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A Comparison of Media between the Linear and Broadview Approach in Self-Instruction

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A COMPARISON OF MEDIA BETWEEN THE LINEAR AND
BROADVIEW APPROACH IN SELF-INSTRUCTION

A Thesis
Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Leslie T. Cotter
August 1971

APPROVED FOR THE GRADUATE FACULTY

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TABLE OF CONTENTS

	Page
LIST OF TABLES	ii
ACKNOWLEDGMENTS	iii

Chapter

I. INTRODUCTION	1
STATEMENT OF THE PROBLEM	4
IMPORTANCE OF THE STUDY	4
LIMITATIONS OF THE STUDY	5
DEFINITION OF TERMS	6
II. REVIEW OF LITERATURE	8
INDIVIDUALIZED AND MEDIATED SELF-INSTRUCTION	8
PROBLAMATIC CONTENT PRESENTED THROUGH DIFFERENT MEDIA	11
The Media of Programmed Instruction	11
The Media of Graphics.	14
TESTS AND MEASUREMENTS	16
SUMMARY	17
CONCLUSIONS	19
III. METHODOLOGY	20
SELECTION OF THE SAMPLE	20
TREATMENT	20
EVALUATION	21
PRODUCTION OF MATERIALS	22
STATISTICAL PROCEDURES	23

Chapter	Page
Null Hypothesis	24
IV. PRESENTATION OF FINDINGS	25
EVALUATION OF RESULTS	25
HYPOTHESIS REVIEWED	25
V. SUMMARY AND RECOMMENDATIONS	27
SUMMARY	27
INTERPRETATIONS	28
SUGGESTIONS FOR FURTHER STUDY	29
Methodology	30
Measuring Responses	30
Feedback	30
APPENDIX	31
BIBLIOGRAPHY	46

LIST OF TABLES

Table	Page
I. MEAN SCORES ATTAINED AND TIME CONSUMED	25
II. t-TEST RESULTS MEASURES OF GROUP VARIANCE	26

CHAPTER I

I. INTRODUCTION

Teachers are exposed to various audio-visual (A-V) machines and expected to operate them in carrying out their instructional duties. In these days of population explosion and knowledge expansion, it has become obvious that use of traditional methods are too inefficient and ineffective to keep pace with current educational demands.¹ The percentage of the population demanding more education is increasing and as more educated people contribute to the enlarging volume of knowledge; the problem increases in geometric proportions.² The American Association of School Librarians and the Department of Audio Visual Instruction (NEA), recommended for schools with 250 pupils or more, a minimum of 5,000 books but also, 1,500 filmstrips, 500 8 mm short cartridges, 3000 16 mm films, and 3,000 records or tapes.³ However optimistic these standards appear they indicate the changing nature of the educational world.

Postlethwait, S.N., Novak J., and H.T. Murrays Jr. The Audio Tutorial Approach to Learning: Through Independent Study and Integrated Experiences. (Minneapolis Minn. Burgess Publishing Co., 1971). p.5.

Rossi, Peter H. and Biddle, Bruce J. ed. The New Media and Education: Their Impact on Society. (Double Day Inc. New York, 1966) p.205.

Squire, James P. Taking the Long View of Media and Machines. May 1969. A Paper delivered at the International Reading Assoc. Conference (Kansas City, Mo. 10. 30, May 3, 1969).

Like other institutions, schools place too much emphasis on what has worked in the past and too little emphasis on what is appropriate today.⁴ Economic and developmental problems force educators to face the reality that educational institutions are not yet ready or able to embrace the full spectrum of multi-sensory audio-visual devices; but are at least moving to enhance programs with some of the more effective and accessible aids.⁵ The Bureau of Social Sciences Research reports that all but the very smallest public school districts have been able to equip their schools with one or more of four basic machines: 16MM sound projectors, record players, slide filmstrip projectors, and tape recorders.⁶ Social and technological change seem to indicate that students and educators should learn to operate various audio-visual machines.

The knowledge of the operation of audio-visual equipment is therefore required of undergraduate teacher candidates at Central Washington State College. Each student is expected to demonstrate his competency in the

⁴Perry, Charles R. and Wesley A. Wudman. The Impact of Negotiations in Public Education: The Evidence From The Schools. Excerpt from Educational Administration Quarterly. (Washington, D.C.: American Society for Public Administration, spring 1970). p.80.

⁵Rossi, loc. cit.

⁶Rossi, Peter H. and Bruce J. Biddle, (eds.) The New Media and Education. (Garden City, N.Y.: Double Day and Co. Inc., 1967). p.205.

set up and operation of the following pieces of equipment; two 16 mm sound projectors, a filmstrip-slide projector, an opaque projector, an overhead projector, and a reel-to-reel tape recorder. For this study, two groups of students were exposed to two different sets of self-instructions using a linear and broadview format. Each student was then asked to demonstrate, without the aid of instructions, operation of three machines selected by a laboratory assistant.

II. STATEMENT OF THE PROBLEM

The present study is investigative in nature and seeks to clarify the following question: whether a difference exists in student performance using linear or a broadview format.

III. IMPORTANCE OF THE STUDY

The value of utilizing educational media has been recognized for many years. In 1926, Pressey advocated the release of the instructor from many of the routine tasks so that "She can be a real professional teacher, not a clerical worker."⁷ He also argued for an "industrial revolution in education." Skinner, writing later during the initial development of programmed instruction, also voiced the need

Hill, Edwin K. The Development and Testing of an Experimental Polysensory Self-Instructional System Designed to Help Students Acquire Basic Electrical Occupational Competencies. (Pullman, Washington: Department of Education, June 1968). p.7.

for using technology to release the teacher to do "real teaching".⁸

The last decade has witnessed a tremendous utilization of visual media for instructional purposes. There is a need for guidelines to establish which visual materials are most effective in promoting student achievement in varied learning objectives.⁹

Students in classrooms today seem to have greater visual awareness than students of the past. This study is concerned with how to apply teaching to the learning styles of visually aware students. Both perception and transmission of ideas are changing rapidly and the ultimate effect on young people is multiple and not always clear.

