true statement?
 - a. sound film may be shown on a silent projector
 - b. silent film may be shown on a sound projector
 - c. both a and b
 - d. neither a nor b
23. Which would you not check if a projector fails to produce a picture?
 - a. projection lamp
 - b. exciter lamp
 - c. power cord
 - d. classroom circuit breaker

24. Which of the following functions primarily as a shock absorber on a motion picture projector?
 - a. feed sprocket
 - b. upper loop
 - c. pressure plate
 - d. lower loop
25. Which of the following affects the synchronization between the sound and picture on a sound motion picture?
 - a. exciter lamp
 - b. tone control
 - c. lower loop
 - d. sound drum
26. When referring to motion picture film, 16 mm refers to the:
 - a. speed of the film
 - b. width of the film
 - c. length of the film
 - d. thickness of the film
27. Which motion picture film size is most commonly used in education?
 - a. 8 mm
 - b. 16 mm
 - c. 35 mm
 - d. 70 mm
28. Which film size is most often used for home movies?
 - a. 8 mm
 - b. 16 mm
 - c. 35 mm
 - d. 70 mm
29. Which film size is most often used in commercial movie theaters?
 - a. 8 mm
 - b. 16 mm
 - c. 35 mm
 - d. 70 mm
30. Which should be turned off first when a film is completed?
 - a. motor
 - b. lamp
 - c. a & b simultaneously
 - d. makes no difference
31. At what speed are sound 16 mm films projected?
 - a. 8 frames per second
 - b. 16 frames per second
 - c. 24 frames per second
 - d. 32 frames per second

32. At what speed are silent 16 mm films projected?
 - a. 8 frames per second
 - b. 16 frames per second
 - c. 24 frames per second
 - d. 32 frames per second
33. Which of the following is the most suitable instrument for removing hard deposits from the pressure plate of a projector?
 - a. a pocket knife
 - b. a wire brush
 - c. a wooden toothpick
 - d. a straightened paper clip
34. How often do the latest 16 mm projectors require lubrication?
 - a. every 30 days
 - b. every 90 days
 - c. determined by use
 - d. never, it is sealed in at the factory
35. Which of the following should be used to clean the projector lens?
 - a. a handkerchief
 - b. a Kleenex
 - c. a silicone treated cloth
 - d. lint-free tissue
36. Which of the following is the most suitable instrument for cleaning dust and lint from the aperture?
 - a. a wooden toothpick
 - b. a pipe cleaner
 - c. a pocket knife
 - d. tweezers
37. When projecting a motion picture if there appears to be a line at either the top or bottom of the image on the screen the operator should:
 - a. clean the lens
 - b. adjust the focus
 - c. adjust the framer
 - d. re-thread the projector
38. Tape-recorders erase automatically when?
 - a. rewinding
 - b. recording
 - c. playing
 - d. in fast forward
39. Which tape recording speed is most suited for recording music?
 - a. 1 $\frac{7}{8}$ ips
 - b. 3 $\frac{3}{4}$ ips
 - c. 7 $\frac{1}{2}$ ips
 - d. no difference

40. Which length audio tape will play for one hour at 3 3/4 ips when the tape is recorded on only one track and run only one direction?
 - a. 600 feet
 - b. 1200 feet
 - c. 2400 feet
 - d. none of the above
41. The shiny side of the tape should be:
 - a. on the outside of the reel
 - b. on the inside of the reel
 - c. depends upon the brand of tape
 - d. makes no difference
42. The most suitable method for erasing tape quickly, is by:
 - a. an alcohol solution
 - b. running through the recorder on fast forward
 - c. an electro-magnet
 - d. all of these
43. Which of these machines has a framer?
 - a. film-strip projector
 - b. slide projector
 - c. overhead projector
 - d. opaque projector
44. Which is most likely to prolong the life of projection lamps?
 - a. allowing the fan to run after lamp is turned off
 - b. keeping them clean
 - c. never using them more than 30 min. at one time
 - d. turning off the lamp and motor simultaneously
45. When inserting a 2 X 2 slide in a projector it should be:
 - a. upside down and reversed
 - b. upside down and not reversed left to right
 - c. right side up but reversed
 - d. none of these

APPENDIX D
SECOND EXAMINATION

1. Which of these is not a resource for film selection?
 - a. educators guide to free film
 - b. index to 16 mm educational films
 - c. film producers catalog
 - d. ERIC
2. According to research the use of color in films:
 - a. is most beneficial
 - b. is necessary to most concepts
 - c. aids social understanding
 - d. none of these
3. According to research note-taking during films is likely to be:
 - a. detrimental
 - b. beneficial
 - c. of no consequence either way
 - d. none of these
4. Which one of these factors cause super 8 films to be a significant improvement over regular 8 mm?
 - a. better color film
 - b. larger picture area
 - c. quieter operation
 - d. more economical
5. Which of these is an advantage of super 8 mm over 16 mm?
 - a. better color film
 - b. larger picture area
 - c. quieter operation
 - d. more economical
6. Which of these motion picture techniques makes action that occurs too quickly for observation more easily observed?
 - a. time-lapse
 - b. flash-back
 - c. slow motion
 - d. animation
7. Which of these motion picture techniques makes action which occurs too slowly for observation more easily observed?
 - a. time-lapse
 - b. flash-back
 - c. slow motion
 - d. animation

