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The relation of selected television teaching methods to learner preference and achievement

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The relation of selected television teaching methods to learner preference and achievement

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TABLE OF CONTENTS

LIST OF TABLES

Page

Page

LIST OF FIGURES

INTRODUCTION

In the early 1950s television was emerging as a major medium of communication. It was heralded by educators as a great tool for raising the quality of education. The Ford Foundation prophesied television had two major advantages over traditional instruction. "First, it can vastly extend the reach of the nation's best teachers, and second it can bring to students educational experiences that are quite beyond the potential of conventional means of instruction" (Tanner, 1961).

Though not yet showing the promised effectiveness, a study of research findings indicates that television can teach as well as the conventional methods (Reid and others, 1967). Focus is now turning to isolating methods of making television instruction even more effective. Campeau (1974, p. 25) indicated this need when she stated, "To date, media research has not dealt in any systematic way with cognitive achievement benefits which might accrue from videotaped instruction."

Two important elements of the instructional setting are the teacher and the student. The importance of the television instructor has been stressed by researchers (Becker, 1964; Schramm, 1972). Lundgren (Schramm, 1972) suggested that the selection of the television instructor might be "the most important thing of all in the production of the program."

Research by Kanner (1957) resulted in questioning the appropriateness of the rules and structure of traditional classroom instruction when applying them to television. Schramm (1972, p. 57), while not contradicting

Kanner, found, "There is surprisingly little research on the qualities of a teacher that contribute to his effectiveness in television or film." He also indicated ". . . research on teachers as sources of communication is not very extensive."

The second area of concern is the student viewer. The conditions for learning are tempered by each individual through his perception, and by his particular capabilities (Gagné, 1970). The introduction of television is a change in that perception. It would seem logical that beliefs and attitudes as well as abilities were responsible for achievement, and preference. A study by Engelhart, Schwachtgen and Nee (1958) suggested a relationship between I.Q. and how well students did with instructional television. But the resulting evidences were not expected, since students with an I.Q. of more than 120 profited less than those with an average I.Q. Chu and Schramm (1967, p. 83) considered motivation when they reported, "Students will learn more from instructional television under motivated conditions."

These studies illustrated the complex relation of the learner to television instruction, and gave indications there was a need for further study.

Need for The Study

Television is an increasingly popular medium for use by educators, but at this time little has been found concerning the most effective ways of using it for instruction.

One way to study television instruction's effect on learning would be to analyze the use of a teacher with or without students on camera. Should he be shown with a student? Or, is it necessary for any students to be on the screen with the teacher?

Another area to consider would be the student viewer. Researchers have not established relationships between the student and the method of presentation. It is necessary to find student characteristics that are complementary to the selected teaching format.

Statement of The Problem

The problem was to investigate the differences in selected methods for improving television instruction. These differences were evaluated in terms of student achievement and student preference.

Statement of Purpose

The purpose of the study was to determine the following:

1. Whether cognitive learning could occur through the use of any one, or all three selected videotaped teaching formats as measured by achievement scores of students in Psychology 333.
2. Whether a specific videotaped teaching format could effect a greater amount of learning among viewers.
3. Whether characteristics of students could be identified that predict preference or achievement for one or more of the videotaped teaching formats.

Summary

Students are able to learn from television. The question is can achievement be improved through a more effective use of the medium? To explore this question studies relating to the teacher and student were examined. Two conclusions of this review were: little research has been done concerning the television student and teacher, and studies should be designed to improve the effectiveness of instructional television.

REVIEW OF LITERATURE

A review of the literature was concentrated in four general areas. (1) A summary of effectiveness studies, (2) the area of the television instructor, (3) the television student, and (4) the production and viewing variables of instructional television (ITV) were reviewed.

Television Effectiveness

There have been a large number of studies in the area of effectiveness of television instruction. How effective it is may be tempered by the abilities of those who use it for teaching. Television is a valuable tool for educators, but when reviewing effectiveness studies one should be reminded of the statement by C. R. Carpenter (Adams, Carpenter, and Smith, 1958, p. 14).

> Television is neutral; it is neither educational nor instructive; it is a means and not an end. It is simply an instrument that can be used to do certain kinds of educational jobs, and the quality and dimensions of these jobs are the primary considerations of educators who are interested in using TV. It cannot of itself perform important education functions, and it cannot be expected to do so.

A large share of past research has been directed toward the relative effectiveness of teaching in the classroom pitted against that of instructional television. Major reviews, (Barrington, 1965; Campeau, 1974; Chu and Schramm, 1967; Dubin and others, 1969; Reid and others, 1967; Travers and others, 1967) concluded in general there was no significant

difference in the two methods.

Chu and Schramm (1967, p. 1) presented a basis for changing the focus of research in instructional television. From their extensive review they saw factors that indicated there was no longer any doubt that children and adults learn from instructional television. Their review also witnessed the effectiveness of television "demonstrated in well over 100 experiments, and several hundred separate comparisons, performed in many parts of the world, in developing as well as industralized countries . . ." They also found television effective at educational levels from preschool through adults, and in a variety of subject matter and methods.

Through research indications have been found learning takes place from the use of television for instruction. It has not taught significantly better than the conventional classroom, but it can effectively extend the reach of educators.

The Television Instructor

The methods of classroom instruction have been defined through the years. Research, and practical experience have set the parameters for what is considered to be effective teaching. Gagné (1970, pp. 59-60) described some of the elements of effective teaching as the "functions of instruction." The six instructional functions Gagné describes are:

1. Gaining and maintaining attention.
2. Insuring recall of previously acquired knowledge.
3. Guiding the learning in instruction by providing "clues" or "hints" to new principles usually without

stating them fully in verbal form.

4. Providing feedback to the learner on his accomplishments.

5. Establishing conditions for remembering and transfer of learning.

6. Assessing outcomes.

Gagné (p. 60) described these six functions as being adaptable to media. He explained:

> It can be seen that most media of communication can readily perform most of these instructional functions. They can be performed by pictures, by printed language, by auditory language, or by a combination of media. So far as learning is concerned, the medium is not the message. No single medium possesses properties which are uniquely adapted to perform one or a combination of instructional functions. Instead they all perform some of these functions well, and some not so well. The arrangement of instructional conditions is still the key to effective instruction, regardless of the medium or media employed.

Kanner (1957) found evidence that the successful classroom teacher does not always find equal success in teaching on television. This was especially true when the experienced teacher did not use a prepared script. The rationale had always been that since he knew his presentation so well, it would be a waste of time to prepare and follow a script.

The problem of failure in the scriptless situations was hypothesized to be the lack of the familiar situation to guide the teacher. Normally the student-teacher interaction gave the experienced instructor cues for direction. Without these cues his approach, sense of timing, and rate of speech were altered. All these changed the ingredients of his formula for success.

Further studies by Kanner and others (1958, p. 286) supported the

position that it made little difference if the instructor was an experienced teacher or even needed to understand the content.

> By means of television and prompting equipment, it is possible to take a person with no knowledge of a given course's material, with none of the special skills required of a good instructor, give that person about one or two hours of rehearsal per hour of television instruction, and present this instruction to trainees with no loss in training efficiency.

Schramm (1972) found, "There is surprisingly little research on the qualities of a teacher that contribute to his effectiveness in television or film."

Finding who will make the best TV instructor may be as difficult as predicting who will be the best classroom teacher. As with the classroom teacher the best TV instructor will most likely portray those characteristics our society believes a teacher should have (Isaacson and others, 1963).

Isaacson described emotional stability, friendliness, cooperativeness, agreeableness, restraint, and objectivity as the cultural traits desirable for a TV instructor. In addition, the TV teacher will need to be able to work under the conditions of a television studio and still appear to be earnestly teaching a lesson.

McMenamin (1974, p. 61) saw an additional consideration for the TV teacher. His research indicated that viewers do not perceive the personality of the electronic image as being as dynamic as they would the same "real" person.

> On TV the "real" personality is viewed through a different matrix of sense ratios and is seen as something different from its "electronic" counterpart. The absence of the

> living presence is compensated for but at the expense of forcefulness. As the electronic image is "fleshed out," the dots filled in, and the two dimensional figure extrapolated beyond the confines of the frame, the viewer is highly involved. He created a living person out of an electronic image by "reading" more into the image than is there. A change in sense ratios creates a change in perception.

Though the presentor may lose forcefulness through the electronic image, the importance of his presence cannot be underestimated. Evidence to support this importance was seen in a study by Meyer (1971). In this research two groups of individuals watched war film violence. Though the viewers saw the same film version of war violence, they heard different narrations. Their overt behavior was significantly different.

The Television Student

This portion of the review examined some of the characteristics of the television student, with some emphasis on the college level. Generally, this examination concerned the areas of attitudes and learning.

The general conclusions already stated were that instructional television could be effectively used with students of all ages and abilities. However, Chu and Schramm (1967) related that this review indicated television was less effective at the college level than at the high school or elementary age groupings. Chu found no evidence explaining causes for this relationship.

Reid and others (1967) believed their review of research suggested students' opinions were a function of two things. First, they reflected the feeling and attitudes of their teachers. (This is perhaps tempered

by the knowledge that most ITV research has been done at lower age levels.) And secondly, the quality of instructional television presentation caused good or bad opinions.

However, it has not been established that disliking a presentation will reduce learning. Chu and Schramm's (1967) opinion was that liking and learning have a commonality, but they saw enough exceptions to raise doubts concerning such a relationship.

Dubin and others (1969, p. 79) reviewed nine studies conducted between 1956 and 1964. The following question was asked of college students: "If you have the option next semester of enrolling in either a TV section or a conventional section of a particular course, which will you choose - other things being equal?"

The overwhelming choice in each college and year was the conventional method.

Interestingly, in eight other colleges reviewed by Dubin, (p. 80) a similar question was asked.

"If you were given the option would you like to take this course in a live large lecture class or a small class by TV?"

The results in this case found the majority of the students preferring TV. Dubin, (p. 85) speculated students were not as worried about the medium as they were about quality instruction. This opinion was reinforced by a third review of studies, in eight colleges. The question posed was: "Suppose the TV section was to be taught by an excellent instructor whereas you would have to take a chance on instructor assignment in the conventional section, which would you choose?"

The overwhelming response to this question favored the television instructor.

Jamison, Suppes and Wells (1974, p. 38) reported from their earlier study of an attempt to establish a "feeling for students' strength of preference." In a sample of 90 students they found 32% indicating preference for a non-ITV version of a course. They inquired of these 32% how much of a tuition rebate would cause them to prefer television for the course. The results were: "Of the students sampled, 18% (who were working on an MBA at Stanford University) would accept a rebate of $50 or less; 9% would accept $100; and 4.5% would only accept $200 or more.

Westley (1963) found interesting results in his study with ninth grade algebra students. TV taught pupils tended to rate their own teachers higher than a non-TV group, giving rise to the contention that variations of TV and live instruction had a positive effect upon the students' view of the classroom teacher.

Dubin and others (1969) found an unexpected relationship between those students with prior TV learning experience and an increased preference for TV instruction. Dubin reviewed 6 separate studies whose results supported, "Students receive ITV favorably and even more favorably after they have experienced it." It was hypothesized that the increased favor displayed a skepticism on the students' part for the effectiveness of television as a teacher. But after seeing what it could do, they became more favorable.

Robert Janes (1964) attempted to establish relationships between student traits, and positive and negative response to the television

lecturer. To do this he recorded measures of authoritarianism, self-confidence, and intelligence. The results pointed to all traits having positive correlations with preference for television lectures. Authoritarianism correlated slightly, and intelligence more highly. Self-confidence correlated the highest for this study.

There have been a great number of studies designed to improve the effectiveness of ITV. Chu and Schramm (1967, p. 83) reviewed a number of these studies and concluded there were indications that motivation would increase learning from instructional television. "Results from learning experiments generally using learning situations of relatively short duration, have shown students learn more when motivated than when unmotivated." It should be explained the motivation mentioned was given prior to the presentation and not included as part of the television instruction.