Skinner, Gagne, Ausubel, Bruner and other learning theorists all argue the critical importance that structure plays in instruction.¹⁰ McLuhan says students today are subjected to visual and audio experiences of many different kinds, and they tend to organize their image "fields" quite differently than those reared in earlier "print-orientated" cultures.¹¹ It seems permissible then to teach audio-visual

⁸Ibid.

⁹Dwyer, Francis M. "Adapting Varied Visual Illustrations for Optimum Teaching and Learning." Paper presented at the 24th Annual Meeting of Media Illustrators. (Washington, D.C., Sept. 1969). p.3.

¹⁰Postlethwait, op. cit., p.140.

¹¹McLuhan, Marshall, *Understanding Media: The Extensions of Man*, Signet Books. (New York 1964) p.viii.

skills by utilizing the structure of audio-visual fields of perception.

IV. LIMITATIONS OF THE STUDY

The scope of this study is limited to the use and integration of programmed audio-visual learning activities in an A-V laboratory. A review of available literature indicated that similar studies in other areas have been undertaken. This study was an attempt to measure the relative effectiveness of locally produced filmstrips, audio-tapes and diagrams. Therefore, the quality of the materials must be considered as a limitation in interpreting the results of the study.

V. DEFINITION OF TERMS

For purposes of clarity, terms which are frequently used throughout this report will be referred to as follows:

Audio-Visual equipment. In this study the following A-V equipment was used: Wollensak Tape Recorder, Model T-1500 Serial; Bell and Howell 552 Autoload Filmosound Specialist; Bell and Howell 540 Filmosound Specialist; HS. Delineascope Spencer Opaque Projector; Filmstrip Slide Projector, Model 500 C-2 Standard Projector.

Audio-visual Laboratory. A classroom that encloses learning carrels which contain various pieces of audio-visual equipment.

Broadview. Student use of written instructions, graphic material and the manipulation of component parts of A-V machinery.

Filmstrip-viewer. The model 200 Standard Filmstrip previewer.

Learning station or carrel. A table enclosed on three sides containing an A-V machine, software, and instructions for their use.

Linear. Student use of audio tapes, filmstrips and the manipulation of component parts of the A-V machines.

Mediated self-instruction. The use of media to present information without the direct aid of an instructor.

Program. The sequential presentation of information for the learner with each student responding in the same order to instructions.

Software. Anything written, drawn, or spoken that can be shown, recorded, or duplicated on A-V equipment; for example, film, filmstrips, recording tape or slides.

Systems. This refers to a means of combining instructional materials and processes that jointly contribute to specified outcomes.

Audiovisual Materials. Refers to those teaching materials, some real, some graphic, not solely dependent upon words as a predominant source of meaning for the observer. Such materials include field and classroom study of real things; demonstrations and dramatizations; objects,

models, and mockups; displays and exhibits; television programs and motion pictures; lantern slides; transparencies for the overhead projector; sound and silent filmstrips; projected study prints and other illustrations.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter contains a review of literature pertaining to the following areas: (1) Individualized and mediated self-instruction; (2) Problematic content presented through different media; and (3) Tests and measurements.

I. INDIVIDUALIZED AND MEDIATED SELF-INSTRUCTION

The core of instruction by the year 1279 at the University of Paris was the lecture method. "When books were scarce, the lecture was, to a large extent, the reading of a book by a master while the pupils copied down what he had said."¹² The lectures evolved from the mere reading of texts to summerizations of authorities and commentaries upon them. When the commentaries were put into textbook form, the authors had to make new commentaries. Thus the lecture was transformed into a process of systematic presentation of facts gathered from, and contributing to, the growing field of knowledge.¹³

Silberman expressed a common concern with education

¹²Arnheim, Rudolph, Visual Thinking. (London: Faber and Faber Limited, 1969). p.1.

¹³Gage, N.L. ed. Handbook of Research on Teaching. (Chicago: Rand McNally and Company, 1967). p.18,19.

when he stated that although the concept of teaching as telling has been discounted repeatedly, it is still the most widely used strategy.¹⁴

Social change and technological advances indicate that educators and students must integrate an ever increasing amount of information and skills. Most authorities agree that current education demands something more than the traditionally accepted methods.¹⁵

Veatch defines individualized instruction as a way to manage a group of students, not a method of instruction. It may be defined as the way a teacher arranges students, equipment, and materials.¹⁶

In principle, few teachers would disagree that the end of all education should be a curious, imaginative, and intelligent human being. However, some educators feel that individual differences are those unforeseen disasters which stand in the way of real education. Instead of viewing individual differences as something to be overcome, individualized instruction should be seen as the most important part

¹⁴Ibid. p.21.

¹⁵Barry, Franklyn (reviewer). "Crises In the Classroom." Excerpt from Educational Administration Quarterly. (Washington, D.C.: American Society for Public Administration, spring 1970). pp.81-83.

¹⁶Postlewait, loc. cit.

of education.¹⁷

The dicotomy between individualized instruction and mediated self-instruction is more than academic hair splitting. In individualized instruction, the student sets goals pertinent to his individual differences and uses a multiplicity of media to attain these goals.¹⁸

In mediated self-instruction, the goals are set by the programmer/instructor. The self-instruction takes place only if the student wishes to master a given body of knowledge and only when he feels like entering the laboratory.¹⁹ A self-instructional system places the responsibility of learning directly on the student. All students who enter the laboratory do so on their own time and naturally should use this time effectively.²⁰ Thus concentrated information is presented to the student only when he is alert and receptive.²¹

¹⁷Howes, Virgil M. ed. Individualization of Instruction. (London, Collier-Macmillan, 1970). p.90.