8. Which of these motion picture techniques can be used to visualize an invisible process?
 - a. time-lapse
 - b. slow motion
 - c. flash-back
 - d. animation
9. Which of these motion picture techniques is used to represent a return to an earlier time?
 - a. time-lapse
 - b. flash-back
 - c. slow motion
 - d. animation
10. Which of these techniques is used to make extremely small objects more visible?
 - a. animation
 - b. tele-photo photography
 - c. micro-photography
 - d. slow motion
11. Which of these is unnecessary when planning a film presentation for maximum effectiveness?
 - a. selection of the film
 - b. preparation of the class
 - c. previewing
 - d. the above are all necessary
12. Which of these is the least legitimate reason for using a classroom film?
 - a. to make students more easily managed on naturally difficult days, like Fridays
 - b. to recreate an event which happened in the past
 - c. to recreate events which happen at distant places
 - d. to show an event too dangerous for direct observation
13. Motion picture films have been proven effective to:
 - a. teach skills
 - b. develop attitudes
 - c. transmit knowledge
 - d. all of the above
14. Which of the following is not a good practice in the utilization of instructional films?
 - a. showing only part of a film
 - b. using a film as an introduction to other activities
 - c. leaving the lights on to facilitate note-taking
 - d. all of the above

15. The value of 16 mm sound motion pictures in instructional situations:
 - a. is suspected
 - b. has been established by research
 - c. has never been demonstrated
 - d. is negligible
16. A pioneer in instructional film research was?
 - a. Walt Disney
 - b. George Eastman
 - c. Varney C. Arnsperger
 - d. none of the above
17. Who invented the Kinetoscope?
 - a. George Eastman
 - b. Thomas Edison
 - c. Mathew Brady
 - d. none of the above
18. Who invented the flexible film base that made motion pictures possible?
 - a. George Eastman
 - b. Thomas Edison
 - c. Mathew Brady
 - d. none of the above
19. Which of these may cause usage of 8 mm films in schools?
 - a. the super 8 format and its improved picture quality
 - b. increased emphasis on individual study
 - c. cartridge loading projectors
 - d. all of the above
20. Research has shown that critical observation of visual stimuli:
 - a. is an inborn innate quality in some humans
 - b. can be sharpened through training
 - c. is of no importance
 - d. none of the above
21. Which of these is usually more effective?
 - a. audio-print combination
 - b. audio alone
 - c. print alone
 - d. no significant difference
22. Which of these practices has been proven the most beneficial?
 - a. note-taking during films
 - b. humorous episodes inserted in films
 - c. an introduction of the films by the instructor
 - d. none of the above have proven beneficial

23. Which of these has proven especially beneficial in "how-to-do-it" films?
 - a. close-up photography
 - b. micro-photography
 - c. time-lapse action
 - d. stop-action
24. Should you turn the lights off when using a rear-projection screen?
 - a. yes, if the room can be darkened
 - b. yes, if all students are seated in the optimal viewing area
 - c. yes, if you don't want them to read during the film
 - d. yes, if all students cannot be seated in the optimal viewing area
25. The optimal viewing distance from a rear-projection screen is:
 - a. up to 12 feet
 - b. up to 12 screen widths
 - c. any distance from which they can see the screen
 - d. none of the above
26. Which of these may be used to "clinch" a film presentation?
 - a. class discussion of the film
 - b. an oral quiz
 - c. written reports from other sources on the film's subject
 - d. all of the above
27. Which of these has a bearing on learning effectiveness?
 - a. quality of pictorial or graphic content
 - b. utilization procedures
 - c. integration with other materials
 - d. all of these
28. Which media allows the most flexibility of pacing?
 - a. filmstrips
 - b. sound-filmstrips
 - c. 8 mm film loops
 - d. no difference
29. Which is a disadvantage of filmstrips compared to 2 X 2 slide series?
 - a. flexible pacing
 - b. flexible sequence or order
 - c. availability
 - d. cost
30. A tachistoscope allows an instructor to:
 - a. simulate motion
 - b. use long transparent rolls
 - c. flash images on the screen for a fraction of a second
 - d. operate a projector by remote control

31. Which of these machines requires the darkest room for satisfactory operation?
 - a. 2 X 2 slide projector
 - b. opaque projector
 - c. motion picture projector
 - d. overhead projector
32. Which of these machines may be operated most satisfactorily in a fully lighted room?
 - a. 2 X 2 slide projector
 - b. opaque projector
 - c. motion picture projector
 - d. overhead projector
33. For which of these machines are materials most readily available?
 - a. 2 X 2 slide projector
 - b. opaque projector
 - c. motion picture projector
 - d. overhead projector
34. Which of these is a limitation of the overhead projector?
 - a. facility for showing realistic motion
 - b. facility for focusing attention
 - c. teacher controlled pacing
 - d. position of the teacher during operation of the machines
35. Which of these statements most accurately describes the task of the teacher preparing a class to watch a film-strip?
 - a. describing what the class will see
 - b. making everyone sit up and be quiet
 - c. making them want to see the film-strip
 - d. make the students aware of the necessity for hurrying through the film-strip because of its length
36. Which of these is an appropriate follow-up activity
 - a. evaluation
 - b. application
 - c. reteaching as needed
 - d. all of these
37. Which of these slide sizes requires a different projector from the others?
 - a. 35 mm single frame
 - b. 35 mm double frame
 - c. 127 super slide
 - d. lantern slides