The use of visual reminders was the subject of a study to increase television learning (Tidhar, 1973, p. 149). A visual reminder is the projection of an earlier used image again within the proper instructional context. This assists the viewer in recalling what had been seen previously. The research findings indicated visual reminders were, "especially helpful to the pupil whose verbal intelligence and/or abilities in visual memory are lower than average."

Becker (1964) attempted to find a relationship between interest and learning. He devised three methods to determine the level of interest during a television presentation. At the conclusion of his testing he found there was no significant correlation between knowledge gain and the

level of interest in the presentation. It was interesting to note the television instructor provided a state of alertness and tension, as measured by galvanic skin responses, which would indicate a readiness to learn.

Becker found support in a similar study by Egon Guba and others (1964, p. 393). This study dealt with ascertaining what precisely the viewer was watching. Through a complicated system Guba was able to record eye-movements. This gave him the capacity to determine what the viewer was watching at any given moment. They found "that the subjects tend to be preoccupied with the face of the narrator (when he is on the screen) to the virtual exclusion of other objects."

Television has the capacity to use both the visual and the auditory senses of the learner. According to a model proposed by Broadbent (1958) the learner is able to accept information on a single channel system. Despite the sensory item, the information comes from only one input at any given moment. Travers' and others (1967) research indicates using both the audio and visual channels for great amounts of information may be detrimental to learning. He believed the evidence indicated that multiple sensory modality inputs were likely to be of value only when the rate of input of information was very slow.

Travers' research spoke against bombarding a viewer with information from both the audio and visual channels, because the student will not have time to assimilate it.

Production and Viewing Variables

Production variables

The photographic principles and techniques for film are basically the same for television. The research concerning the visual and audio aspects of the two media are generally regarded to be interchangeable. For this reason, some of the studies under consideration in this review may have used film to reach the research conclusions.

Schramm (1972) in his review of research on the use of camera angles came upon some interesting results. He found in a 1947 study that the subjective camera angle was the best for student learning. However, Schramm pointed out a more recent study which added a dimension to the research. Indications were that the subjective angle was not the most effective for all cases. The objective angle was more effective in the more complex skill learning, while the subjective angle continued more effective in the less complex skill learning.

A general assumption in teaching is that you can hold attention better by having "good" eye-contact with students. In television teaching this means looking directly at the camera to establish this feeling of eye-contact. Chu and Schramm (1967) found no clear evidence in the studies they reviewed to suggest the amount of learning could be increased through TV instructor eye-contact.

Aylward (1960) looked into several production techniques in his study. Those chosen were communication image size, program editing, and program background.

The results were significant in the amount of learning for two of the three. Dynamic style of editing was superior for information to static editing. Program background of distracting and nondistracting features behind the presentation was also significant. Learning was greater for those viewing with the nondistracting background. However, learning was not significant when using close-up or long shot in the image size production techniques.

Aylward concluded, "Further support is found for accepting the theory which states that efficiency in communication can be enhanced by controlling or eliminating interference which distracts attention" (p. 1660).

Barrington (1965) reported on the attention-gaining effectiveness of television. He concluded that ITV was, "an effective means of directing and controlling the attention of pupils."

Bridges (1960) reported on the length of a TV lesson and the effect on the attention of students. His findings indicated 25 minutes was a point at which attention to the lesson began to deteriorate.

Pockrass (1960) looked at time factors in his study. He found evidence that the use of a one-minute pause in a 30-minute tape would increase learning.

Viewing variables

McVey's (1970) study concerned finding "the optimum and acceptable minimum and maximum distances for viewing film and television." The resultant research pointed to a cone-shaped viewing area for audience volume. A position in an area 6½ times the width of the television screen from the television receiver was considered the perfect distance.

A television set sold as having a 12-inch screen is 10 inches wide. The "perfect" viewing distance would be 10 inches times 6¼, or 62½ inches from the screen.

Four to 6½ widths was considered the optimum viewing area, providing it was no more than 45 degrees from the center of the viewing screen (see Figure 1). Acceptable viewing areas were described as being between 2 times the width of the screen from the screen to as much as 12 widths distance.

The vertical relationship would be no more than -24 degrees angle of depression, or a +10 degree angle of maximum elevation (see Figure 2). The viewing angles remain the same, although in both cases areas beyond 15 degrees horizontally may cause fatigue.

McVey's findings were supported by Chu and Schramm's (1967) review of a number of studies.

Summary

In a review of the literature relating to instructional television several major elements were valuable for consideration.

Television is an effective educational tool. However the quality of the instructional television presentation will not only effect its efficiency, but also the student's opinion.

Instructional television students have been found to learn better if motivation is provided prior to the instruction. Student interest, however, has not been significantly related to more learning.

In studies related to television teaching the methods of the classroom

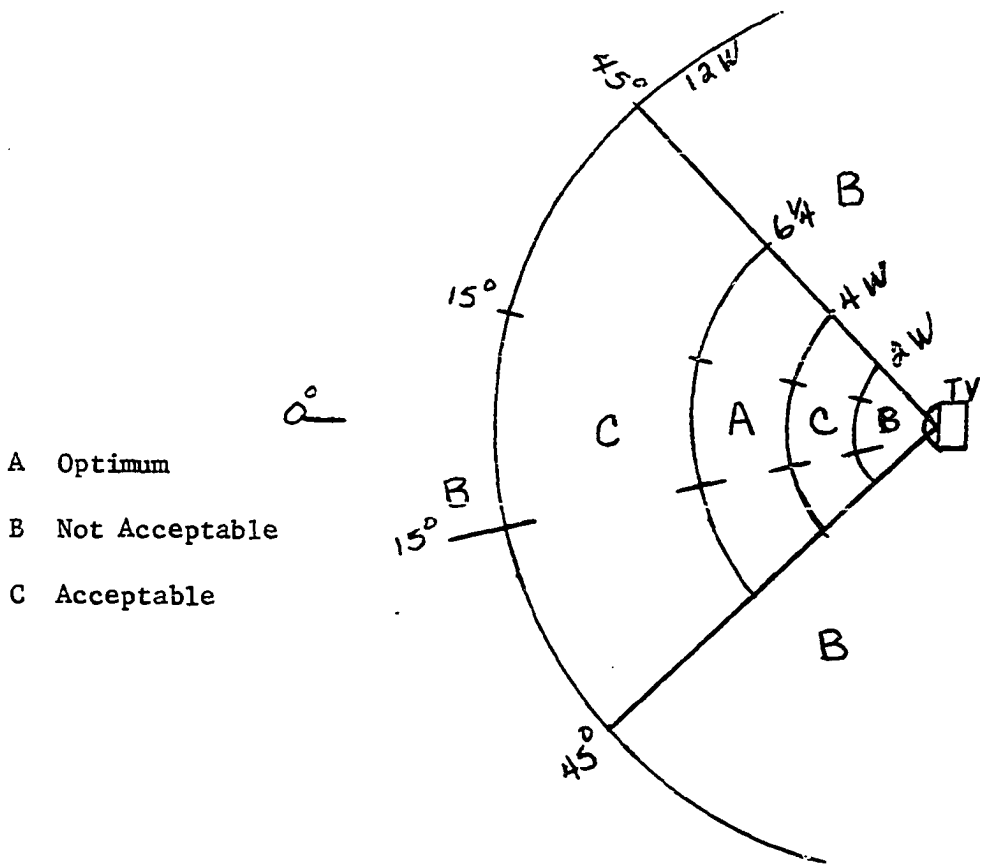

Figure 1. Viewing angles and distances for horizontal sectors

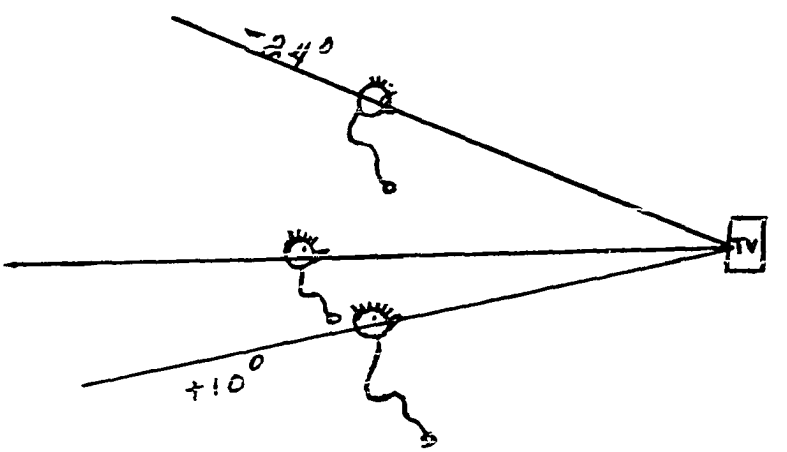

Figure 2. Viewing angles for vertical sectors

were not necessarily the best for television instruction. In addition the best classroom teacher was not necessarily the best television teacher.

Finally, when looking at production, two major elements were found. First, indications were that twenty-five minutes was the maximum television lesson time for student attention. And secondly, any item not directly related to the instruction was distracting and might cause a reduction in learning.

METHOD OF PROCEDURE

The purpose of this study was to determine the effects of three videotaped teaching formats on student achievement and preference. Students using a videotaped teaching format were evaluated with an achievement test, a study habits and attitudes measure, and an evaluation form.

Objective

There were four major objectives for this study. The first was to ascertain differences in achievement among the treatments. A second, was to determine what differences existed for achievement and selected student variables. The third objective was to determine preference for one or more videotaped lessons as indicated by student ratings and measured by a standardized instructor rating form. The final objective was to ascertain differences in student variables and their relation to achievement.

Hypotheses

The following hypotheses stated in null form were tested.

1. There is no significant difference in achievement in the group taking the test prior to the videotape treatment and the groups taking the test after the treatment.
2. There is no significant difference in achievement among group means using the three videotape treatments as measured by achievement scores.
3. There is no significant difference in achievement between

males and females for treatment group one, two, or three.

4. There is no significant difference in ratings of the instructor by students in treatment groups as measured by an instructor rating form.
5. There is no significant relationship between achievement on the videotaped lessons, and scores on a scale of study habits and attitudes, student ratings, or selected student variables for groups one, two, or three.

The Sample

The students in this study were 228 undergraduates at Iowa State University enrolled in Psychology 333, fall quarter 1974. Students met three times a week for lecture and once for a lab. Each student was assigned to one of 12 sections by college registration procedures. Each section became a unit for viewing one of three teaching formats designed for this study (see Table 1).

The Teaching Medium

Three fifteen-minute color video cassettes were prepared, each using the same content and narration. The subject area was typically covered in Psychology 333. A graduate student who previously taught the course developed the script, and served as the television instructor.

The studios and professional staff of WOI Television in Ames, Iowa, were used to help create color video cassettes entitled, "Interpreting Test Scores."

Table 1. Section assignment and student numbers for Psychology 333

Day	Section	Time	Treatment[a]	Number used[b]	
Monday	1	12:00 pm	B	25	Block one
Monday	2	2:00 pm	D	21	
Tuesday	3	10:00 am	A	19	
Tuesday	4	12:00 pm	C	22	
Tuesday	5	2:00 pm	D	22	Block two
Wednesday	6	12:00 pm	A	20	
Wednesday	7	2:00 pm	B	14	
Thursday	8	10:00 am	C	22	
Thursday	9	12:00 pm	A	22	Block three
Thursday	10	2:00 pm	B	17	
Friday	11	8:00 am	C	8	
Friday	12	12:00 pm	D	16	
Total				228	

[a]Treatment totals: A = 61, B = 56, C = 52, D = 59.

[b]D treatment acted as the pretest group for A, B, and C.

In addition to controlling production, the same script, graphics, and teacher were used in each taping session. The tapes were made at the same time of day over a two-day period.

Practice sessions helped to standardize the teaching performance. The teacher was able to experience television teaching through two practice sessions with black and white videotape equipment. At the studio the instructor acquainted himself with procedures and equipment, and rehearsed before the cameras prior to making of the final tapes. A copy of

the script is found in Appendix A.

The Tapes

Since content and production techniques were uniform, the only planned difference in the three tapes was in the settings.