¹⁸Petrequim, Gaynor. Individualizing Learning Through Modular-Flexible Programming. (San Francisco: McGraw-Hill Book Co., 1968). pp.52-53.

¹⁹Ibid. p.56.

²⁰Postlethwait, op. cit., p.97.

²¹Postlethwait, op. cit., p.17.

II. PROBLEMATIC CONTENT PRESENTED THROUGH DIFFERENT MEDIA

The Media of Programmed Instruction

Schramm defines programmed instruction as the kind of learning experience in which a program takes the place of a tutor for the student and leads him through specified behaviors designed and sequenced to make it more probable that he will behave in a given manner in the future.²² This definition of programmed instruction fits very closely the objectives in a mediated self-instructional laboratory. There has been a tremendous amount of research on programmed learning and the programs do seem to teach.²³ "Even a bad program is a pretty good teacher."²⁴

Gage has summarized a number of studies in Handbook of Educational Research. His section on instruments and media of instruction discussed the potential advantages of active-response procedures in instructional media presentations. However, there seems to be two schools of thought on this subject. Data presented by Hoveland, Lumsdain, and Sheffield (also reproduced in Hoveland and in Lumsdain).

²²Postlethwait, op. cit., p.3.

²³Schramm, Wilbur. Programmed Instruction: Today and Tomorrow. (New York, Ford Foundation, Nov. 1962). p.1.

²⁴Thornton, James W. and James W. Brieum (eds.) New Media and College Teaching. (Washington, D.C. National Education Association, 1968). p.69.

demonstrated ". . . consistent superiority of the active over the passive group . . . of recall promptness in oral tests given at the end of the training."²⁵ In addition, Skinner, Holland, and others assert that each response must be reinforced immediately.²⁶ On theoretical ground, knowledge of results or feedback would appear to be an extremely important variable in perceptual motor skills.

Other authorities felt that external feedback is essential in all types of perceptual motor learning. Krumboltz, Welsman, Kurtz, and Brenner side with Prentice in sequential linear, rather than branching, types of programmed instruction and surmised the relative frequency of feedback does not appear to influence learning outcomes.²⁷ In tasks such as gunnery where appropriate responses or stimulus-response connections are already established, sounding a buzzer when on target improves current performance, but does not result in transferable gain in learning.²⁸ "Nevertheless, because of serious gaps and inadequacies in available

²⁵Schramm, Wilbur, op. cit., p.11-12.

²⁶Gage, N.L. ed. op. cit., p.2-5.

²⁷Schramm, Wilbur, op.cit., p.2-5.

²⁸Ausbel, David P. The Psychology of Meaningful Verbal Learning: An Introduction to School Learning. (New York: Grune and Stratton Inc., 1963). p.203.

research evidence, we possess very little unequivocal information either about its actual effects on learning or about its mechanism of action."²⁹

In a self-instruction laboratory, the assistant is freed by the informational systems output to devote his time to individual problems and give positive or negative feedback to students who are having problems.³⁰

Authorities assert that in almost all programs the student must know what goals he is to attain.³¹ In a laboratory, the accomplishment of these goals in most cases, seems to serve as the student's reward.³²

Programmers have demonstrated the effectiveness of small unit steps in a sequential program. But the program should have the added feature of allowing the student to progress at his own intellectual capacity.³³

²⁹Krumboltz, J.D. and R.G. Weisman. "The Effect of Intermittent Confirmation in Programmed Instruction (paper presented to the American Psychological Association (St. Louis, Sept. 1962). p.87; and Kuntz, A.K. Jeanette Walter and H. Brenner, "The Effects of Inserted Questions and Statements on Film Learning". (Technical report presented to Pennsylvania State College September 1950). p.269.

³⁰Postlethwait, op. cit.

³¹Prentice, W.C.H. "Retroactive Inhibition and the Motivation of Learning," American Journal of Psychology, 56:283-92, 1943.

³²Postlethwait, op. cit.

³³Schramm, Wilbur op, cit. p.2. and Petrequim, Gaynier, op. cit. pp.62-64.

Suggestions by Blyth assist in the selection, design and use of self-instructional systems.

1. The system should be packaged in small units.
2. Film is recommended for low duplication costs.
3. Storage should be designed for ready accessibility.
4. Teaching equipment should be easy to operate.
5. Automatic scoring devices should be used to aid the student and teacher.
6. Use of audio in addition to visual presentation is recommended.³⁴

The Media of Graphics

It is defined as a kind of learning experience, that by the use of graphics such as diagrams and charts to assist the student, brings about educational objectives.³⁵

The use of graphic symbols assumes the student knows about the reality the diagram represents. Thus its basic limitation depends on the present knowledge of the student.³⁶

The student must learn to see the principles behind the drawings. All shape has been reduced to the simplest presentation. Volume has become reduced to a single plane. In short the artist must present the basic essentials of the subject with a good deal of care and simplicity.³⁷

³⁴Postlethwait, S.N. op. cit. p.3; and Gage, N.L. op. cit. p.627.

³⁵Dwyer, Francis M., op. cit., p.205

³⁶Hill, Edwin K., op. cit., p.401-415.

³⁷Arnheim, Rudolf, op. cit., p.305-307.

Justification for the use of various types of visual illustrations for instructional purposes should be based on their distinctive contributions to specific types of learning."³⁸

Several studies were conducted by Dwyer which investigated variables associated with visualized instruction. In those studies an evaluation of abstract line drawings, detailed shaded drawings, and photographs were supplemented by tape recording, television, and programmed information.³⁹

In a study conducted by Dwyer, four groups of study were tested on drawings from a simple to complex nature and finally photographs.⁴⁰

A portion of the study also revealed that students preferred detailed shaded drawings but performed better on the photographs which led Dwyer to suggest that student attitudes towards instructional materials are not valid indications of their instructional value.⁴¹ These suggestions were in agreement with previous findings by Elliot in 1949, Twyford in 1951, and Macomber and Segal in 1957.⁴²

³⁸Dwyer, Francis M., op. cit., p. 35.