38. Which of these slide sizes is sometimes called 1/2 frame?
- a. 35 mm single frame
 - b. 35 mm double frame
 - c. 127 super slide
 - d. none of the above
39. Which of these is the same format used in 35 mm movies and most filmstrips?
- a. 35 mm single frame
 - b. 35 mm double frame
 - c. 35 mm full frame
 - d. none of them
40. Which of these cameras does not produce 2 X 2 slides?
- a. 35 mm single lens reflex
 - b. 127 box camera
 - c. 126 instamatic
 - d. they can all produce slides of this size
41. Which slide size is sometimes referred to as a lantern slide?
- a. 35 mm
 - b. 126
 - c. 3 1/4 X 4
 - d. 127
42. Although all are transparencies in the broad sense, which of these sizes is most often referred to as a transparency?
- a. 2 X 2
 - b. 2 1/4 X 2 1/4
 - c. 3 1/4 X 4
 - d. 10 X 10
43. Which of these is used primarily to facilitate information storage?
- a. micro-film
 - b. micro-projection
 - c. film-strips
 - d. 2 X 2 slides
44. Which of these is not used primarily for information storage?
- a. micro-film
 - b. micro-projection
 - c. micro-fiche
 - d. micro-cards
45. Which of these does not use film?
- a. 2 X 2 slide
 - b. micro-film
 - c. micro-projection
 - d. filmstrips

46. Which form of media would best visualize a concept involving complex motion to a physical education class?
 - a. overhead transparencies
 - b. motion picture film
 - c. 2 X 2 slides
 - d. filmstrips
47. A first grade class is planning a field trip to a dairy farm. Which media would probably be most effective in helping the class discuss what they saw on the trip?
 - a. overhead transparencies
 - b. 2 X 2 slides
 - c. a tape recording
 - d. all of these
48. Which of these is the most difficult to project?
 - a. 2 X 2 slides
 - b. lantern slides
 - c. stereo-slides
 - d. filmstrips
49. Which is least likely to allow individual scenes to get out of sequence?
 - a. filmstrips
 - b. 2 X 2 slides
 - c. lantern slides
 - d. stereo slides
50. The teacher can most easily control the order in which the various scenes will appear by using:
 - a. filmstrips
 - b. 2 X 2 slides
 - c. 16 mm films
 - d. film loops
51. Most filmstrips are made in which format?
 - a. single frame 35 mm
 - b. double frame 35 mm
 - c. super 8
 - d. single frame 16 mm
52. Which is easier to produce by hand drawing methods?
 - a. 35 mm
 - b. super slides
 - c. lantern slides
 - d. 10 X 10 transparencies
53. Which machine allows the teacher to maintain the best eye contact with the students?
 - a. slide projector
 - b. opaque projector
 - c. overhead projector
 - d. filmstrip projector

54. A filmstrip combined with a recorded narration is called
a:
a. visual recording
b. sound filmstrip
c. video tape
d. victrola
55. Which machine has replaced the chalkboard for many class-
room purposes?
a. auto-load 16 mm projector
b. carousel slide projector
c. overhead projector
d. 8 mm loop projector
56. Motion may be simulated on an overhead projector by the
use of:
a. a polarized disc
b. a tachistoscope
c. a cellophane roll
d. red and green glasses
57. Which of these is a potential advantage of microfilm?
a. reduces vandalism
b. low cost
c. easy storage
d. all of the above
58. Which of the following is opaque?
a. micro-film
b. micro-cards
c. micro-fiche
d. none of these
59. Which of these allows group viewing of microscope slides?
a. micro-fiche
b. micro-cards
c. micro-film
d. micro-projection
60. Which of these cameras has two lenses which take pictures
simultaneously?
a. 35 mm single lens reflex
b. twin lens reflex
c. stereo camera
d. none of the above
61. Which of these is a modern form of stereographic slides?
a. stereo albums
b. lantern slides
c. stereodisks
d. all of the above

62. Which of the following is not an appropriate use for filmstrips?
 - a. to provide a basis for understanding symbols
 - b. to help teach skills
 - c. to show motion
 - d. to focus group attention
63. Which of these is the least legitimate use for filmstrips?
 - a. to provide information
 - b. to reduce the cost of instruction
 - c. to stimulate aesthetic appreciation
 - d. to consolidate and review learning
64. A major advantage of 2 X 2 slides is?
 - a. they are less expensive than filmstrips
 - b. they have a smaller format than filmstrips
 - c. the sequence of pictures can be more readily changed than filmstrips
 - d. they are easier stored than filmstrips
65. A part of a transparency which may be added during the presentation is generally called?
 - a. a color lift
 - b. a cover sheet
 - c. a frame
 - d. an overlay
66. Which can be more easily produced by teachers?
 - a. slides
 - b. filmstrips
 - c. sound motion pictures
 - d. no difference
67. The text material on an overhead transparency master should not exceed:
 - a. 10 X 10 inches
 - b. 7 1/2 X 9 1/2 inches
 - c. 8 1/2 X 11 inches
 - d. 11 X 14 inches
68. Which size type is preferable for use on transparencies intended for general classroom use?
 - a. pica
 - b. elite
 - c. primary
 - d. all are equally acceptable
69. Which process requires masters that contain a high carbon content?
 - a. thermal
 - b. Diazo
 - c. dry photo-copy
 - d. color-lift

70. Which process requires clay base paper?
 - a. thermal
 - b. Diazo
 - c. dry photo-copy
 - d. color-lift
71. Which process could you use to make a transparency of an outline map drawn with color pencils?
 - a. thermal
 - b. Diazo
 - c. dry photo-copy
 - d. color lift
72. With which process can the original not be reused?
 - a. thermal
 - b. Diazo
 - c. dry photo-copy
 - d. color lift
73. Which process would you usually use to make a transparency with three color overlays?
 - a. thermal
 - b. Diazo
 - c. dry photo-copy
 - d. color lift
74. Which process could be used to make a transparency of a color photograph from Life magazine?
 - a. thermal
 - b. Diazo
 - c. dry photo-copy
 - d. color lift
75. Which process requires a transparent or translucent master?
 - a. thermal
 - b. Diazo
 - c. dry photo-copy
 - d. color lift
76. An opaque master for producing thermal transparencies can also be used with which process?
 - a. Diazo
 - b. dry photo-copy
 - c. color-lift
 - d. none of the above
77. Which of these usually will not reproduce on a thermal transparency?
 - a. India ink
 - b. ball point pen
 - c. soft lead pencil
 - d. electro-graphic pencil