Tape one did not include students in the presentation. The instructor spoke to the camera to give viewers the impression he was talking to them. The production featured the teacher framed in the picture from mid-waist to just above the head.

A student joined the instructor on camera for the second tape. The teacher lectured to this student while, except for a brief introduction, he ignored the television audience. Both subjects were always shown together with no close shots of the instructor or the student.

The third tape featured the instructor with a group of students. He spoke only to the group with no reference to the television audience. The entire group with the instructor was framed by the cameras with no close-up shots of the teacher or students.

A character generator electronically superimposed the same words and phrases in each tape. Other graphics, when used, were also the same in all tapes.

The Content

The concepts for the instruction were taken from Psychology 333. The tapes were used instead of the normal instruction that would have been provided by the lab section's teaching assistant.

The television instruction was developed around those concepts needed when interpreting test scores. These were average, distribution, standard deviation, percentile rank, test symbols (X, $\bar{X}$, and s), and standard scores (Z scores). Each concept was taught with illustrations, diagrams, and pictures, and superimposed words and phrases of explanation.

The Instruments

Data were collected for this study using student records and three instruments.

The Brown and Holtzman Test

Brown and Holtzman's Survey of Study Habits and Attitudes was selected for administration to the sample population. This inventory is recognized as one of the best designed to measure study habits (Brown, 1964).[1] It is heavily loaded with attitudinal rather than factual items and has low correlations with measures of scholastic aptitude.

The survey of Study Habits and Attitudes inventory produces seven scores. See Appendix B for survey questions.

1. (DA) Delay Avoidance - Freedom from wasteful delay and distraction when studying.
2. (WM) Work Methods - How to study skills.
3. (TA) Teacher Approval - Opinions about teachers.
4. (EA) Education Acceptance - Approval of educational objectives,

[1]F. G. Brown not W. F. Brown codesigner of the study habits inventory.

practices, and requirements.

5. (SH) Study Habits - Acquired through DA + WM scores.
6. (SA) Study Attitudes - Acquired through TA + EA scores.
7. (SO) Study Orientation - Acquired through SH + SA scores.

The Brown and Holtzman survey was given during the lab period for each section. Those who were absent on the day their section was given the test were urged through in-class announcements and telephone calls to take the test.

The instructor evaluation

An instructor evaluation form developed by the Student Counseling Service at Iowa State University was slightly modified for use in determining student opinion of the instructor and tape.

A copy of the instructor evaluation form is found in Appendix C.

This evaluation contained 24 questions concerning the student, quality of the instruction, and quality of the presentation. Included in the evaluation were these areas.

1. Organization/Planning
2. Class time efficiency
3. Preparedness
4. Interest
5. Oral presentation
6. Written presentation
7. Explanations
8. Relevance

9. Expectations

10. Overall rating

Five questions on the instructor rating form were difficult to answer because of differences in television, and conventional teaching. Questions included showing respect for students, tolerance of weak students or those of differing opinion, fairness to students, availability to students outside class, and clear, fair and appropriate evaluation procedure for assessing student performance. Since impressions of the television teacher were important to understanding how students felt about the presentation, they were asked to judge how they believed the instructor would perform.

Achievement test

The achievement test was developed to measure understanding of the concepts associated with the content of the videotapes. This test consisted of 12 multiple-choice items. These items were selected from existing exams prepared by instructors for Psychology 333. These instructors judged the questions to be valid in reflecting the content of their course and that of the television tape.

The achievement test was machine graded and an item analysis was done by the Iowa State University Testing Service. The results gave the estimate of reliability at 0.71.

In order to facilitate the standardization of the testing, guidelines for the administration were developed to be used by each section. A copy of the achievement test and guidelines are found in Appendix D.

The Method of Collecting Data

The grade point average was secured through college records. When filling out the instructor rating instrument, each student indicated his year in school, sex, and reason for taking the course.

The student sections were randomly assigned to one of three groups for the purpose of viewing one of the three fifteen minute videotapes. The Brown-Holtzman, Survey of Study Habits and Attitudes was administered in the lab section a week prior to the tape viewing.

All students were to view the tapes in class as a group during the assigned lab period. In the event that time of week would effect achievement, the week was divided into three blocks. The three treatment sections and one control section were then randomly placed within each block.

The results of the random placement within blocks was tape one viewed by sections 3, 6, and 9. Tape two was viewed by sections 1, 7, and 10. Tape three was viewed by sections 4, 8, and 11. Sections 2, 5, and 12 could view any one of the tapes (see Table 1). The last three sections completed the achievement test prior to viewing the tape and the results served as the pretest for all those in the study. The remaining nine sections viewed the tape, then were asked to complete the achievement test and the instructor evaluation of the television teacher.

Method of Statistical Analysis

The primary methods of analysis were multiple regression and the analysis of variance. Analysis of variance was used to test for differences in achievement and preference for teaching format. Multiple regression analysis was used to determine the importance of learner variables on achievement and preference for teaching formats.

Basic Assumptions

The following assumptions were used throughout this study.

1. Students were randomly and independently distributed in all four groups.
2. The performer-instructor performed equally well in all three tapes.
3. Differences between groups were due to planned variables and learner variables.
4. The quality of production methods was equal for all tapes.
5. Prior sensitivity or preference for TV teaching was randomly distributed.

Delimitations of The Study

A number of factors prevented a generalization of conclusions beyond certain parameters. Only 278 students enrolled in Psychology 333 at Iowa State University fall 1974 were used. In addition a student had to complete an inventory of study habits and attitudes, and attend a class

using the videotape treatment. Twenty-nine students were unavilable to complete the inventory, and an additional twenty-one were absent from the videotape treatments.

There may have been differences in the three videotapes in addition to those planned. The instructor might have been better in performing one of the teaching formats. Also, he might have improved as he taught the lesson on television causing a difference for each videotape.

FINDINGS

This chapter contains results of statistical tests performed on data collected for this study. These results have been organized as follows: tests of initial differences, tests of the main hypotheses, analysis of the relationship between variables, and other findings.

Tests of Initial Differences

In order to establish a basis for an assumption of homogeneity for the groups involved in the experiment, tests were conducted to determine if there were indications of initial differences. The learner variables selected as criteria were college grade point average, student sex, and the two scales Educational Acceptance, and Teacher Approval from the Survey of Study Habits and Attitudes. The statistical procedure used in each case was a one-way analysis of variance.

The F values calculated for college grade point (0.851), males to females (1.311), and Teacher Approval (1.958) were all less than the .05 level for significance (see Table 2). The only variable approaching significance was Educational Acceptance at 2.286. The results of the analysis of variance produced no significant differences. This indicated these groups were initially the same for the variables examined, giving credence to the assumption of homogeneity.

Table 2. Analysis of variance for the tests of initial differences[a]

Variable	Source of variation	Degrees of freedom	Sum of squares	Mean squares	F
College GPA					
	Between groups	3	2.79	0.93	0.851
	Residual	224	245.12	1.09	
	Total	227	247.91		
Sex					
	Between groups	3	0.74	0.25	1.311
	Residual	224	42.01	0.19	
	Total	227	42.75		
Educational acceptance	Between groups	3	312.62	104.21	2.286
	Residual	224	10209.95	45.58	
	Total	227	10522.57		
Teacher approval	Between groups	3	375.79	124.93	1.958
	Residual	224	14290.10	63.80	
	Total	227	14664.89		

[a]The table value required 2.60 at the .05 level, and 3.78 for the .01 level.

Tests of the Main Hypotheses

The purpose of this study was to determine the effect of three videotaped teaching formats on student achievement and preference. The first two hypotheses dealt with student achievement in accordance with the particular tape they viewed. They are stated in the null form as follows:

1. There is no significant difference in achievement between the group taking the test prior to the videotape treatment and the groups taking the test after the treatment.

2. There is no significant difference in achievement among group means using the three videotape treatments as measured by achievement scores.

The test of the first hypothesis resulted in an F value calculated to be 68.95 (see Table 3). The table value of 2.60 was required at the .01 level of significance for 224 degrees of freedom. Since this indicated significant differences the Dunnett test for comparisons involving a control mean was used (Kirk, 1968). This statistic with a two-tailed test using 224 degrees of freedom requires a table value of 2.92. Calculation of the comparison resulted in a value of 11.240 between group four (the pretreatment unit) and the next closest group. This indicated there was a highly significant difference between pre- and posttreatment scores, making it possible to reject null hypothesis one.

See Table 4 for the means and standard deviations of variables achievement and overall instructor rating for the treatment groups.

Table 3. Analysis of variance for differences between pre- and posttreatment groups using achievement as the dependent variable

Source of variation	Degrees of freedom	Sum of squares	Mean square	F
Between groups	3	816.74	272.249	68.947**
Residual	224	884.49	3.949	
Total	227	1701.23		

** Significant at the .01 level.

Table 4. Means and standard deviations of treatment groups for the variables achievement and overall instructor rating

Variable	Number	Mean	Standard deviation
Achievement			
Videotape group one			
Male	17	10.41	2.37
Female	44	10.25	1.95
Group	61	10.30	2.06
Videotape group two			
Male	18	11.39	1.04
Female	38	10.42	1.64
Group	56	10.73	1.53
Videotape group three			
Male	12	10.67	1.23
Female	40	10.55	1.47
Group	52	10.58	1.41
Pretreatment group	59	6.22	0.31
Overall instructor rating			
Videotape group one	61	3.43	0.81
Videotape group two	56	3.34	0.88
Videotape group three	52	3.52	0.61

A second analysis of variance was calculated to find indications of differences in achievement between posttreatment groups (see Table 5). The resulting F value was 0.988. The significance level required for 166 degrees of freedom at the .05 level was 3.053. There was insufficient evidence to reject the null hypothesis.

The third hypothesis concerned testing for achievement differences between males and females in their videotape treatment group. Stated in

Table 5. Analysis of variance for differences in achievement between means of the three videotape treatment groups

Source of variation	Degrees of freedom	Sum of squares	Mean square	F
Between groups	2	5.77	2.884	0.988
Residual	166	484.36	2.918	
Total	168	490.13		

the null form the hypothesis is as follows:

3. There is no significant difference in achievement between males and females for treatment group one, two, or three.

Analysis of variance procedures were used for each treatment group (see Table 6). The F value for group one was 0.774. This does not exceed the .05 level of significance of 4.002. Group two's F value was calculated to be 5.256, which exceeds the required 4.024 at the .05 level. The F value of group three was calculated to be 0.625. The .05 level of significance with 166 degrees of freedom was 4.030. There was insufficient evidence to reject the hypothesis concerning groups one and two. However, group two provided the required value to indicate rejection of the third null hypothesis.

The fourth hypothesis stated in the null form follows:

4. There is no significant difference in ratings of the instructor by students in treatment groups as measured by an instructor rating form.

Ratings of the instructor were used to assess student preference

Table 6. Analysis of variance for achievement between males and females in treatment groups one, two, and three

Source of variation	Degrees of freedom	Sum of squares	Mean square	F
Group one				
Between	1	0.32	0.32	0.0744
Residual	59	254.37	4.31	
Total	60	254.69		
Group two				
Between	1	11.44	11.44	5.256*
Residual	54	117.54	2.18	
Total	55	128.98		
Group three				
Between	1	0.13	0.13	0.0625
Residual	50	100.57	2.01	
Total	51	100.70		

*Significant at the .05 level.

for the treatment. Analysis of variance used to test for differences among the treatment group means resulted in an F value of 0.721. When compared with the table a value of 3.053 was required for the .05 level with 166 degrees of freedom. Thus the null hypothesis cannot be rejected (see Table 7).

The fifth hypothesis dealt with the relationship of several student measures with achievement in their respective treatment.

Stated in the null form hypothesis five follows:

5. There is no significant relationship between achievement on the videotaped lessons, and scores on a test of study habits and attitudes, student ratings, or selected student variables for

Table 7. Analysis of variance between treatment groups with instructor rating as the dependent variable

Source of variance	Degrees of freedom	Sums of squares	Mean square	F
Between groups	2	0.87	0.44	0.721
Residual	166	100.45	0.61	
Total	168	101.32		

group one, two, or three.