³⁹op. cit., p.12.

⁴⁰loc. cit., p.12.

⁴¹Gage, N.L., op, cit., p.421-423.

⁴²Tiegs, Ernest W., Tests and Measurements in the Improvement of Learning, (San Francisco: Houghton Mifflin Co., 1939). p.15.

A number of generalizations can be suggested by the cited studies which may be helpful in developing visual illustrations for instructional purposes:

- (1) The use of visuals does not automatically improve student achievement.
- (2) Different visuals differ in their effectiveness.
 - (A) Abstract line drawings should be used to complement vocal instruction.
 - (B) Vocal presentation without visuals tended to improve terminology retention on comprehensive tests.
 - (C) Too many details in a drawing may distract the student.
 - (D) Realistic photographs should be used to complement programmed instruction when the student can control the advancement of the program.
- (3) The effectiveness of a particular type of visual in promoting achievement depends on the amount of time given to the students to view the visual.
- (4) The addition of color in certain types of visuals appears to improve student achievement.
- (5) Student perceptions of the value of visual illustrations are not valid assessments of their instructional effectiveness.
- (6) Visual illustrations must be appropriately structured to maximize achievement of specific learning objectives.

III. TESTS AND MEASUREMENTS

Bloom defines testing as a systematic sampling of an individual's characteristics at a given time under specified conditions. The response of the individual to given problems,

tasks, and questions are summarized to yield and index values intended to describe the specified characteristics.

Tests are not an end in themselves. The testing process must be seen as a means of making the educational process more effective. Green stated that the purpose of evaluation is change. "The principle function of measurement is the improvement of learning." Measurement as used here is not synonymous with testing although a form of check list or test can be used. Carefully devised check lists comparing systematic recorded observations appeared to be the most realistic approach because essentially, a program can only be judged by how well the learner performs a task for which he has been trained.

It seems clear to the author that most tests on cognitive motor skills fall far short of the purpose of this study, and that no simple revision of any of the tests reviewed would provide a valid measure of the dynamics of setting up audio-visual equipment or the feedback necessary for evaluating student behavior change in this area.

IV. SUMMARY

Literature related to the present study was divided into the topics of: Individualized and mediated self-instruction; Problematic content presented through two different media; and Tests and measurements.

Individualized and Mediated Self-Instruction: both methods seem to provide the student with enough motivation

to use his time more effectively than in the lecture method.

Mediated self-instruction provides the student with information, while individualized instruction forces the student to seek out his own sources for information. Both areas provide the student with more "freedom" than is generally accepted in current educational institutions.

Problematic Content Provided Through Two Different Media. Programmed instruction is defined as a kind of learning experience that brings about educational objectives by the use of sequential instructions. The program takes the place of a tutor. There seems to be an unresolved problem with determining whether or not intermittent rewards are essential to a program. Nevertheless, most authorities agree that the student must be aware of what goals he is to attain before he attains them; for the "ultimate" reward of knowing that he has achieved these goals.

Studies indicated that student attitudes are not valid indications of instructional materials. Different visuals differ in their effectiveness; line drawings were considered most effective with vocal instructions - too many details distract the students. Vocal presentations without visuals tended to improve student retention of terminology. Realistic photographs were found most effective in programmed instruction when the student could control the advancement of the program.

Tests and Measurements: tests and measurements were defined as a systematic sampling of an individual's

characteristics at a given time under specified conditions. The purpose of testing and measuring was given as change, to make the educational process more effective.

V. CONCLUSIONS

1. In research concerned with self-instruction and individual instruction, it was suggested by some that educators often agree to the importance of developing the student into a curious, imaginative, and intelligent human being. These same educators seem reluctant to use curious, imaginative and intelligent methods to pursue these ends.

2. In research related to programmed instruction it seemed that there is no singularly accepted definition of programmed learning - specifically in the area of intermittent feedback.

3. There was agreement however that programmed learning (as defined in this study), should allow the student to progress at his own intellectual capacity.

4. A number of studies dealt with the sequencing of a program. Most studies reviewed favored student control of sequence advancement. In research related to graphics, apparently student attitudes concerning media are not valid indications of student retention. Too many details in graphic illustrations hinder student progress.

5. Tests and measurement seemed to indicate they are instruments of change to make the educational systems more effective.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to describe the methodology used in this study which includes: (1) the selection of the sample; (2) description of the treatment; (3) the evaluation procedures; (4) the production of materials and (5) delineation of statistical procedures utilized in this study.

I. SELECTION OF THE SAMPLE

Subjects were students enrolled in the Education (Ed) 314 classes at Central Washington State College (CWSC). The College is located in Ellensburg, Washington.

During the summer session of 1971 at CWSC, a list of 119 students was obtained from Ed. 314 instructors. Each student was then assigned a number. The population was then divided into two treatment groups by using a table of random numbers. A total of seventy students took part in the study.

II. TREATMENT

Both groups used self instructional methods. Group A, consisting of forty students, used the Linear Programmed method with filmstrips and vocal instructions supplied by cassette tape recorders. This group was exposed to the treatment from June 26 to July 9.

Group B, consisting of thirty students, used the Broadview method that had been used the previous year which consisted of written instructions and diagramed posters. This group was individually exposed to the treatment from July 12 to July 23, 1971.

III. EVALUATION

Each student was evaluated on the Friday following his exposure to the treatment.