78. Which of these is a function of thermal office copies like the 3M "secretary?"
- making duplicate copies of printed materials
 - making "Ditto" masters from printed materials
 - making transparencies from printed materials
 - all of the above
79. Which of these practices can save transparency film?
- the use of test strips
 - running the machine faster than usual
 - running the machine more slowly than usual
 - none of the above
80. If the first thermal process attempt results in a transparency which is too light you should:
- slow the machine down
 - speed the machine up
 - turn the master over
 - none of the above
81. Diazo transparencies are developed by:
- heat
 - ammonia fumes
 - photographic chemicals
 - light
82. For which process are the materials most easily stored for a long period of time:
- dry photo-copy
 - thermal
 - Diazo
 - no difference
83. Which type of transparency can be most quickly and easily produced?
- dry photo-copy
 - thermal
 - Diazo
 - color-lift
84. When producing thermal transparencies, the material should be placed on the master with the notched corner:
- in the upper right hand corner
 - in the lower right hand corner
 - in the upper left hand corner
 - makes no difference
85. Transparencies produced by the dry photo-copy method are developed by:
- heat
 - ammonia fumes
 - photographic chemicals
 - light

86. The color of a Diazo transparency is determined by:
- length of time in the light box
 - length of time in the pickle jar
 - film selected
 - none of the above
87. Which of these processes is the least messy?
- wet-mounting
 - dry-mounting
 - rubber cement-mounting
 - they are equally messy
88. Which of these materials is not used in dry mounting?
- rubber cement
 - poster board
 - dry-mount tissue
 - butcher paper
89. Before laminating, flimsy materials should be:
- soaked in hardening solution
 - washed with vinegar
 - dry-mounted
 - none of the above
90. Which of these is most available to classroom teachers?
- film strips
 - mock-ups
 - flat-pictures
 - motion picture films
91. Which of these is usually preferable when using flat pictures for instructional purposes?
- rapid inspection of many prints
 - thoughtful study of a few prints
 - they are equally sound practices
 - neither is a sound practice
92. What type graph is used to the best advantage when the number of values to be compared is small?
- line graph
 - pictorial graph
 - bar graph
 - pie or circle graph
93. Which type graph shows continuous data most accurately?
- line graph
 - pictorial graph
 - bar graph
 - pie or circle graph

94. Visual representations of numerical data are called:
 - a. charts
 - b. graphs
 - c. diagrams
 - d. dioramas
95. Which of the following is not recommended with diagrams?
 - a. use of other audio-visual aids
 - b. use as introductory material
 - c. use as supplemental material
 - d. none of the above
96. Which of these is usually more symbolic?
 - a. chart
 - b. diagram
 - c. graph
 - d. mock-up
97. Which of these should be used only to represent the parts of a whole or 100%?
 - a. bar graphs
 - b. line graphs
 - c. pictorial graphs
 - d. pie or circle graphs
98. Which type graph is most useful for plotting trends?
 - a. bar graph
 - b. line graph
 - c. circle or pie graph
 - d. pictorial graph
99. Color is most important on globes and maps because:
 - a. of its aesthetic value
 - b. it helps distinguish features
 - c. it is highly decorative to a room
 - d. none of the above
100. Distance is easier to estimate on which size globe?
 - a. 12 inch
 - b. 16 inch
 - c. 24 inch
 - d. 36 inch

APPENDIX E
FINAL EXAMINATION

1. What is the primary characteristic of an effective poster?
 - a. color
 - b. impact
 - c. detail
 - d. beauty
2. Which of these is not characteristic of a good poster?
 - a. simplicity
 - b. attractiveness
 - c. multi-purpose
 - d. a brief text
3. What is the major advantage of hook and loop boards?
 - a. materials are easily removed
 - b. surfaces are easily cleaned
 - c. heavy objects will cling to the board
 - d. the boards are very portable
4. What are recognizable three-dimensional representations of real things called?
 - a. copies
 - b. models
 - c. mock-ups
 - d. specimen
5. What do we call three dimensional representations of real things which do not necessarily look like the object being represented?
 - a. copies
 - b. models
 - c. mock-ups
 - d. specimen
6. Which of these is least advisable for effective utilization of models and specimens?
 - a. allow students to handle them when practical
 - b. use CCTV to enlarge small specimen
 - c. integrate them with other teaching materials
 - d. store them where the students have full access to them
7. The globe is an example of which of these?
 - a. Diorama
 - b. model
 - c. mock-up
 - d. specimen