Correlation coefficients were computed using the scores obtained from the achievement test, four independent scales from the Survey of Study Habits and Attitudes, the overall instructor rating, the tape effectiveness rating, and three student variables (see Table 8). Computation was done independently for each treatment group.

Correlations were used to test the null hypothesis that $r = 0$ for each of the correlations, in the three treatment groups.

The number of pairs in treatment one used to test the hypothesis was 61. The table value for 59 degrees of freedom at the .01 level is $r = .328$. For this group only the tape effectiveness rating exceeded either the .05 level or the .01 level. That variable's correlation coefficient was .419. Group two used 56 paired observations. The table value with 54 degrees of freedom was $r = .264$ at the .05 level. The student variables of sex, and college GPA were computed to be .298 and .330, and were the only variables of that group to exceed the .05 level. There were 52 observations for group three. The table value with 52 degrees

Table 8. Correlation coefficients between scores on the achievement test and four study habits and attitude scales, the instructor rating, the tape effectiveness rating, and three student variables

Name of variable	Achievement Group one[a]	Group two[b]	Group three[c]
Survey scales			
Delay avoidance	-.021	-.108	-.151
Work methods	.049	.066	-.029
Teacher approval	-.040	-.005	-.227
Educational acceptance	.164	.055	-.225
Overall instructor rating	.144	-.039	.010
Tape effectiveness rating	.419**	.242	.353*
Student variables			
Year in school	-.067	.228	.043
Sex	-.035	-.298*	-.035
GPA	.219	.330*	.295*

[a]Group one with 59 degrees of freedom requires a value of .252 at the .05 level, and .328 at the .01 level.

[b]Group two with 54 degrees of freedom requires a value of .264 at the .05 level, and .342 at the .01 level.

[c]Group three with 50 degrees of freedom requires a value of .273 at the .05 level, and .354 at the .01 level.

*Significant at the .05 level.

**Significant at the .01 level.

of freedom was .273 at the .05 level. (This as other values for checking significance of correlation was found in a table developed by Fisher as used by Glass and Stanley, 1970.) The tape effectiveness rating's correlation coefficient was .353, and college GPA was .295. The values for both these variables exceeded the .01 or .05 levels relationships did exist that were significantly different from zero or no correlation. Therefore, null hypothesis five was rejected.

Complete tables of correlation coefficients are found in Appendix F.

Multiple Regression

Stepwise multiple regression was computed to determine the learner variables which would best predict achievement. In addition the same was calculated to predict instructor ratings and tape effectiveness ratings. Separate analyses were performed for each treatment group.

In treatment group one student belief, as displayed by a rating form concerning material relevancy was the single best predictor of achievement. Student belief that the material was matched to class ability contributed 6% of the variance. Student belief the television instructor would try to make himself available to students, belief that time in the tape was used wisely, belief the tape was well planned, and believing the instructor was interested, were the greatest contributors to the amount of variance explained. The total variance accounted for in tape one using all variables is 62% (see Table 9).

Table 9. Stepwise multiple regression correlation with achievement for treatment group one

R	R^2	Major predictors
0.50	0.25	Relevance
0.56	0.31	Relevance, Ability
0.60	0.36	Relevance, Ability, Avail
0.64	0.41	Relevance, Ability, Avail, Time
0.66	0.44	Relevance, Ability, Avail, Time, Plan
0.69	0.46	Relevance, Ability, Avail, Time, Plan, Interest
0.79	0.62	All variables

Relevance = Instructor showed the relevance of the material.
Ability = Instructor matched material to ability of the class.
Avail = Instructor would try to be available to students.
Time = Instructor used lesson time efficiently.
Plan = Instructor planned the lesson well.
Interest = Instructor was interested and enthusiastic.

A complete list of variables is found in Appendix E.

The single best predictor of achievement for treatment two was the college GPA. GPA with student sex and material relevance accounted for 30% of the variance. Total variance accounted for using all variables was 71% (see Table 10).

The single best predictor for achievement for treatment three was the student rating of ability to teach subject matter. Coupled with student ratings of how well they could see (View) accounted for 24% of the variance. Other major contributors were planning, educational acceptance scale, GPA and would show respect to students. The total variance accounted for using all variables was 56% (see Table 11).

Table 10. Stepwise multiple regression correlation with achievement for treatment group two

R	R^2	Major predictors
0.33	0.11	GPA
0.45	0.21	GPA, Sex
0.54	0.30	GPA, Sex, Relevance
0.58	0.33	GPA, Sex, Relevance, Prep
0.62	0.38	GPA, Sex, Relevance, Prep, Tape
0.84	0.71	All variables

GPA = College grade point average.
Sex = Male or female.
Relevance = Instructor showed the relevance of the material.
Prep = Instructor was well prepared.
Tape = Television presentation was effective in presenting the lesson.

Table 11. Stepwise multiple regression correlation with achievement for treatment group three

R	R^2	Major predictors
0.35	0.12	Tape
0.49	0.24	Tape, View
0.55	0.30	Tape, View, Plan
0.60	0.36	Tape, View, Plan, Ed. Accept.
0.63	0.39	Tape, View, Plan, Ed. Accept., GPA
0.75	0.56	All variables

Tape = Television effectiveness in presenting the lesson.
View = Classroom position for viewing.
Plan = Instructor planned the lesson well.
Ed. Accept. = Survey scale of educational acceptance.
GPA = College grade point average.

The same methods and procedures were used to predict how a student would rate the instructor as was done for achievement.

The single best predictor for treatment one concerning instructor rating was oral presentation. The total amount of variance accounted for in using all variables was 65% (see Table 12).

Table 12. Stepwise multiple regression correlation with overall instructor rating for treatment group one

R	R^2	Major predictors
0.59	0.35	Oral
0.66	0.44	Oral, Respect
0.68	0.46	Oral, Respect, Fair
0.69	0.48	Oral, Respect, Fair, Delay
0.71	0.51	Oral, Respect, Fair, Delay, Graph
0.81	0.65	All variables

Oral = Instructor's speaking ability.
Respect = Instructor would show respect for students.
Fair = Instructor would be fair to students.
Delay = Survey scale of delay avoidance.
Graph = Instructor's graphic presentation.

In treatment two, 76% of the variance was accounted for. The best predictor for the rating of the instructor was his display of interest. This accounted for 30% of the variance (see Table 13).

The single best predictor of treatment three was the rating of instructor explanations. This accounted for 49%, and adding instructor respect for students accounted for 11% more of the variance. The total variance accounted for was 87% (see Table 14) using all variables.

Table 13. Stepwise multiple regression correlation with overall instructor rating for treatment group two

R	R^2	Major predictors
0.54	0.30	Interest
0.64	0.41	Interest, Explain
0.67	0.45	Interest, Explain, Sex
0.69	0.48	Interest, Explain, Sex, GPA
0.72	0.51	Interest, Explain, Sex, GPA, Avail
0.87	0.76	All variables

Interest = Instructor was interested and enthusiastic.
Explain = Instructor explained material clearly.
Sex = Male or female.
GPA = College grade point average.
Avail = Instructor would try to be available to students.

Table 14. Stepwise multiple regression correlation with overall instructor rating for treatment group three

R	R^2	Major predictors
0.70	0.49	Explain
0.77	0.60	Explain, Respect
0.81	0.65	Explain, Respect, Interest
0.82	0.67	Explain, Respect, Interest, Year
0.83	0.70	Explain, Respect, Interest, Year, TV
0.93	0.87	All variables

Explain = Instructor explained material clearly.
Respect = Instructor would show respect for students.
Interest = Instructor was interested and enthusiastic.
Year = Year in school.
TV = Had used ITV previously.

Stepwise multiple regression analysis was also applied to predict the rating of tape effectiveness. Again, this was done separately for each treatment.

All three analyses of treatments gave the rating variable, effective use of graphics (picture), to be the single best predictor for the tape effectiveness rating. In treatment one its contribution was 39%. Sixty-nine percent of the variance was in account for this prediction equation (see Table 15) using all variables.

Table 15. Stepwise multiple regression correlations with the tape effectiveness rating for treatment group one

R	R^2	Major predictors
0.63	0.39	Picture
0.70	0.48	Picture, Explain
0.73	0.54	Picture, Explain, Study
0.76	0.57	Picture, Explain, Study, View
0.78	0.60	Picture, Explain, Study, View, Time
0.83	0.69	All variables

Picture = Presentation effectively used graphics.
Explain = Instructor explained material clearly.
Study = Survey scale of study habits.
View = Classroom position for viewing.
Time = Instructor used lesson time efficiently.

Effective use of graphics plus instructor organization accounted for 39% of the variance in treatment two. Other major contributors were achievement, and the Brown-Holtzman Study Attitude Scale. Total variance to be accounted was 68% (see Table 16) using all variables.

Table 16. Stepwise multiple regression correlations with the tape effectiveness rating for treatment group two

R	R^2	Major predictors
0.57	0.33	Picture
0.63	0.39	Picture, Plan
0.67	0.45	Picture, Plan, Achieve
0.70	0.49	Picture, Plan, Achieve, Attitude
0.73	0.53	Picture, Plan, Achieve, Attitude, Oral
0.83	0.68	All variables

Picture = Presentation effectively used graphics.
Plan = Instructor planned the lesson well.
Achieve = Score from achievement test.
Attitude = Survey scale of study attitudes.
Oral = Instructor's speaking ability.

As stated, effective use of graphics was the single best predictor for all three tapes. In treatment three it accounted for 18% of the variance. How well the student could see the presentation accounted for nearly as much. Sixty-eight percent of the variance was accounted for (see Table 17) using all variables.

Table 17. Stepwise multiple regression correlations with the tape effectiveness rating for treatment group three

R	R^2	Major predictors
0.42	0.18	Picture
0.56	0.32	Picture, View
0.65	0.42	Picture, View, Achieve
0.67	0.45	Picture, View, Achieve, Dave
0.69	0.47	Picture, View, Achieve, Dave, Sex
0.82	0.68	All variables

Picture = Presentation effectively used graphics.
View = Classroom position for viewing.
Achieve = Score from achievement test.
Dave = Knew the television instructor.
Sex = Male or female.

Other Findings

There was concern in the random assignment of treatments that achievement might differ because of the time of the week. The nine experimental sections were randomly assigned three groups of three to the first, middle, or end of the week meeting time. Analysis of variance was calculated to find indications of differences in achievement for the time of the week. The F value was found to be 2.43. This was insufficient to meet the .05 level of significance (see Table 18).

Several additional measures were taken to discover indications of student preference for a given tape. Among these were:

1. A student rating of how well the videotape taught the concepts of the lesson.

Table 18. Analysis of variance of achievement for blocks through the week[a]

Source of variance	df	Sums of squares	Mean square	F
Between	2	13.95	6.976	2.432
Residual	166	476.178	2.869	
Total	168	490.130		

[a] A table value of 3.053 was required for significance at the .05 level.

2. A student rating of how well the instructor used graphic materials.

3. A student affective rating of how the instructor would test.

An analysis of variance procedure was used for each of the above measures to find differences in the means between groups. The outcome of the analysis found no significance at the .05 level. This gave the indication that all treatments were nearly alike as perceived by their student ratings (see Table 19).

In addition to measures concerning the student's sex in determining achievement for a treatment, analysis was performed to establish the possible effect of the student's sex on their rating of the instructor, and their rating of treatment effectiveness. Analysis of variance procedures were used six times. No significant F values resulted from the tests.

For analysis of variance tables see Appendix H.

Table 19. Analysis of variance of tape treatments for tape evaluation, instructor's graphic presentation, and instructor testing fairness

Source of variation	DF	Sums of squares	Mean square	F
Tape evaluation				
Between	2	2.989	1.494	1.912
Residual	166	129.757	0.782	
Total	168	132.746		
Instructor graphics				
Between	2	3.180	1.590	1.950
Residual	166	135.340	0.815	
Total	168	138.520		
Testing fairness				
Between	2	3.234	1.617	2.201
Residual	166	121.937	0.735	
Total	168	125.171		

DISCUSSION

The major objectives of this study were to determine if learning could occur through the use of selected videotaped teaching formats. The investigation attempted to identify one or more of the taped teaching formats that might show indications of greater learning, and to see if certain student characteristics could be identified to predict achievement or preference for a taped teaching format.