Students were expected to demonstrate proficiency by operating three A-V machines. Three forms were randomly selected from six, stapled together and piled face down on the laboratory assistant's desk. As a student entered the laboratory for evaluation, a set of forms were selected from the top of the pile. The student's name was written on the form and the evaluation proceeded.

Proficient operation was defined as being able to set up and operate each selected machine within five minutes. The student could not refer to diagrams or directions, other than those permanently placed on the machine by the manufacturer. If the student could not complete the task within five minutes, or could not set up and operate any one of the machines, it was recommended that the student spend more time in the laboratory the following week working with the equipment. Basically, the check-out involved demonstrating all of the stages outlined in the instructions. (See appendix C).

Evaluation consisted of the laboratory assistant checking off on the test questionnaire each step not com-

pleted by the student. The laboratory assistant could use a certain amount of subjectivity; for example, the form was not checked if the student did not pre-focus the 16 mm projectors. However, if the student did not focus the machine during its operation, the questionnaire was then marked in the box immediately in front of the instruction on the evaluation sheet. The student was not allowed to read this form during the test, since it consisted of written instructions for the set up and operation of the A-V equipment.

IV. PRODUCTION OF MATERIALS

During the fall quarter of 1971 at Central Washington State College, the investigator was assigned to the A-V laboratory. One of his first duties was to construct diagramed posters to demonstrate the operation of A-V equipment. The next task was to write instructions that corresponded to these diagrams. During winter quarter, three additional diagramed posters were added, and at the beginning of spring quarter the investigator produced up-dated, re-written instructions to correspond with the new posters and to improve the effectiveness of the old ones. The investigator then produced the evaluation check-off list by enabling the laboratory assistant to mark any procedure missed by the student during the evaluation stage.

Colored slides were then taken by the investigator of each step outlined in the written instructions, using Ektachrome Type D bulk loaded film in a Yashica 35 mm camera. The written instructions were then shortened, using

key words to save space, and photocopied with a 35 mm camera on Kodalith film. The Kodalith written instructions were negatives, for white letters. The film was then returned to the Production Laboratory for developing. After development, each picture was then mounted and double exposed on the Reprenar slide duplicating machine. The resulting slides were then mounted and turned over to the Production Laboratory for conversion to half-frame filmstrips.

The next procedure was the production of sound tracks on Cassette tapes. The investigator voiced the procedure on how to operate the equipment on a Sony Cassette Tape Recorder. Each vocal instruction was paced with approximately ten second intervals between steps to correspond with the filmstrips and to give the students time to carry out each procedure on the machine he was learning to operate.

The last item produced was a simple drawing of the operational instructions on the use of the filmstrip pre-viewer. (See Appendix D).

V. STATISTICAL PROCEDURES

Check off sheets were scored by the investigator and other laboratory assistants. Following the scoring of the answer sheets, computer data cards were punched to indicate each student's evaluation score.

Univariate t-test computation for differences between two groups was utilized in the computer center at Central Washington State College.

The following null hypothesis was tested:

Null Hypothesis : There will be no significant difference in the mean score performance as measured, between either group.

$$H_0: \quad \underline{U_1} - \underline{U_2} = 0$$

$$T = \quad \underline{X_1} - \underline{X_2} - 0$$

$$S_{\underline{X_1} - \underline{X_2}} = \sqrt{S^2_{\underline{X_1}} + S^2_{\underline{X_2}}}$$

The above procedure was executed at the CWSC computer center. It was anticipated that the means obtained for treatment A would differ significantly from those obtained for treatment B.

CHAPTER IV

PRESENTATIONS OF FINDINGS

This chapter contains a summary of the data resulting from the execution of the procedures used in chapter III Methodology. Included in this chapter are (1) Evaluation of Results and (2) Hypothesis Reviewed.

I. EVALUATION OF RESULTS

Results from the Central Washington State College Computer Center indicated no significant differences between the groups, in the equipment laboratory performance evaluation.

TABLE I

MEAN SCORES ATTAINED AND TIME CONSUMED (69 df)

Group	A N = 40	B N = 30
Error rate Mean Score Attained	46.30*	45.64
Time rate Mean Time Consumed	1.70**	1.58

*the highest score obtainable was 47

**1 = one 45 minute period

df = 69 degrees of freedom

II. HYPOTHESIS REVIEWED

The following null hypothesis was accepted; there will be no significant difference in performance as measured between groups A or B.

MEASURES OF GROUP VARIANCE

	Mean	Std. Dev.	Var.	Std. Er.
Group A (N=40)	46.300	.853	.728	.134
Group B (N=30)	45.645	1.355	1.836	.243

CHAPTER V

SUMMARY AND RECOMMENDATIONS

This chapter contains (1) a summary; (2) conclusions; (3) interpretation and (4) suggestions for further study.

I. SUMMARY

The purpose of the self-instructional audio-visual laboratory was to teach students the operation of basic instructional media machinery. This study compared the relative effectiveness of two means of presenting information in a self-instructional laboratory.

Students were selected and divided into two sections. Each section initially containing approximately sixty students were exposed to a different method of presentation of self-instructional information. The first section, Group A, used filmstrips and viewers with cassette tape recorded instructions. Group B used posters and written instructions. (See Appendix B). Students spent as little or as much time as they wished practicing the operation of laboratory equipment. The students' practice time was noted by the laboratory assistant to determine how much time each student used during each method of presentation.

Each Friday an operational test was administered by a laboratory assistant. Each student was asked to demonstrate proficiency using three randomly selected pieces of A-V equipment. The laboratory assistant would mark each procedure not completed correctly; if the student could not operate a machine, his test was stopped and it was recommended he spend more time working with the machinery the following week.

II. CONCLUSIONS

A univariate t-test computation of mean scores was run at the Central Washington State College Computer Center. There was no significant difference between group means.