8. Branching programs usually utilize:
 - a. a constructed response
 - b. a multiple choice response
 - c. a true-false response
 - d. a written response
9. The person generally credited with initiating the development of the branching approach to programming is:
 - a. Crowder
 - b. Pressey
 - c. Skinner
 - d. Green
10. The most valid criticism levied against current programmed learning materials is:
 - a. They don't allow students to move at varying speeds
 - b. They are too verbal
 - c. They are too complicated for practical use
 - d. They are too concentrated
11. Which of the following is usually not a function of class discussion prior to community study?
 - a. to arouse the students interest
 - b. to decide on the safest route
 - c. to locate new vocabulary terms
 - d. to identify questions to be answered
12. Which is a legitimate activity for following up community study?
 - a. further study in areas of special interest
 - b. building models and displays
 - c. participation in civic projects
 - d. all of the above
13. It is best for the media center in each individual school to be:
 - a. self-sufficient
 - b. supported by a system media center
 - c. separated into print and non-print centers
 - d. extremely quiet at all times
14. A media center could best be described as:
 - a. a traditional school library
 - b. an extension of the classroom
 - c. an audio-visual materials collection
 - d. a regional library
15. A media center is necessary if the philosophy of education in that school stresses:
 - a. individual creativity
 - b. rote learning
 - c. textbook centered lessons
 - d. faculty psychology

16. Which is not an advantage of ITV?
 - a. ability to enlarge small objects
 - b. ability to store events for later playback
 - c. ability to recognize individual differences
 - d. ability to distribute information to huge audiences
17. If a television audience is restricted we say that is:
 - a. UHF television
 - b. VHF television
 - c. broadcast television
 - d. closed-circuit television
18. Which of these is an approach to teacher training which makes the greatest use of the video-tape recorder?
 - a. computer assisted instruction
 - b. dial access instruction
 - c. micro-teaching
 - d. modular scheduling
19. Most broadcast educational television stations receive some programs from:
 - a. NBC
 - b. FCC
 - c. NET
 - d. NRA
20. A poster may be used:
 - a. to create motivation
 - b. as a reminder
 - c. to enhance an atmosphere
 - d. all of these
21. Which of these is not a true statement?
 - a. the communication process is basic to effective teaching
 - b. both sender and receiver can improve their communication skills
 - c. teaching communication skills is the responsibility of the speech teacher alone
 - d. before the teacher can reinforce the message to the students he needs to receive feedback from the students
22. A poster differs from a painting or picture in that:
 - a. a pointing or photograph may contain extensive detail and should be carefully studied
 - b. a painting or photograph has unmistakable contrast and impact
 - c. a poster contains intricate detail, while the others do not
 - d. none of the above

23. Hook and loop boards are particularly advantageous for use with:
 - a. flannel cut-outs
 - b. magnetic materials
 - c. heavier objects
 - d. none of the above
24. The greatest disadvantage of a feltboard is:
 - a. items do not stay on well
 - b. not colorful
 - c. items are hard to make or obtain locally
 - d. too small
25. Which of these is usually most expensive?
 - a. flannel board
 - b. hook and loop board
 - c. felt board
 - d. masonite board
26. A magnetic board can often be used as a:
 - a. peg board
 - b. hook and loop board
 - c. chalk board
 - d. none of the above
27. Which method can be used to enlarge a picture on the chalkboard?
 - a. grid method
 - b. hidden drawing method
 - c. template method
 - d. pattern method
28. Which method is most useful for drawing an outline map on the chalkboard which is used every semester and shows the boundary and the rivers?
 - a. grid method
 - b. hidden drawing method
 - c. template method
 - d. pattern method
29. Which method uses forms cut from plywood or other material?
 - a. grid method
 - b. hidden drawing method
 - c. template method
 - d. pattern method
30. Which is not a reason for using colored chalk?
 - a. to give emphasis
 - b. easier to erase
 - c. to make visuals more attractive
 - d. to distinguish between different parts of something

31. All ideas must be transmitted by:
 - a. symbols
 - b. thoughts
 - c. complete sentences
 - d. words
32. Which part of the communication model is most closely associated with encoding messages?
 - a. sender
 - b. channel
 - c. receiver
 - d. none of these
33. When the receiver gives the sender an indication of the success of the communication, this response is called:
 - a. symbols
 - b. channels
 - c. reinforcement
 - d. feedback
34. The sender can then give approval, corrections, or additional information. This is called:
 - a. symbols
 - b. channels
 - c. reinforcement
 - d. feedback
35. Which psychological barrier is caused by the learner using a faulty frame of reference?
 - a. physical discomfort
 - b. excessive verbalism
 - c. daydreaming
 - d. referent confusion
36. Which is the most abstract?
 - a. the written word, automobile
 - b. a picture of a car
 - c. a toy car
 - d. they are equally abstract
37. Which of the following is not a psychological barrier to teaching?
 - a. day-dreaming
 - b. feedback
 - c. referent confusion
 - d. imperception
38. If the word "seahorse" causes a child to visualize a horse, he is experiencing:
 - a. day-dreaming
 - b. feedback
 - c. referent confusion
 - d. imperception

39. Which of these means of learning is the least concrete?
 - a. lecture
 - b. direct experience
 - c. television
 - d. motion pictures
40. When projecting a film in the usual manner the feed role on a 16 mm projector turns:
 - a. clockwise
 - b. counter-clockwise
 - c. the opposite direction than the take-up reel
 - d. none of the above
41. When threading a 16 mm film the sprocket holes of the film should:
 - a. be away from the operator
 - b. be toward the operator
 - c. varies from machine to machine
 - d. is of no importance
42. Which of these is a true statement?
 - a. sound film may be shown on a silent projector
 - b. silent film may be shown on a sound projector
 - c. both a and b
 - d. neither a nor b
43. Which of the following functions primarily as a shock absorber on a motion picture projector?
 - a. feed sprocket
 - b. upper loop
 - c. pressure plate
 - d. lower loop
44. Which of the following affects the synchronization between the sound and picture on a sound motion picture?
 - a. exciter lamp
 - b. tone control
 - c. lower loop
 - d. sound drum
45. Which motion picture film size is most commonly used in education?
 - a. 8 mm
 - b. 16 mm
 - c. 35 mm
 - d. 70 mm
46. Which film size is most often used for home movies?
 - a. 8 mm
 - b. 16 mm
 - c. 35 mm
 - d. 70 mm