College grade point average, the sex ratio of male to female for a group, the scales of Teacher Approval, and Educational Acceptance from the Survey of Study Habits and Attitudes were selected to test the assumption that the four groups used in the study were alike. Analysis showed no significant differences for the groups in any of these areas.

To find if the students were familiar with the material prior to the instruction, and if the videotape treatments could increase achievement, one of the four groups was given the achievement test prior to viewing the tapes. This group was able to answer about 50 percent of the questions on the test. The remaining groups, after seeing a taped treatment, were able to answer more than 80 percent of the same questions. These results would indicate the sample was not totally unaware of the subject matter, though there were no perfect scores for the first group. However, the significant difference between the two groups would indicate the videotape treatments were able to improve the achievement scores.

The test of the hypothesis that there was no difference in achievement across treatment groups could not be rejected. However, there may be

several explanations for the similarity of mean scores. The test may not have been difficult or long enough to show differences in means. Since all three groups had means of between ten and eleven, the twelve questions of the test may have created a ceiling preventing possibly higher scores. Also, these students were new to videotaped lessons in Psychology 333. This might indicate the presence of a Hawthorne Effect. If present, it could have contributed to the effect of the ceiling by narrowing the range of the scores. If there was a Hawthorne Effect, all students would do better than expected under normal circumstances, except the upper students who could not score higher.

Production may also have had an effect on the similarities of the achievement outcomes. Differences were planned to be attributable to the teaching formats after controlling the other variables. The script and graphics were developed to make the best production possible, and 60 different graphic changes were used during each 15 minute instructional tape. This provided for a clear illustration of the content, but may have reduced the teaching format's effect because of the influence of the large number of graphics.

Differences in achievment between males and females for treatment groups were found. In each group the mean score for males was higher than for females. However, in group two the difference was statistically significant at the .05 level. Why males had a higher score for this treatment is unclear. In this tape a male instructor taught a female subject. Since the only planned difference in the tape was the female subject, a conclusion could have been that this created greater male

attention for the content. This would be at odds with other research which concluded anything which is contrary to the content is distracting from it (Aylward, 1960), or largely ignored in favor of the instructor (Guba and others, 1964). Further study is necessary in this area.

One measure used to ascertain group preference for a particular teaching format was the overall instructor rating on the rating form. The analysis of variance test performed on these scores found group three rating the instructor highest though it was not significantly greater than the other two.

The instructor rating difference may also have been hidden due to the graphic presentation. The ratings were those of an above average instructor. Since the graphics did a major portion of the visual instruction, the teacher's abilities may have been equated with them. Because of this, planned differences of teaching format may have had a less important role than the instructor's apparent use of graphics.

Correlation coefficients were reviewed for the dependent variable achievement using four study habits and attitude scales, an instructor and a tape effectiveness rating, and the student variables of year in school, sex, and college grade point average. The test of the correlations found the tape effectiveness rating, sex, and grade point average to be the only ones reaching significance. Grade point average and the tape effectiveness rating were significant in two of the three groups and high in the other. The scales of study habits and attitudes (delay avoidance, work methods, teacher approval, and educational acceptance) surprisingly yielded low correlation coefficients with

achievement. They were orginally selected to find student personality characteristics for predictive purposes. These low correlations suggest that a student's study habits, and attitudes may not apply to achievement when used with a relatively short television presentation.

Predictors gained from stepwise multiple regression varied for the three teaching formats. Tape treatment one (see Table 9) found all major predictors related to the instructor. In Table 10 only two of the major predictors are seen to be instructor variables. Tape treatment three (see Table 11) found only one (instructor planning) concerned with an instructor variable. Since these variables were predictors of achievement it may indicate those who were influenced most by instructor variables were able to do best in teaching format one. In treatment two and three other influences such as the individual's general abilities as expressed by grade point average were the major influence. This is not to say that general ability was not a factor for those achieving in tape one. It may have been that those who had the general ability and responded well to the instructor as indicated by the predictive variables were the ones who did best under this format.

Stepwise multiple regression was also calculated for the prediction of the overall instructor rating. The majority of the types of variables explaining variance were instructor related. Instructor related variables have been defined in this study as those variables gained from student's ratings concerning how the instructor performed or would perform. Tape two departed from the other two tape treatments by having student's sex and college grade point average as major predictors. Each

tape treatment's variables were for the most part different. However, a general conclusion was that the predictors were instructor oriented rather than dependent on student variables.

A third prediction equation was developed using the tape effectiveness rating score. Unlike the prediction for achievement and the instructor rating, many variables were the same for all teaching formats. The student rating of the effectiveness of the graphics in the production was the first step of the stepwise multiple regression equation indicating it was the best predictor of the variables given. It was concluded the elements of the prediction equation seemed logical for the prediction of tape effectiveness. Graphics, explanation, organization, how well the student could see and hear the presentation were the major elements.

There was concern that people seeing the tape and taking a test at the first part of the week would score higher than those later in the week. To minimize this effect treatments were randomly assigned to blocks throughout the week (see Table 1). This resulted in assuring no treatment would be shown at only one time of the week. With the three treatments divided into three blocks an analysis of variance was calculated to see if there were differences in achievement for the time of the week (see Table 18). The results approached significance. The spread of the means among blocks for achievement was greater than among treatment groups, suggesting that the time of the week may have had as great or greater effect as the teaching format. The implications were that if the administration of all treatments covered a week's time, consideration should be given to evenly distributing them throughout that week. A

treatment which would ordinarily only approach significance if randomly placed at the beginning of the week while others came later, might result in the rejection of a null hypothesis that was true.

Teaching format one was the easiest to produce, since no students were on camera with the instructor. And, since there is but one on camera there is less chance of a distraction that might come from the addition of another person. This may be a factor in selecting a teaching format since no significant difference was found for achievement in the formats used. Student preference as judged by the students in the instructor rating form found tape one ranking in the middle to low ratings. These were only relative positions since the differences were not significant (see Table 20).

Table 20. Relative positions of the tape treatments by mean scores

Test	Tape one	Tape two	Tape three
Achievement	Low	High	Middle
Males	Low	High	Middle
Females	Low	Middle	High
Instructor evaluation	Middle	Low	High
Males	Middle	Low	High
Females	Middle	Low	High
Tape evaluation	Middle	Low	High
Males	Low	Middle	High
Females	Middle	Low	High
Instructor's graphics	Low	High	Middle
Instructor's test fairness	Middle	Low	High

Tape two was less realistic as a real teaching situation, since the television student made no verbal response to the instructor. This may account for the low student ratings in relation to the other tapes. Psychology 333 (the class used in this study) is a course in educational psychology. This led to the assumption that most of the students were preparing to be teachers. They may have expected dialog in this one-to-one teaching situation. Not seeing it may have indicated to them they were viewing a poor teaching technique. The results may have been lower ratings.

Tape three required the greatest number of students on camera. For that reason it may be the most difficult teaching format for television. For student achievement it was in the middle compared to the other teaching formats. However, it was ranked highest on the instructor rating forms. Though the rankings were not significantly higher it would warrant a search for possible reasons.

The incorporation of dialog in the teaching formats might bring about the measurable differences that had been expected. Student questions or comments contributing to a logical sequence in the lesson could result in increased viewer achievement scores. Distraction from the content might occur from poorly conceived questions and comments. The careful scripting of selected responses could result in increased achievement scores and preference ratings.

Instructor style and personality could also be a factor in achievement and preference. In this study the instructor used a serious straightforward approach. There was no introduction of humor or interesting

examples. Using a friendly style, with humor and sidelights might contribute to measurable differences in preference and achievement. Appropriateness of material will largely affect test results. Further research concerning instructor variables as well as teaching format are needed to provide indications of what is appropriate or distractive in the televised learning situation.

SUMMARY

The problem was to evaluate differences in selected methods of television instruction. These differences were evaluated in terms of student achievement and student preference as shown by achievement tests, a study habits and attitude survey, and instructor ratings.

The students in this study were 229 undergraduates at Iowa State University enrolled in Psychology 333 fall quarter 1974. These students were divided by registration procedures into 12 sections. Each section became a unit for viewing one of three television teaching formats.

The television teaching formats consisted of the inclusion or exclusion of students in the television setting. Content and production techniques were uniform, the only differences were in the setting. Tape one did not include students in the presentation. Tape two used one student, and tape three included a small group of students. There was no spoken response from the students.

Several hypotheses were tested: 1) There is no significant difference in achievement between the group taking the test prior to the videotape treatment and the groups taking the test after the treatment; 2) There is no significant difference in achievement among group means using the three videotape treatments as measured by achievement scores; 3) There is no significant difference in achievement between males and females for treatment groups one, two, or three; 4) There is no significant difference in ratings of the instructor by students in treatment groups as measured by an instructor rating form; 5) There is no significant relationships between achievement on the videotaped

lessons and scores on a test of study habits and attitudes, student ratings or selected student variables for group one, two, or three.

Analysis of variance and correlation coefficients were used to analyze the data. Independent variables were student study habits and attitudes, grade point average, sex, year in school and student ratings. F values were obtained on the pretest, achievement test, instructor evaluation, and tape evaluation. A correlation matrix was used for finding indications of relationships for achievement.

Differences in achievement between pre- and posttreatment scores were found to be highly significant. However, differences in achievement scores between groups using the three videotape treatments did not reach the .05 level of significance. Significance was found for achievement between males and females of treatment group two reaching the .05 level. The analysis of variance found no significant difference for instructor ratings between groups. Correlation coefficients used for measuring relationships on hypothesis five revealed several variables as significant. Highly significant for treatment group one was the variable tape effectiveness. In tape two, two variables (sex and grade point average) were significant at the .05 level. Tape three also had two variables (tape effectiveness rating, and grade point average) significant at the .05 level.

Stepwise multiple regression analysis was used to predict achievement for each tape. The best predictor varied for each television teaching format. Tape one's best predictors were instructor variables as rated by the students. In the second tape grade point average and

student sex were the best predictors. Tape three's best predictor for achievement was the student rating of the tape's effectiveness.

There was evidence that television was effective in bringing about gains in achievement. The results of the analysis of achievement for television teaching formats did not show differences. However, analysis results indicated it did show relationships may exist between achievement and preference and student variables.

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APPENDIX A: TELEVISION SCRIPT

TELEVISION SCRIPT

Title: Interpreting Test Scores

Graphics	Narrative
1. WOI Graphics: Interpreting Test Scores 2. WOI Graphics: With Dave Rindskopf	Hello, I'm Dave Rindskopf and today I am going to talk to you about interpreting test scores.
3. WOI Graphics: 1. Averages 2. Distributions 3. Standard Deviation 4. Percentile Rank 5. Z Scores	Some of the words you will become familiar with are: averages, distributions, standard deviations, percentile rank and Z scores.
4. Character Generator: Picture of Jim	Let's start with an example, suppose you've given a test, or your students have taken a standardized test. You have the results in front of you, and you want to know for example how well Jim did on the test. The first thing you might look at is, how many questions did Jim get right?
5. Character Generator: Score of 40	You find he got 40 right. How is this good or bad? Obviously, it is not

enough just to have Jim's raw score. Some other information is needed in order to correctly interpret the score. One thing which might help is to know the average score of all the pupils who took the test.

6. Character Generator: Average is 35

Suppose the average is 35. Now you know more than you did before. You know that Jim is above average. But you notice that knowing this isn't enough. You would still like to know, how far above average is he? So let's look at some possible outcomes of the testing and see how Jim's score would be interpreted in each case.

7. Chart: Showing two ranges of scores.

Here is an illustration of 2 different possibilities for the way the scores of the class members might be distributed. Each X represents the score of one person, and we're supposing there were 100 people in the class. Notice that for each of the 2 distributions illustrated, as many people scored above 35 as scored

below 35, and more people got 35 than any other single score. The average score for each of these distributions is 35, but notice that the amount of spread between people varies greatly between the 2 illustrations.