Variance scores seemed to indicate that the linear presentation of information tended to show less variability than did the broadview approach. Apparently student performance becomes less variable when problematic content is presented through the linear approach. The reason for this is not apparent from the present study. It may be that the linear approach placed minimal emphasis upon extraneous variables - such as lack of personal assistance.

III. INTERPRETATION

The investigator's own biases may be indicated, but the repetition of questions asked the investigator and colleagues during exposure for Group A was much less than for Group B. This leads the investigator to assume a possible difference between the groups; the investigator simply

asked the wrong questions. The investigator felt that more self-instruction was being carried out in Group A simply because fewer questions and requests for help were asked by the students during treatments for Group A.

The investigator felt that the use of sequential filmstrips in the viewers would eliminate some pre-conceptions on the complexity of audio-visual equipment. The student, in effect, used A-V equipment inadvertently to learn how to operate other A-V equipment. The investigator feels that this assumption was borne out by the student's acceptance and use of both the viewer and the cassette tape recorders.

IV. SUGGESTIONS FOR FURTHER STUDY

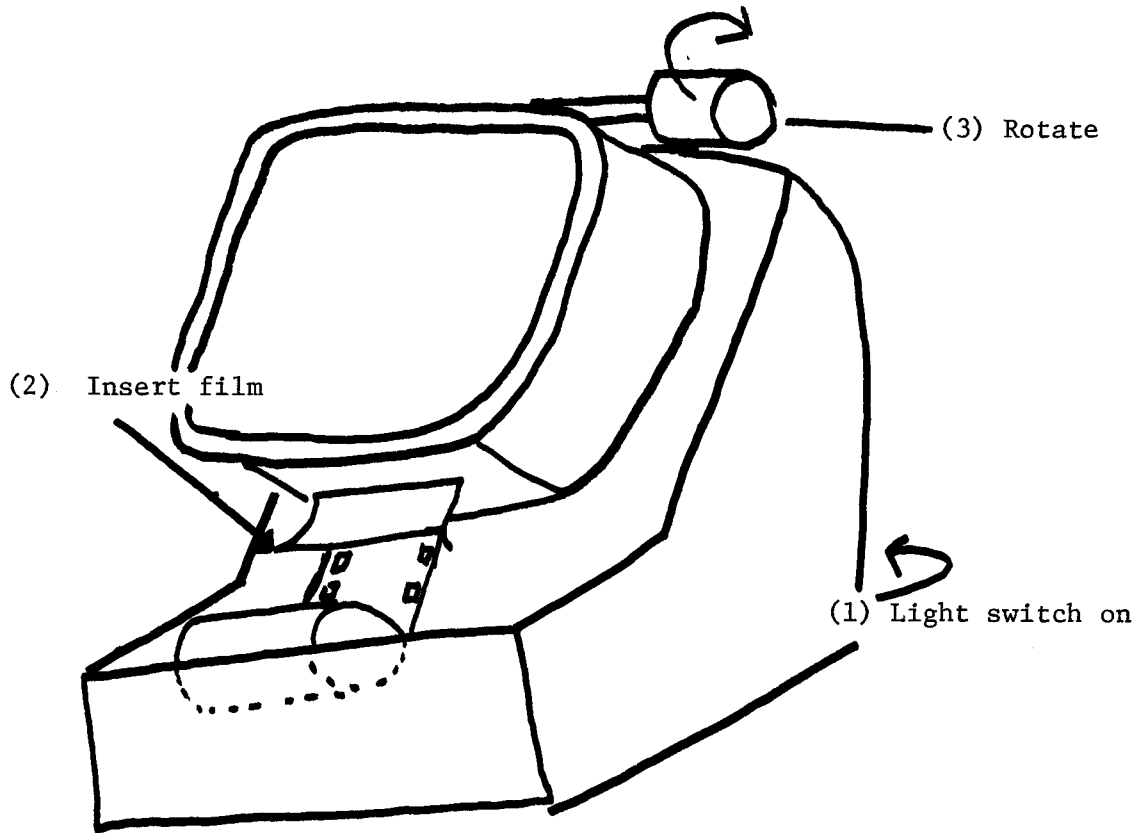
The purpose of this study was to determine if filmstrips and vocal instructions are more effective in reducing correctable errors than diagramed posters. The investigator found no significant differences in the data. Yet, data yields answers only to questions asked and hindsight may be far more revealing.

The investigator noted that the laboratory under Group A seemed extremely quiet. There was much less conversation and the number of students working together dropped considerably. This may have been because of the relatively small viewing area of the filmstrip previewer. The lack of student interaction may or may not have hindered the progress of some students.

The investigator would recommend that a similar study be carried out using the following suggestions:

1. Compare the lecture method with filmstrips and laboratory practice with filmstrips.
2. Allow groups to discover their own method of working audio-visual machines with no instructions other than those provided on the machines.
3. Select incoming freshmen for a longitudinal study and a follow-up study to determine the retention of machine operation and to see if each treatment has any specific effect on teacher use of machines in the classroom.
4. Use video tape recordings of student responses and subject the recording to critical analysis of the treatment being presented by counting each active overt student response before he makes the correct moves.
5. Set question "panic" light on booth carrel so student can seek help from assistant, count the number of questions, note area in which questions are being asked.

APPENDIX A



Model 200 Standard Filmstrip Previewer
Standard Projector and Equipment Company, Inc. Chicago, Illinois

APPENDIX B

Operating the Standard Filmstrip Slide Projector:

1. Remove the top section of the case.
2. Plug in power cord.
3. Push fan and light switches down.
4. Elevate front of projector until light shows on screen.
5. Turn knob counter clockwise to raise.
6. Press top of machine and turn knob clockwise to lower.
7. Turn focus control for sharp outline on screen.