47. Which should be turned off first when a film is completed?
 - a. motor
 - b. lamp
 - c. a and b simultaneously
 - d. makes no difference
48. Which of the following is the most suitable instrument for removing hard deposits from the pressure plate of a projector?
 - a. a pocket knife
 - b. a wire brush
 - c. a wooden toothpick
 - d. a straightened paper clip
49. Which of the following, should be used to clean the projector lens?
 - a. a handkerchief
 - b. a Kleenex
 - c. a silicone treated cloth
 - d. lint-free tissue
50. Which of the followins is the most suitable instrument for clearing dust and lint from the aperture?
 - a. a wooden toothpick
 - b. a pipe cleaner
 - c. a pocket knife
 - d. tweezers
51. When projecting a motion picture if there appears to be a line at either the top or bottom of the image on the screen the operator should:
 - a. clean the lens
 - b. adjust the focus
 - c. adjust the framer
 - d. rethread the projector
52. Which tape recording speed is most suited for recording music?
 - a. 1 7/8 ips
 - b. 3 3/4 ips
 - c. 7 1/2 ips
 - d. no difference
53. The shiny side of the tape should be:
 - a. on the outside of the reel
 - b. on the inside of the reel
 - c. depends upon the brand of tape
 - d. makes no difference

54. Which of these machines has a framer?
 - a. film-strip projector
 - b. slide projector
 - c. overhead projector
 - d. opaque projector
55. Which is most likely to prolong the life of projection lamps?
 - a. allowing the fan to run after lamp is turned off
 - b. keeping them clean
 - c. never using them more than 30 min. at one time
 - d. turning off the lamp and motor simultaneously
56. According to research note-taking during films is likely to be:
 - a. detrimental
 - b. beneficial
 - c. of no consequence either way
 - d. none of these
57. Which one of these factors cause super 8 films to be a significant improvement over regular 8 mm?
 - a. better color film
 - b. larger picture area
 - c. quieter operation
 - d. more economical
58. Which of these motion picture techniques makes action which occurs too slowly for observation more easily observed?
 - a. time-lapse
 - b. flash-back
 - c. slow motion
 - d. animation
59. Which of these motion picture techniques is used to represent a return to an earlier time?
 - a. time-lapse
 - b. flash-back
 - c. slow motion
 - d. animation
60. Which of these is unnecessary when planning a film presentation for maximum effectiveness?
 - a. selection of the film
 - b. preparation of the class
 - c. previewing
 - d. the above are all necessary

61. Motion picture films have been proven effective to:
 - a. teach skills
 - b. develop attitudes
 - c. transmit knowledge
 - d. all of the above
62. Which of the following is not a good practice in the utilization of instructional films?
 - a. showing only part of a film
 - b. using a film as an introduction to other activities
 - c. leaving the lights on to facilitate note-taking
 - d. all of the above
63. The value of 16 mm sound motion pictures in instructional situations:
 - a. is suspected
 - b. has been established by research
 - c. has never been demonstrated
 - d. is negligible
64. Who invented the flexible film base that made motion pictures possible?
 - a. George Eastman
 - b. Thomas Edison
 - c. Mathew Brady
 - d. none of the above
65. Which of these practices has been proven the most beneficial?
 - a. note-taking during films
 - b. humorous episodes inserted in films
 - c. an introduction of the films by the instructor
 - d. none of the above have proven beneficial
66. Which of these has proven especially beneficial in "how-to-do-it" films?
 - a. close-up photography
 - b. micro-photography
 - c. time-lapse action
 - d. stop-action
67. Should you turn the lights off when using a rear-projection screen?
 - a. yes, if the room can be darkened
 - b. yes, if all students are seated in the optimal viewing area
 - c. yes, if you don't want them to read during the film
 - d. yes, if all students cannot be seated in the optimal viewing area

68. Which of these has a bearing on learning effectiveness?
- quality of pictorial or graphic content
 - utilization procedures
 - integration with other materials
 - all of these
69. Which media allows the most flexibility of pacing?
- filmstrips
 - sound-filmstrips
 - 8 mm film loops
 - no difference
70. Which of these machines requires the darkest room for satisfactory operation?
- 2 X 2 slide projector
 - opaque projector
 - motion picture projector
 - overhead projector
71. Which of these machines may be operated most satisfactorily in a fully lighted room?
- 2 X 2 slide projector
 - opaque projector
 - motion picture projector
 - overhead projector
72. For which of these machines are materials most readily available?
- 2 X 2 slide projector
 - opaque projector
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 - overhead projector
73. Which slide size is sometimes referred to as a lantern slide?
- 35 mm
 - 126
 - 3 1/4 X 4
 - 127
74. Which of these is used primarily to facilitate information storage?
- micro-film
 - micro-projection
 - filmstrips
 - 2 X 2 slides
75. Which of these is not used primarily for information storage?
- micro-film
 - micro-projection
 - micro-fiche
 - micro-cards