8. Character Generator: Jim's score is 40

In the first illustration, there is very little spread. The scores range from 30-40, so Jim has the top score. In the second illustration, there is a very large spread. The scores range from 15-55.

In this distribution, Jim's score would put him in the upper half, but he would be nowhere near the top as he would if the distribution was like the first illustration.

9. Character Generator: Standard Deviation

There is a number that we can use to describe how spread out a distribution is:

The Standard Deviation.

If the standard deviation is small, then the spread of the distribution is small,

like the first illustration. If the standard deviation is large, then the spread is large, like the second illustration.

10. Slide:
Picture illustrating
10th best of 10 people.

For example, a person might be the tenth best on the history test in his class.

11. Slide:
Picture illustrating
10th best of 100 people.

As you can see your evaluation for this score would be different if there were 100 people in the class than if there were 10 people in the class.

Therefore, it seems logical to use some sort of relative ranking procedure which would not depend on knowing how large the class was in order to interpret the score.

12. Slide:
Picture illustrating Jim
beating 90% of class.

13. Character Generator:
90th percentile

For example, you might say that Jim beat 90 percent of his class if he ranked 10th out of 100. Another way is to say Jim is at the 90 percentile. The percentile is probably the most easily understood method of expressing

scores that we will talk about today. All you have to remember is that, for example,

14. Slide: 84th percentile beats 84 percent of students.

If a student is at the 84th percentile in her class, then she beat 84% of the students in her class.

15. Slide: 50th percentile beats 50 percent of students.

Or, if she is at the 50th percentile on a standardized test for 5th graders, then she did better than 50% of the 5th graders who took the test.

Now let's see some of the common abbreviations and the symbols used in describing scores and standard deviations.

16. Character Generator: X or Y

We use a capital letter, usually X or Y, to denote somebody's score on a test. So in our case where Jim got 40 questions right, if we let X represent Jim's score, then

17. Character Generator: X = 40

X = 40. To denote the average score of all the class, we would use a capital X with a bar over it. So in this case,

where the average was 35 we would write, $\bar{X} = 35$.

18. Character Generator: $\bar{X} = 35$

19. Character Generator: Small letter "s"

The standard deviation is always denoted by the small letter s.

20. Slide: Standard Deviation S = 2.00

So if the standard deviation was 2.00, which would be what it was in the first illustration of the spread of the distribution, we would write s = 2.00. Now that we know a little bit about standard deviations, and spread of the distribution, and the common symbols, we can show how these are used in interpreting and expressing test scores.

To do this, let's look at illustrations of two possible distributions of test scores in a class of 100 people.

21. Character Generator: $\bar{X} = 35$

The average score for each of these distributions is 35.

22. Slide: Picture illustrating computation of average.

The average, of course is computed by adding up all of the scores, and dividing by the number of scores.

23. Character Generator:
S = 2.00

The standard deviation of the top distribution is 2.00.

24. Character Generator:
S = 5.00

And the standard deviation of the bottom distribution is 5.00.

25. Slide:
Picture showing standard deviation formula.

The standard deviation is computed by using a formula involving all of the test scores, just as the average is; but the formula is much more complicated, so I won't bother asking you to remember it. When you give tests the test maker of standardized tests will tell you the average and standard deviation, and if you have a test scoring service like we do here at ISU, they will compute the average and standard deviation of your classroom tests for you if you use a multiple-choice test with the special answer sheets for computer scoring.

26. Slide:
Picture of John

Now suppose John got a score which is one standard deviation above the mean.

27. Slide:
Picture illustrating 2 points above the mean.

If the distribution was like this,

then John was 2 points above the mean, and the mean was 35, so John got 37 right. If we count the number of people John beat on this test, we could find John beat 84% of the people in the class.

28. Character Generator: John's score is 37.

29. Character Generator: 84th percentile

So John is at the 84th percentile.

30. Chart: Chart of standard deviation.

Now let's look at this other distribution. If John had scored one standard deviation above the mean on the test where the distribution of the class's scores looked like this, then John would have scored 5 points above the mean of 35, so he would have a score of 40. Again, if we count how many people John beat on this test, we find that John beat 84%.

31. Character Generator: 84%

32. Slide: Standard deviation equals the 84th percentile.

So in two examples shown here, we've seen that a score which is one standard deviation above the mean is at the 84th percentile.

33. Slide: Picture showing normal distribution

This is no coincidence. If the distribution has this shape, which is called

a normal distribution, then it will always be true that someone who scores one standard deviation above the mean will beat 84% of the people who take the test. This leads us to another way of expressing scores called standard scores or Z scores. A person's Z score is simply the number of standard deviations above the mean that he scores on a test.

34. Character Generator: Z Scores

35. Chart: Chart of standard deviation

36. Character Generator: X = 40, S = 10, X = 50

37. Character Generator: Z = +1

38. Character Generator: Z = -1

39. Character Generator: Z = -.5

For example, in this illustration where the mean is 40 and the standard deviation is 10, a person who scored 50 would be 10 points above the mean. This means he would be one standard deviation above the mean, so he would have a Z score of +1. If he scored 30 on the test, he would be 10 points below the mean, so he would have a Z score of -1. If he scored 35, he would be ½ a standard deviation below the mean. He would have a Z score of -.05.

Now let's look at a situation where it might be useful to think in terms of

standard scores. Suppose you gave your class two tests. One was in arithmetic, the other in spelling. Now suppose the distributions for the tests turned out like this illustration, where for the arithmetic test the mean was 30 and the standard deviation was 10,

40. Slide:
Arithmetic
$\bar{X} = 30$
$s = 10$

41. Slide:
Spelling
$\bar{X} = 50$
$s = 10$

while for the spelling test the mean was 50 and the standard deviation was 10.

42. Slide:
Picture of Mary

Now if Mary got a score of 40 on Arithmetic and 50 on spelling,

43. Character Generator:
Arithmetic X = 40
Spelling X = 60

Which is Mary better in, Arithmetic or spelling? In order to answer this, you would like to know Mary's percentile rank on each test.

44. Chart:
Chart showing arithmetic and spelling deviations

To get this, you could count up the number of people she beat on each test, but if the class is large this might take a lot of time. An easier way to proceed is to notice that Mary is 10 points above the mean on the arithmetic test. Since 10 points, is the standard deviation on that test, Mary is one standard deviation above the mean; in

other words, her

45. Character Generator:
Z = +1
+1 = 84%

Z score is +1 and she is in the 84th percentile. On the spelling test, her score of 60 is 10 points above the mean of 50. 10 points is one standard deviation on the spelling test, so she has

46. Character Generator:
Z = +1
+1 = 84%

a Z score of +1 and a percentile rank of 84. So Mary beat 84% of the class on each test, so she did equally well on each test compared to the rest of the class.

All this is very simple so far, when a student scores one standard deviation above the mean, but what if he gets some other score? What would his percentile rank be?

47. Chart:
Chart to illustrate
Z scores.

If we look at this illustration, we can see that if a person has a Z score of +1 he has beat 84% of the people who took the test.

48. Character Generator:
16% of the people.

That means that the other 16% of the people beat him. So this area contains 16% of the people, since the distribution

is symmetrical, then 16% of the people are down here. So a person who got this score, which is one standard deviation below the mean is at the 16th percentile.

49. Character Generator: Percentile rank of 16.

So a Z score of -1 is equivalent to a percentile rank of 16. Now a person has a Z score of -2, then he will beat 2% of the people, and will be at the 2nd percentile. So if someone has a Z score of +2, then that means 2% of the people beat him, and he beats 98% and is in the 98th percentile.

50. Character Generator: 98th percentile.

51. Slide:
Z = 0
Beats 50%

The easiest case to remember is that of the average person who scores no standard deviations above the mean, and therefore has a Z score of 0. Since he is right in the middle, he has beat 50% of the people who took the test, and the other 50% of the people beat him. He is at the 50th percentile.

Now I told you that Z scores are useful in cases where we know the mean and

standard deviation of a test, but we don't want to count up the number of people that each person beat in order to find their percentile ranks.

52. Slide:
$\bar{X} = 100$
$S = ?$

A good example is the IQ test. All IQ tests have a mean of 100, but different standard deviations.

53. Slide:
Stanford Binet
$\bar{X} = 100$
$s = 16$

One of the most common IQ tests is called the Stanford-Binet, and it has a standard deviation of 16. So if you take an IQ test, and the results show that you have an IQ of 116, then you are 16 points above the average of 100. 16 points is one standard deviation, so your Z score is +1, and therefore you are at the 84th percentile.

54. Slide:
Pictures showing standard deviation

55. Character Generator:
$Z = +1$, 84th percentile

56. Slide:
Picture showing standard deviation with IQ 132

If your IQ is 132, then you are 32 points above average, which is 2 standard deviations. Therefore, you scored higher than 98% of the population.

58. Slide:
Picture showing
standard deviation with IQ of 84

59. Character Generator:
Z = -1, 16th percentile

If your score was 84, then you were 16 points below the mean, so your Z score was -1, and you are in the 16th percentile.

60. WOI Graphics:
1. Averages
2. Distribution
3. Standard deviation
4. Percentile rank
5. Z scores

Today we have talked about averages,
distributions
standard deviations
percentile rank
and
Z scores or standard scores.
I hope you will be able to use this information the next time you are called on to do some interpretation of test scores.

APPENDIX B: SURVEY OF STUDY HABITS AND ATTITUDES

Survey of Study Habits and Attitudes

Answer the questions in terms of a five-point scale, defined on a percentage basis as follows:

1. RARELY means from 0 - 15 percent of the time.
2. SOMETIMES means from 16 - 35 percent of the time.
3. FREQUENTLY means from 36 - 65 percent of the time.
4. GENERALLY means from 66 - 85 percent of the time.
5. ALMOST ALWAYS means from 86 - 100 percent of the time.

1. I feel that teachers lack understanding of the needs and interests of students.

2. My dislike for certain teachers causes me to neglect my school work.

3. My teachers succeed in making their subjects interesting and meaningful to me.

4. I feel that I would study harder if I were given more freedom to choose courses that I like.

5. Whether I like a course or not, I still work hard to make a good grade.

6. When my assigned homework is extra long or unusually difficult, I become discouraged and either quit in disgust or skip hurriedly through the assignment, studying only the easier parts of the lesson.

7. In preparing reports, themes, term papers, etc., I make certain that I clearly understand what is wanted before I begin work.

8. Difficulty in expressing myself in writing slows me down on reports, themes, examinations, and other work to be turned in.

9. My teachers criticize my written reports as being hastily written or poorly organized.

10. I feel that teachers allow their personal like or dislike for a student to influence their grading unduly.

11. I believe that the easiest way to get good grades is to agree with everything your teachers say.

12. I think that teachers like to exercise their authority too much.

13. I feel that teachers are too rigid and narrow-minded.

14. I lose interest in my studies after the first few days of a new semester.

15. I believe that teachers truly want their students to like them.

16. I give special attention to neatness on themes, reports, and other work to be turned in.

17. I memorize grammatical rules, definitions of technical terms, formulas, etc., without really understanding them.

18. I hesitate to ask a teacher for further explanation of an assignment that is not clear to me.

19. I feel that students are not given enough freedom in selecting their own topics for themes and reports.

20. I think that teachers expect students to do too much studying outside of class.

21. Lack of interest in my school work makes it difficult for me to keep my attention focused on assigned reading.

22. Unless I really like a course, I believe in doing only enough to get a passing grade.

23. I get nervous and confused when taking an examination and fail to answer questions to the best of my ability.

24. I have trouble with the mechanics of English composition.

25. When explaining a lesson or answering questions, my teachers use words that I do not understand.

26. When I get behind in my school work for some unavoidable reason, I make up back assignments without prompting from the teacher.