Showing a filmstrip:

1. Face the screen and hold filmstrip so that the title reads normally.
2. Invert and insert the filmstrip downward into the threading slot.
3. Push down on the film while you turn the operating knob counter clockwise until the sprocket wheel engages.
4. Adjust the framing knob by turning the framing lever until you see only one complete picture on the screen.
5. Advance the filmstrip by turning the operating knob counter clockwise.

Showing slides:

1. Remove the filmstrip carrier by grasping the advance knob and pulling toward you.
2. Locate the slide carrier and take it out of the case.
3. Insert the slide carrier by placing it in the same slots where the film carrier was located.
4. Hold the slide towards the screen, if you can read it turn it upside down and insert it at the top of the slide carrier.
5. Push the slide advance knob toward the projector.
6. Insert another slide and continue.

Operating the Bell and Howell Specialist projector:

1. Open projector and plug in power cord.
2. Turn on volume. Raise reel arms until click is heard.
3. Turn motor switch clockwise until light shows.
4. Elevate front of projector until light shows on screen.
5. Turn focus control for sharp outline on screen.
6. Turn motor switch off.
7. Place film reel on front arm and take-up reel on back arm.
8. Unroll approximately five feet of film.
9. Insert film under first roller.
10. Depress button, raise clamp, insert film and close clamp.
11. Pull firmly on lens rim, swing out to open film gate.
12. Thread gate - adjust upper loop to follow red line on case, close gate. Make sure gate is flat against film.
13. Thread film under loop restorer.
14. Depress button, raise clamp, insert film and close clamp.
15. Insert film under roller and around sound drum.
16. Insert film over roller and depress button to lower clamp.
17. Insert film while pulling to insure the tightness of the film around drum.
18. Continue threading under remaining two rollers.
19. Insert end of film on take-up reel.
20. Turn motor switch clockwise for viewing and adjust sound.

Rewinding:

1. Run all film on take-up reel or unthread projector.
2. Insert end of film in forward reel.
3. Raise rear arm, turn motor switch to reverse, depress fast rewind button.

Operating the Bell and Howell Auto Load:

1. Open projector and plug in power cord.
2. Turn on volume.
3. Raise reel arms to position until a click is heard.
4. Place film reel on front arm and take-up reel on back arm.
5. Turn motor switch to #6 lamp.
6. Elevate front of projector until light shows on screen.
7. Adjust focus for sharp outline on screen.
8. Push self-threading lever to forward.
9. Trim end of film only if it is split or ragged.
10. Insert end of film as shown until sprocket engages.
11. Turn off motor control switch when film is approximately two feet beyond projector.
12. Wind film around snubbing roller.
13. Tightly tug film until click is heard.
14. Insert end of film on take-up reel.
15. Turn motor switch to lamp for viewing, adjust sound.

Rewinding:

1. Run all film on take-up reel.
2. Insert end of film in forward reel.
3. Reverse motor switch.
4. Depress fast rewind button.

Operating the Travelgraph Overhead Projector:

1. Plug in power cord.
2. Turn on fan and lamp switch.
3. Place a transparency in the position indicated (bottom of picture toward screen).
4. Adjust elevation to match screen.
5. Focus until crisp picture is on screen.
6. When finished, turn OFF lamp, replace transparency, the fan will continue cooling automatically.

Operating the Delineascope Opaque Projector:

1. Connect power cord.
2. Turn on motor lamp.
3. Adjust elevation by extending the front legs.
4. Place material on platen, bottom of picture toward screen.
5. Raise platen by pulling lever to the right.
6. Adjust focus.
7. Turn pointer until it can be seen on the screen.

Operating the Wollensak Tape Recorder:

1. Open machine by depressing buttons and lifting top.
2. Insert power cord in machine and then into power receptical.
3. Turn tone switch clockwise for motor on.
4. Place full reel of tape on left spindle. Take-up reel on right spindle.
5. Insert the tape in slot as shown.
6. Insert and wind tape on take-up reel.
7. Depress the PLAY button.
8. The $3 \frac{3}{4}$ speed for voice, and $7 \frac{1}{2}$ for music.
9. Adjust sound.

To Record:

1. Take microphone out of the machine top.
2. Insert mike plug in microphone out of the machine top.
3. Make certain button is pressed to RECORD.
4. Set counter to 000.
5. Pull back on record lock and depress record button at the same time.
6. Speak in normal tone of voice, holding mike approximately 6 inches from mouth.
7. Adjust volume control until sound control light flashes on normal.
8. Complete your recording, press the stop button.
9. Move the rewind lever to your left.
10. When the counter reads 000, move the rewind lever to the right.
11. Play back what you have recorded.

APPENDIX C

Group A B C (Circle one) INSTRUCTOR _____

Please check any step that is missed. Each student must complete the total operational task within 5 minutes. STUDENT _____

PRIOR OPERATING EXPERIENCE: Yes _____

No _____

MALE _____ FEMALE _____

Operating the Standard Filmstrip Slide Projector:

- 1. Remove the top section of the case.
- 2. Plug in power cord.
- 3. Push fan and light switches down.
- 4. Elevate front of projector until light shows on screen.
- 5. Turn knob counter clockwise to raise.
- 6. Press top of machine and turn knob clockwise to lower.
- 7. Turn focus control for sharp outline on screen.

Showing a filmstrip:

- 1. Face the screen and hold filmstrip so that the title reads normally.
- 2. Invert and insert the filmstrip downward into the threading slot.
- 3. Push down on the film while you turn the operating knob counter clockwise until the sprocket wheel engages.
- 4. Adjust the framing knob by turning the framing lever until you see only one complete picture on the screen.
- 5. Advance the filmstrip by turning the operating knob counter clockwise.