76. Which form of media would best visualize a concept involving complex motion to a physical education class?
- overhead transparencies
 - motion picture film
 - 2 X 2 slides
 - filmstrips
77. Which of these is the most difficult to project?
- 2 X 2 slides
 - lantern slides
 - stereo-slides
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78. Which is least likely to allow individual scenes to get out of sequence?
- filmstrips
 - 2 X 2 slides
 - lantern slides
 - stereo slides
79. Most filmstrips are made in which format?
- single frame 35 mm
 - double frame 35 mm
 - super 8
 - single frame 16 mm
80. Which of these is a potential advantage of microfilm?
- reduces vandalism
 - low cost
 - easy storage
 - all of the above
81. Which of these allows group viewing of microscope slides?
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 - micro-cards
 - micro-film
 - micro-projection
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 - b. Diazo
 - c. dry photo-copy
 - d. color-lift
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- a. slow the machine down
 - b. speed the machine up
 - c. turn the master over
 - d. none of the above

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 - c. Diazo
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 - b. thoughtful study of a few prints
 - c. they are equally sound practices
 - d. neither is a sound practice
95. Which type graph shows continuous data most accurately?
 - a. line graph
 - b. pictorial graph
 - c. bar graph
 - d. pie or circle graph
96. Which of the following is not recommended with diagrams?
 - a. use of other audio-visual aids
 - b. use as introductory material
 - c. use as supplemental material
 - d. none of the above
97. Which of these is usually more symbolic?
 - a. chart
 - b. diagram
 - c. graph
 - d. mock-up
98. Which of these should be used only to represent the parts of a whole or 100%?
 - a. bar graphs
 - b. line graphs
 - c. pictorial graphs
 - d. pie or circle graphs
99. Which type graph is most useful for plotting trends?
 - a. bar graph
 - b. line graph
 - c. circle or pie graph
 - d. pictorial graph

100. Color is most important on globes and maps because:
- a. of its aesthetic value
 - b. it helps distinguish features
 - c. it is highly decorative to a room
 - d. none of the above

APPENDIX F
SCHEDULE FORMS

Name _____

Check each hour that it would be possible for you to
attend class or lab

	8:00	9:00	10:00	11:00	1:00	2:00	3:00	4:00
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								

Name _____

Check each period that you can attend class or lab

4:15--6:45

7:00--9:30

	4:15--6:45	7:00--9:30
MON.		
TUES.		
WED.		
THUR.		
FRI.		

APPENDIX G
PERSONAL DATA SHEET

1. Name _____
 last first middle
2. Date of birth _____
 mo. day year
3. Sex _____
 male female
4. Home town _____
5. School address _____ ph.no. _____
6. If you have a significant degree of visual or auditory impairment, please describe its nature and extent. _____

7. Major and minor fields of study _____

8. College work completed ☐ 60 hrs. ☐ 90 hrs.
☐ B.A. ☐ M.A. ☐ M.A. + 30
9. Please list and describe any experience you have had with audiovisual materials and equipment. _____

APPENDIX H
PICTURES OF SELF-INSTRUCTIONAL AREA



APPENDIX I
PRINTED ASSIGNMENTS

Paschall

ASSIGNMENT: Study carefully pages 535 through 542 in the textbook and answer these study questions.

1. How can you quickly determine if an audio-tape is on the reel correctly?
2. What are the common tape recorder speeds?
3. When should the faster speed on a tape recorder be used?
4. When should the slower?
5. What length tape will record for one hour at 3 3/4 I.P.S.?
6. Why do tape recorders have "lock-outs" on the record mode?
7. The text mentions bulk erasers, but does not explain them. Try to find out what a bulk eraser actually is.
8. Obtain from the lab instructor a screwdriver, Q-tip, and a bottle of xylene. Remove the four screws from the panel covering the recording heads and following the directions on page 539 of the text, clean the heads on one of the tape decks in the lab.

Education 290

- I. Select several concepts from your teaching area which you feel might be taught effectively by the use of motion pictures.
- II. Using the OU Film Library rental catalog from reference shelf in the lab, select several films which might be helpful for teaching one of these concepts. Notice that this catalog is a joint publication between OU and OSU; therefore, select only films which are marked OU.
- III. Go to the OU Film Library which is located in the basement of the Carnegie Building and explain that you are one of my Education 290 students and would like to preview a few films. This is a service which the OU Audio-Visual Department has been kind enough to furnish, without charge. Therefore, I request that you show every courtesy to the people working there and express to them our gratitude for this accommodation.
- IV. After you have previewed a film which is suitable for your purposes, write a brief paper showing how you would incorporate that film into a lesson. Be sure to include these points:
 1. a description of the lesson's objectives;
 2. a description of the students;
 3. a description of the activities you would use to prepare the students for the film;
 4. a brief summary of the film's content;
 5. your comments regarding the particular strengths and weaknesses of this film and your suggestions on how to overcome the weaknesses; and
 6. a description of the follow-up activities you would use. Include both those activities which would be designed to reinforce and expand the learning from the film and those which are intended to evaluate the success of the learning experience.

Education 290

- I. Read carefully pages 575-589 in this text.
- II. View the 8 mm film loops on "Operating a Spirit Duplicator," which can be obtained from the lab instructor.
- III. Following the step-by-step instructions found on pages 577 through 579 prepare a ditto master. This may be either typed or drawn by hand.
- IV. Using the ditto machine in the Materials Center, for which you must furnish the paper, run off five copies of your master.
- V. Hand in your master and the five copies to the lab instructor within one week from the time this assignment was made.

Pashcall
Assignements
Education 290

This video-tape features Dr. John Renner, discussing the developmental theories of Jean Piaget, as you watch the tape be particularly observant for any implications these theories have for the use of instructional media. After viewing the tape write a brief statement (one page or less) describing these implications, which should be turned in to the lab instructor before leaving the lab.