27. I feel confused and undecided as to what my educational and vocational goals should be.

28. Some of my courses are so uninteresting that I have to "force" myself to do the assignments.

29. When I am under pressure, my work is inferior in quality.

30. My teachers fail to give sufficient explanation of the materials they are trying to teach.

31. Daydreaming about dates, future plans, etc., distracts my attention from my lessons while I am studying.

32. I believe that having a good time and getting one's full share of fun out of life is more important than studying.

33. Even though an assignment is dull and boring, I stick to it until it is completed.

34. In taking notes, I tend to take down material which later turns out to be unimportant.

35. I feel that teachers are overbearing and conceited in their relations with students.

36. I believe that teachers secretly enjoy giving their students a "hard time."

37. I think that teachers tend to talk too much.

38. I keep all the notes for each subject together, carefully arranging them in some logical order.

39. When I am having difficulty with my school work, I try to talk over the trouble with the teacher.

40. I feel that teachers try to distribute their attention and assistance equally amongst all their students.

41. I believe that teachers tend to avoid discussing present-day issues and events with their class.

42. The illustrations, examples, and explanations given by my teachers are too dry and technical.

43. I feel that teachers tend to be sarcastic towards their poorer students and ridicule their mistakes excessively.

44. I feel that my grades are a fairly accurate reflection of my ability.

45. I doubt that it is worth the time, money, and effort that one must expend to get a college education.

46. Difficulty in assembling ideas with order and clearness within a brief amount of time results in my doing poorly on examinations.

47. Some of my classes are so boring that I spend the class period drawing pictures, writing letters, or daydreaming instead of listening to the teacher.

48. I lay aside returned examinations, reports, and homework assignments without bothering to correct errors noted by the instructor.

49. I keep my place of study business-like and cleared of unnecessary or distracting items such as pictures, letters, mementos, etc.

50. Telephone calls, people coming in and out of my room, "bull-sessions" with my friends, etc., interfere with my studying.

51. It takes a long time for me to get warmed up to the task of studying.

52. I am unable to concentrate well because of periods of restlessness, moodiness, or "having the blues."

53. I put off writing themes, reports, term papers, etc., until the last minute.

54. I feel that I am taking courses that are of little practical value to me.

55. I believe that the sole purpose of education should be to equip students to make a living.

56. When I sit down to study I find myself too tired, bored, or sleepy to study efficiently.

57. I feel that teachers make their courses too difficult for the average student.

58. I strive to develop a sincere interest in every course I take.

59. The prestige of having a college education provides my main motive for going to college.

60. I believe that a college's football reputation is just as important as its academic standing.

61. I think that football coaches contribute more to school life than do the teachers.

62. I feel that teachers lose sight of the real objectives of education as a consequence of the overemphasis on grades.

63. I think that it might be best for me to drop out of school and get a job.

64. I feel that the things taught in school do not prepare one to meet adult problems.

65. I skip over the figures, graphs, and tables in a reading assignment.

66. Prolonged reading or study gives me a headache.

67. After reading several pages of an assignment, I am unable to recall what I have just read.

68. I feel like cutting classes whenever there is something I'd rather do or whenever I need to cram for a test.

69. I think that students who ask questions and offer comments in class are only trying to impress the teacher.

70. I believe that grades are based upon a student's ability to memorize facts rather than upon the ability to "think."

71. I waste too much time "chewing the fat," reading magazines, listening to the radio, going to the movies, etc., for the good of my studies.

72. My studying is done in a random, unplanned manner--is impelled mostly by the demands of approaching classes.

73. "Extracurricular activities"--dating, clubs, athletics, fraternity and sorority activities, etc.--cause me to get behind in my school work.

74. I believe that teachers intentionally schedule tests on the days following important athletic or social activities.

75. I utilize the vacant hours between classes for studying so as to reduce the evening's work.

76. Problems outside of school--financial difficulties, being in love, conflict with parents, etc.--cause me to neglect my school work.

77. I complete my homework assignments on time.

78. I have difficulty in picking out the important points of a reading assignment--points that are later asked on examinations.

79. When in doubt about the proper form for a written report, I refer to an approved model to provide a guide to follow.

80. I like to have a radio or phonograph playing while I'm studying.

81. When reading a long textbook assignment, I stop after each major section and mentally review the main points that have been presented.

82. I seem to accomplish very little in relation to the amount of time I spend studying.

83. I believe that one way to get good grades is by using flattery on your teachers.

84. With me, studying is a hit-or-miss proposition depending on the mood I'm in.

85. I study three or more hours per day outside of class.

86. At the beginning of a study period I set up a goal as to how much material I will cover.

87. I feel that it is almost impossible for the average student to do all of his assigned homework.

88. I can concentrate on a reading assignment for only a short while before the words become a meaningless jumble.

89. I feel that the ridiculous assignments made by teachers is the main reason for student cheating.

90. I copy the diagrams, drawings, tables, and other illustrations that the instructor puts on the blackboard.

91. I keep my assignment up to date by doing my work regularly from day to day.

92. I prefer to study my lessons alone rather than with others.

93. I lost points on true-false multiple-choice examinations because I change my original answer only to discover later that I was right the first time.

94. When preparing for an examination I arrange facts to be learned in some logical order--order of importance, order of presentation in class or textbook, order of time in history, etc.

95. I am careless of spelling and the mechanics of English composition when answering examination questions.

96. Although I work until the last possible minute, I am unable to finish examinations within the allotted time.

97. If time is available, I take a few minutes to check over my answers before turning in my examination paper.

98. When tests are returned, I find that my grade has been lowered by careless mistakes.

99. I feel that students cannot be expected to like most teachers.

100. I believe that teachers enter their profession mainly because they enjoy teaching.

101. At the beginning of a study period I organize my work so that I will utilize the time most effectively.

102. During the examinations I either "freeze up" or "blow up" and fail to do my best.

APPENDIX C: TELEVISION INSTRUCTOR RATING

TELEVISION INSTRUCTOR RATING

Please rate your television instructor on the points listed below. This will provide feedback for the improvement of the techniques necessary for effective television instruction.

INSTRUCTIONS:
A) On the answer sheet, indicate the name and number of the course and section.
B) Enter your name.
C) Use a pencil; do NOT use ink.
D) Please respond to all items. Some will represent situations not observable in this lesson. Your responses will help in establishing impressions given by the instructor.

NOTE - E) Do NOT use the identification block on the answer sheet; start with item number 1.

ITEMS:

1) I have taken this course:
1/A to meet a general college requirement.
2/B because it is required in my major.
3/C because it is my major, although not required.
4/D as an elective course not in my major.

2) My classification is: 1/A Frosh. 2/B Soph. 3/C Jr. 4/D Sr. 5/E Grad.

3) My sex is: 1/A Male. 2/B Female.

4) I am taking this course: 1/A for regular (A-F) grade. 2/B Pass/NP.

Please use the following five point scale to rate your instructor. The rating indicates how you believe this instructor would compare with all other instructors you have had at ISU.

1/A	Far Below Average	(among the lowest 10%)
2/B	Below Average	(among the next 20%)
3/C	Average	(among the middle 40%)
4/D	Above Average	(among the next 20%)
5/E	Far Above Average	(among the top 10%)

		INSTRUCTOR
5)	ORGANIZATION/PLANNING	organized and planned the lesson well.
6)	LESSON TIME EFFICIENCY	used lesson time efficiently.
7)	PREPAREDNESS	was well prepared for this lesson.
8)	INTEREST	was interested and enthusiastic.
9)	ORAL PRESENTATION	spoke loudly enough and enunciated clearly.
10)	GRAPHIC PRESENTATION	visual materials were understandable and clearly legible.
11)	EXPLANATIONS	explained material clearly.
12)	RELEVANCE	showed the relevance of the material.
13)	RESPECT	would show respect for students.
14)	TOLERANCE	would be tolerant of weak students, or those with differing opinions.
15)	FAIRNESS	would be fair to students.
16)	AVAILABILITY	would try to be available to students outside class.

17) EXPECTATIONS — matched the level of the material to the ability of the class.

OMIT 18) and 19) please remember to skip to item 20 on your answer sheet.

20) EVALUATION — would present clear, fair, and appropriate evaluation procedures for assessing student performance.

21) OVERALL INSTRUCTOR RATING — compared to all other instructors.

- THE PRESENTATION -

22) The presentation effectively used appropriate pictures, diagrams and other graphics.
- 1/A Ineffective
- 2/B Below Average
- 3/C Moderately Effective
- 4/D Above Average
- 5/E Highly Effective

23) This use of television was an effective method of presenting the concepts in this lesson.
- 1/A Ineffective
- 2/B Below Average
- 3/C Moderately Effective
- 4/D Above Average
- 5/E Highly Effective

24) Your position in the classroom made viewing and/or hearing:
- 1/A Extremely Difficult.
- 2/B Barely Adequate.
- 3/C Adequate.
- 4/D Good.
- 5/E Perfect.

25) Viewing of videotaped television instruction.
- 1/A This was your first lesson using videotape for an instructional presentation.
- 2/B You had previously been in a class that used videotape for an instructional presentation.

26) Have you ever met the television instructor, or been taught by him before this lesson?
- 1/A Yes
- 2/B No

APPENDIX D: INTERPRETING TEST SCORES AND GUIDELINES FOR VIDEOTAPE SHOWING AND TEST ADMINISTRATION

PSYCHOLOGY 333 INTERPRETING TEST SCORES

Instructions: Print your name on the answer sheet only. Also, indicate your section number for this course. Remember to use pencil.

1. A teacher received his test back from a testing service. Some of the results were: $Y = 29$, $\overline{X} = 36$, $s = 2$, $N = 35$, $s^2 = 4$
What was the average for the test?
a) 29 b) 36 c) 2 d) 35 e) 4

Questions 2 - 7 refer to the following data, which represent John Peterson's test scores, and the national norms.

National norms	Math	Spelling	Reading	LA
average	40	80	90	60
standard deviation	10	20	20	10
John's scores	20	120	90	75

2. Using national norms, it appears that John is best in
a) math b) spelling c) reading d) LA

3. Using national norms, John's z-score in math is
a) -2 b) -1 c) -0.5 d) 0

4. Using national norms, what is John's percentile rank in reading?
a) 16 b) 50 c) 84 d) 98

5. John is about at the 98th percentile in
a) math b) spelling c) reading d) LA

6. In math, John is better than what percentage of the people who took the test?
a) 2 b) 16 c) 34 d) 50 e) 84

7. In LA John has a z-score of
a) 0 b) +.5 c) +1.0 d) +1.5

8. On a history test, Jean scored at the 70th percentile and Millie at the 35th percentile. Compared to Millie, Jean:
a) correctly answered twice as many items
b) knows twice as much history
c) answered 35% more items correctly
d) answered 35 more items correctly
e) none of these

9. Pete Placid obtains a score of 60 on an exam that has a mean of 50 and a standard deviation of 5 points. Assuming a normal distribution of scores:

a) Pete's performance is very good
b) not enough information is provided to assess Pete's performance
c) Pete's performance is average
d) a standard deviation of 5 showed that the test is not reliable.

10. A sixth grade class of 34 students took a standardized achievement test which contained 125 questions. Pete got 68 questions right. What is the most precise determination of Pete's standing that we can make from this information?
    a) We can't tell anything important
    b) Pete is at least average, and maybe above average.
    c) There is a 20% chance that Pete is below average.
    d) Pete is in the lower half of his class.
    e) Pete is in the lower half of the nation.

11. In a normal distribution, a z-score of +1.00 is equivalent to a percentile rank of:
    a) 34
    b) 50
    c) 84
    d) 98
    e) 16

12. If test scores are distributed normally, what percent of the scores will <u>exceed</u> a score falling one standard deviation below the mean?
    a) 68%
    b) 84%
    c) 98%
    d) 16%
    e) 34%

Guidelines for Videotape Showing and Test Administration

For Treatment Groups

1. Explain:

   a. There will be a videotape presenting material concerning the interpretation of test scores.

   b. There will be a test after the videotape. It will be closed book and closed notes.

   c. The five students scoring highest will receive extra credit for the course.

   d. Note taking may be helpful since there will be a test over the material later in the quarter.

2. Ask students to position themselves in the classroom for best viewing.

3. Show videotape selected for the group.

4. Achievement Test

   a. Remind students it is closed book and closed notes.

   b. Distribute scoring sheets, pencils and test.

   c. Allow time for everyone to finish.