Showing slides:

- 1. Remove the filmstrip carrier by grasping the advance knob and pulling toward you.
- 2. Locate the slide carrier and take it out of the case.
- 3. Insert the slide carrier by placing it in the same slots where the film carrier was located.
- 4. Hold the slide towards the screen, if you can read it turn it upside down and insert it at the top of the slide carrier.
- 5. Push the slide advance knob towards the projector.
- 6. Insert another slide and continue.

Operating the Bell and Howell Auto Load:

- 1. Open projector and plug in power cord.
- 2. Turn on volume.
- 3. Raise reel arms to position until a click is heard.
- 4. Place film reel on front arm and take-up reel on back arm.
- 5. Turn motor switch to #6 lamp.
- 6. Elevate front of projector until light shows on screen.
- 7. Adjust focus for sharp outline on screen.
- 8. Push self-threading lever to forward.
- 9. Trim end of film only if it is split or ragged.
- 10. Insert end of film as shown until sprocket engages.
- 11. Turn off motor control switch when film is approximately two feet beyond projector.
- 12. Wind film around snubbing roller.
- 13. Tightly tug film until click is heard.
- 14. Insert end of film on take-up reel.
- 15. Turn motor switch to LAMP for viewing, adjust sound.

Rewinding:

- 1. Run all film on take-up reel.
- 2. Insert end of film in forward reel.
- 3. Turn motor switch to reverse.
- 4. Depress fast rewind button.

Group A B C (Circle one)

INSTRUCTOR _____

Please check any step that is missed. Each student must complete the total operational task within 5 minutes.

STUDENT _____

PRIOR OPERATING EXPERIENCE: Yes ___

No ___

MALE _____ FEMALE _____

Group A B C (Circle one) INSTRUCTOR _____

Please check any step that is missed. Each student must complete the total operational task within 5 minutes. STUDENT _____

PRIOR OPERATING EXPERIENCE: Yes _____

No _____

MALE _____ FEMALE _____

Operating the Bell and Howell Specialist Projector:

1. Open projector and plug in power cord.
2. Turn on volume. Raise reel arms until click is heard.
3. Turn motor switch clockwise until light shows.
4. Elevate front of projector until light shows on screen.
5. Turn focus control for sharp outline on screen.
6. Turn motor switch off.
7. Place film reel on front arm and take-up reel on back arm.
8. Unroll approximately five feet of film.
9. Insert film under first roller.
10. Depress button, raise clamp, insert film and close clamp.
11. Pull firmly on lens rim, swing out to open film gate.
12. Thread gate - adjust upper loop to follow red line on case, close gate. Make sure gate is flat against film.
13. Thread film under loop restorer.
14. Depress button, raise clamp, insert film and close clamp.
15. Insert film under roller and around sound drum.
16. Insert film over roller and depress button to lower clamp.
17. Insert film while pulling to insure the tightness of the film around drum.
18. Continue threading under remaining two rollers.
19. Insert end of film on take-up reel.
20. Turn motor switch clockwise for viewing and adjust sound.

Rewinding:

1. Run all film on take-up reel or unthread projector.
2. Insert end of film in forward reel.
3. Raise rear arm, turn motor switch to reverse.
4. Depress Fast Rewind button.

Group A B C (Circle one) INSTRUCTOR _____

Please check any step that is missed. Each student must complete the total operational task within 5 minutes. STUDENT _____

PRIOR OPERATING EXPERIENCE: Yes _____

No _____

MALE _____ FEMALE _____

Operating the Travelgraph Overhead Projector:

- () 1. Plug in power cord.
- () 2. Turn on fan and lamp switch.
- () 3. Place a transparency in the position indicated (bottom of picture toward screen).
- () 4. Adjust elevation to match screen.
- () 5. Focus until crisp picture is on screen.
- () 6. When finished turn OFF lamp, replace transparency, the fan will continue to cool automatically.

Group A B C (Circle one) INSTRUCTOR _____

Please check any step that is missed. Each student must complete the total operational task within 5 minutes. STUDENT _____

PRIOR OPERATING EXPERIENCE: Yes _____

No _____

MALE _____ FEMALE _____

Operating the Delineascope Opaque Projector:

- () 1. Connect power cord.
- () 2. Turn on motor lamp.
- () 3. Adjust elevation by extending the front legs.
- () 4. Place material on platen, bottom of picture toward screen.
- () 5. Raise platen by pulling lever to the right.
- () 6. Adjust focus.
- () 7. Turn pointer until it can be seen on the screen.

Group A B C (Circle one) INSTRUCTOR _____

Please check any step that is missed. Each student must complete the total operational task within 5 minutes. STUDENT _____

PRIOR OPERATING EXPERIENCE: Yes _____

No _____

MALE _____ FEMALE _____

Operating the Wollensak Tape Recorder:

- () 1. Open machine by depressing buttons and lifting top.
- () 2. Insert power cord in machine and then into power receptical.
- () 3. Turn tone switch clockwise for motor on.
- () 4. Place full reel of tape on left spindle. Take-up reel on right spindle.
- () 5. Insert the tape in slot as shown.
- () 6. Insert and wind tape on take-up reel.
- () 7. Depress the PLAY button.
- () 8. The $3 \frac{3}{4}$ speed for voice, and $7 \frac{1}{2}$ for music.
- () 9. Adjust sound.

To Record:

- () 1. Take microphone out of the machine top.
- () 2. Insert mike plug in microphone out of the machine top.
- () 3. Make certain button is pressed to RECORD.
- () 4. Set counter to 000.
- () 5. Pull back on record lock and depress RECORD button at the same time.
- () 6. Speak in normal tone of voice, holding mike approximately 6 inches from mouth.
- () 7. Adjust volume control until sound control light flashes on normal.
- () 8. Complete your recording, press the stop button.
- () 9. Move the rewind lever to your left.
- () 10. When the counter reads 000, move the rewind lever to the right.
- () 11. Play back what you have recorded.

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