Paschall
Assignements
Education 290

Go to the film library in the Carnegie Building and select a filmstrip which would be useful for teaching a concept in your subject area. View the filmstrip and write a script for a narration to accompany the filmstrip. Return to the lab and check out a blank tape from the lab instructor. Record your narration on this tape and turn it in for evaluation.

APPENDIX J

TIME CARD

NAME:

[illegible]

APPENDIX K

RAW DATA

No.	Length of Session	Method	Level of Education	Sex	Pre Score	Post Score
1.	D	C	G	M	18	227
2.	D	C	U	F	16	231
3.	D	C	U	F	21	213
4.	D	C	U	M	17	220
5.	D	C	U	M	17	177
6.	D	C	U	M	22	202
7.	D	C	U	F	16	206
8.	D	C	U	F	14	192
9.	D	C	U	M	23	210
10.	D	C	U	F	17	224
11.	D	C	U	F	14	207
12.	D	C	G	M	18	213
13.	D	C	U	M	12	185
14.	D	C	G	F	11	183
15.	D	C	U	M	17	204
16.	D	C	U	F	20	184
17.	D	C	G	F	17	176
18.	D	C	U	M	13	144
19.	D	C	U	M	19	145
20.	D	C	G	F	23	224
21.	E	C	U	F	16	228
22.	E	C	U	F	22	226
23.	E	C	U	F	19	225
24.	E	C	G	F	16	219
25.	E	C	U	F	17	222
26.	E	C	U	F	18	230
27.	E	C	U	F	18	198
28.	E	C	G	F	16	216
29.	E	C	U	F	20	221
30.	E	C	U	F	19	226
31.	E	C	G	F	19	216
32.	E	C	U	M	20	200
33.	E	C	U	F	21	195
34.	E	C	U	M	20	208
35.	E	C	U	F	17	206
36.	E	C	G	F	14	225
37.	E	C	U	F	18	167
38.	E	C	U	F	20	205
39.	E	C	U	M	11	207
40.	E	C	U	F	20	223
41.	E	C	G	M	23	211
42.	E	C	U	F	20	222
43.	E	C	U	F	22	227
44.	E	C	U	F	20	217
45.	E	C	G	F	16	216
46.	E	C	U	F	23	196
47.	E	C	U	F	18	222

No.	Length of Session	Method	Level of Education	Sex	Pre Score	Post Score
48.	E	C	U	M	19	197
49.	E	C	G	F	16	176
50.	E	C	U	F	11	199
51.	E	C	U	M	20	180
52.	D	E	U	F	19	214
53.	D	E	U	F	19	230
54.	D	E	G	F	17	201
55.	D	E	U	M	23	205
56.	D	E	U	F	20	212
57.	D	E	U	F	17	214
58.	D	E	G	F	19	229
59.	D	E	U	F	18	215
60.	D	E	U	F	13	178
61.	D	E	U	F	24	231
62.	D	E	U	F	20	228
63.	D	E	G	M	27	210
64.	D	E	U	M	13	192
65.	E	E	U	F	21	209
66.	E	E	G	M	24	221
67.	E	E	U	F	16	192
68.	E	E	U	F	22	193
69.	E	E	U	F	17	171
70.	E	E	U	F	19	226
71.	E	E	U	F	14	211
72.	E	E	U	M	24	214
73.	E	E	G	F	23	208
74.	E	E	U	F	14	225
75.	E	E	U	F	16	194
76.	E	E	G	F	20	220
77.	E	E	G	F	18	239
78.	E	E	U	F	21	238
79.	E	E	U	F	22	213
80.	E	E	U	F	20	214
81.	E	E	U	M	27	229
82.	E	E	U	F	22	221
83.	E	E	U	F	19	232
84.	E	E	U	M	18	214
85.	E	E	G	F	15	231
86.	E	E	G	F	11	192
87.	E	E	G	M	24	206

APPENDIX L
OPINIONAIRES

Do Not Write Your Name on this Form

1. In comparison with the other college courses you have taken, how would you rate the overall quality of Ed. 290?

☐ superior ☐ above average ☐ average ☐ below average ☐ inferior

2. In comparison with the other courses you have taken at OU, do you feel that Ed. 290 was:

☐ a great deal less de-
personalized ☐ slightly less de-
personalized ☐ about the same ☐ slightly more de-
personalized ☐ a great deal more de-
personalized

3. In your opinion, how has your attitude toward the use of instructional media changed since you enrolled in this course?

☐ I am a great deal more in favor of it ☐ slightly more in favor ☐ no change ☐ slightly more op-
posed ☐ a great deal more opposed to it

4. Assuming that this course would be taught in exactly the same manner as when you were enrolled, would you recommend it to a friend?

☐ Yes ☐ No

5. Please write a brief statement giving any suggestions you might have for improving the course.

6. Please use this space for any other comments you would care to offer concerning the course.

Paschall

(experimental groups only)

Education 290

1. If you were to take this course again, knowing what you now know, and were given a free choice, which method of instruction would you choose?

☐ traditional

☐ self-instructional

(only those who answered "traditional" to question one should answer question two).

2. Given these choices which would you choose?

☐ traditional at a time inconvenient for you

☐ self-instructional at a time more convenient for you

3. What did you like about the self-instructional method?

4. What did you dislike about the self-instructional method?

5. This is a list of the media and methods which were used to present them numerically from first through seventh according to your preference.

☐ video tapes
☐ laboratory activities
☐ tape-slide series
☐ 8 mm film loops
☐ sound 16 mm motion pictures
☐ the textbook
☐ filmstrips

6. What did you like particularly about the category which you gave first preference?

7. What did you particularly dislike about the category you ranked last?