5. Instructor Evaluation

   a. Remind students that the evaluation is to assist the producers in improving future videotape presentations.

   b. Explain that some of the items may be difficult to answer. However, their impressions will aid in the assessment of the videotape.

For Pretest Groups

1. Explain:

   a. There will be a videotape presenting material concerning the interpretation of test scores.

b. Note taking may be helpful since there will be a test over the material later in the quarter.

c. There will also be a closed book, closed note test over the material before viewing the videotape. This will help to sensitize them to the contents which may aid in learning the material.

d. The five students scoring highest will receive extra credit for the course.

2. Ask students to position themselves in the classroom for best viewing.

3. Show one of the videotapes.

APPENDIX E: CODING OF VARIABLES

Coding of variables as seen in the correlation matrix

Code name variable	Description of variable
YRSH	Year in school.
SEX	Male or female.
INORG	Planned the lesson well.
ITIM	Used lesson time efficiently.
IPRP	Instructor was well prepared.
IINT	Was interested and enthusiastic.
IORL	Instructor's speaking presentation.
IGRF	Instructor's graphic presentation.
IXPL	Material explained clearly by instructor.
IRLV	Instructor showed the relevance of the material.
IRSPT	Would show respect for students.
ITOL	Would show tolerance for students.
IFAIR	Would be fair to students.
IVAIL	Would try to be available to students.
IABLE	Matched material to ability of the class.
IEVAL	Instructor would assess student fairly.
IRAT	Overall instructor rating
IPIC	Presentation used graphics effectively.
ITPE	Television effectiveness in presenting the content.
VIEW	Classroom position for viewing.
ITVU	Student had used instructional television before.
DAVE	Knew the television instructor.
ACH	Student score on the achievement test.
BHDA	Survey score of delay avoidance.
BHWM	Survey score of work methods.
BHSH	Survey score of study habits.
BHTA	Survey score of teacher approval.
BHEA	Survey score of educational acceptance.
BHSA	Survey score of study attitudes.
BHSO	Survey score of study orientation.
GPA	Student college grade point average.

APPENDIX F: CORRELATION TABLES

Table 21. Correlation matrix for teaching format one[a]

Variables[b]	1	2	3	4	5	6	7	8	9	10	11	12
1												
2	-39											
3	-21	20										
4	-16	18	67									
5	-10	18	72	73								
6	-26	00	20	22	26							
7	-28	18	55	61	67	25						
8	-36	21	47	42	52	32	63					
9	-24	17	50	60	55	37	52	57				
10	-27	02	43	39	47	55	36	49	57			
11	-35	07	49	40	44	51	39	42	59	61		
12	-25	02	43	36	40	41	41	43	46	44	68	
13	-10	06	44	37	45	39	26	28	49	43	69	69
14	-14	05	30	32	29	33	18	17	38	47	72	63
15	-14	13	22	35	29	30	35	19	38	20	33	16
16	-08	19	37	47	42	22	57	46	42	41	46	43
17	-30	15	49	42	52	33	59	51	44	28	51	46
18	-17	09	30	40	41	39	57	80	56	60	41	40
19	-23	05	38	52	43	35	50	49	60	50	42	36
20	-22	32	13	17	08	15	30	31	24	14	15	09
21	17	-22	-09	-00	-04	-32	01	-02	-08	-21	-14	07
22	-04	29	10	-02	11	04	07	-04	08	09	10	04
23	-07	-04	21	43	41	19	26	27	42	50	21	04
24	03	36	-09	-14	-09	-01	-20	05	-06	-09	-16	-21
25	-03	44	10	08	08	-01	-11	00	-10	-04	-10	-13
26	00	46	01	-04	00	-01	-17	03	-09	-08	-15	-19
27	-01	21	00	02	03	-08	-10	-06	-23	-18	-14	-07
28	01	29	-07	03	-05	06	-14	-04	-08	00	-13	-19
29	00	27	-04	03	00	-02	-14	-05	-19	-12	-15	-14
30	00	40	-01	-01	-01	-01	-17	-01	-15	-10	-16	-18
31	-01	16	30	16	23	05	14	00	07	18	11	06

[a]Correlations without decimals.

[b]1 = YRSH; 2 = SEX; 3 = INORG; 4 = ITIM; 5 = IPRP; 6= IINT; 7 = IORL; 8 = IGRF; 9 = IXPL; 10 = IRLV; 11 = IRSPT; 12 = ITOL; 13 = IFAIR; 14 = IVAIL; 15 = IABLE; 16 = IEVAL; 17 = IRAT; 18 = IPIC; 19 = ITPE; 20 = VIEW; 21 = ITVU; 22 = DAVE; 23 = ACH; 24 = BHDA; 25 = BHWM; 26 = BHSH; 27 = BHTA; 28 = BHEA; 29 = BHSA; 30 = BHSO; 31 = GPA.

13	14	15	16	17	18	19	20	21	22	23	24
76											
21	28										
29	44	36									
44	35	26	41								
30	26	24	51	41							
22	30	33	39	45	63						
03	10	13	28	22	37	43					
-09	01	-19	06	01	-10	-10	-23				
08	04	07	10	-02	11	03	31	-09			
10	09	35	30	14	33	42	17	-07	-06		
05	-08	06	-17	-26	05	-22	00	-24	22	-02	
03	-02	14	02	-04	00	-22	-07	-17	-22	05	53
04	-06	11	-09	-17	02	-25	-04	-23	25	02	88
05	07	12	05	-10	-07	-22	04	02	05	-04	38
-01	02	27	-07	-19	04	-08	14	-21	19	16	71
03	05	21	-01	-16	-03	-18	09	-09	13	06	60
03	-01	17	-05	-18	00	-23	03	-17	20	04	79
02	-02	22	-07	02	-09	09	23	-04	06	22	-13

Variables	25	26	27	28	29	30	31
26	88						
27	68	61					
28	59	74	58				
29	72	75	91	87			
30	85	94	80	86	93		
31	08	-03	01	14	08	03	

Table 22. Correlation matrix for teaching format two[a]

Variables[b]	1	2	3	4	5	6	7	8	9	10	11	12
1												
2	-34											
3	06	07										
4	-03	-14	78									
5	-08	04	64	72								
6	-11	-12	20	26	29							
7	-10	08	33	28	40	55						
8	04	09	30	29	41	17	53					
9	13	-10	49	50	34	13	30	44				
10	18	05	27	23	14	21	21	24	62			
11	-14	08	21	09	17	46	30	25	23	20		
12	-13	13	-04	-15	-10	38	10	05	00	09	75	
13	-23	22	16	03	18	35	23	20	11	17	78	81
14	-15	12	20	08	06	42	27	30	26	18	72	68
15	-16	25	34	23	15	41	41	28	39	38	59	40
16	-38	09	11	04	06	19	13	07	01	10	41	44
17	-07	09	19	25	16	54	35	22	41	44	38	29
18	-17	02	45	44	63	30	39	54	33	18	30	06
19	-05	-14	49	41	34	26	45	49	33	19	27	12
20	-05	-14	23	23	19	10	26	28	20	-04	18	05
21	16	-23	20	12	10	08	00	-08	14	11	08	01
22	-02	05	26	44	22	00	08	13	23	13	-19	-21
23	23	-30	01	00	-10	07	-03	00	26	19	-02	-16
24	-03	12	-02	07	03	-13	-06	-02	12	02	04	-01
25	-09	22	00	03	-03	-04	07	26	31	07	17	20
26	-06	19	00	06	00	-10	00	13	24	05	12	10
27	11	08	-03	-07	03	-04	-02	00	20	03	-11	01
28	03	15	-02	-03	-02	-07	-01	-02	31	09	-05	-04
29	05	10	01	03	05	02	01	00	28	08	-08	-01
30	-01	16	01	05	03	-05	01	07	29	07	02	05
31	-17	03	-02	08	12	-08	-29	-30	-06	-25	-23	-24

[a]Correlations without decimals.

[b]1 = YRSH; 2 = SEX; 3 = INORG; 4 = ITIM; 5 = IPRP; 6 = IINT; 7 = IORL; 8 = IGRF; 9 = IXPL; 10 = IRLV; 11 = IRSPT; 12 = ITOL; 13 = IFAIR; 14 = IVAIL; 15 = IABLE; 16 = IEVAL; 17 = IRAT; 18 = IPIC; 19 = ITPE; 20 = VIEW; 21 = ITVU; 22 = DAVE; 23 = ACH; 24 = BHDA; 25 = BHWM; 26 = BHSH; 27 = BHTA; 28 = BHEA; 29 = BHSA; 30 = BHSO; 31 = GPA.

13	14	15	16	17	18	19	20	21	22	23	
64											
55	67										
43	43	34									
18	21	34	-02								
32	12	25	27	26							
23	27	35	33	23	57						
06	16	10	13	08	35	26					
-01	07	08	-06	05	-12	11	-10				
-11	-06	06	-17	05	09	05	-04	-08			
-11	04	15	10	-04	03	24	00	-05	-10		
00	08	02	11	-04	06	-14	01	-06	03	-11	
21	20	21	-04	15	08	02	13	-08	18	07	61
11	15	12	05	06	08	-07	07	-07	12	-02	91
00	04	-03	-21	11	12	-15	21	-14	19	-01	40
-07	10	06	-10	06	02	-16	17	-04	-06	06	71
-03	07	02	-19	17	11	-15	20	-12	17	04	55
05	12	08	-08	13	10	-12	15	-11	16	01	82
-19	-22	-06	17	-24	-09	-04	-25	-08	-03	33	04

Variables	25	26	27	28	29	30	31
26	89						
27	40	44					
28	57	72	70				
29	49	58	95	84			
30	78	89	78	88	88		
31	-02	01	-10	-03	-09	-04	

Table 23. Correlation matrix for teaching format three[a]

Variables[b]	1	2	3	4	5	6	7	8	9	10	11	12
1												
2	-40											
3	-09	11										
4	-03	08	61									
5	-07	38	66	80								
6	-18	14	33	40	45							
7	-27	33	40	31	52	45						
8	05	00	26	39	23	03	06					
9	-09	05	50	46	45	15	45	32				
10	-12	28	49	40	52	21	32	29	46			
11	19	20	21	29	35	30	38	17	31	21		
12	04	32	27	11	30	19	30	06	22	36	59	
13	00	30	26	12	27	28	25	09	26	30	60	92
14	01	38	25	12	34	27	32	18	17	41	49	79
15	05	29	43	40	46	17	39	39	60	48	42	35
16	-15	21	38	32	34	23	19	39	40	40	16	15
17	10	02	40	46	50	41	54	30	70	41	53	41
18	15	07	22	63	40	34	07	62	22	29	22	02
19	12	-15	21	34	19	31	-04	23	32	31	12	04
20	-03	-08	30	08	14	10	08	22	42	55	19	20
21	33	-28	-13	-06	-25	02	-24	00	01	-29	-10	-18
22	-16	23	19	25	28	29	17	00	-10	10	00	09
23	04	-04	22	28	10	15	-07	06	07	01	-14	-12
24	17	04	19	-02	11	03	09	-07	11	26	23	28
25	18	10	15	07	10	-01	-09	01	00	12	20	08
26	19	07	19	02	11	02	02	-04	08	22	24	22
27	15	-15	-02	14	21	24	21	-10	08	02	15	09
28	20	-06	10	-8	15	00	15	-03	19	06	10	-02
29	18	-12	04	12	20	14	20	-07	14	05	14	04
30	21	02	13	08	17	09	12	-06	12	15	21	15
31	-04	03	08	18	07	06	-01	34	32	-04	-11	-16

[a]Correlations without decimals.

[b]1 = YRSH; 2 = SEX; 3 = INORG; 4 = ITIM; 5 = IPRP; 6 = IINT; 7 = IORL; 8 = IGRF; 9 = IXPL; 10 = IRLV; 11 = IRSPT; 12 = ITOL; 13 = IFAIR; 14 = IVAIL; 15 = IABLE; 16 = IEVAL; 17 = IRAT; 18 = IPIC; 19 = ITPE; 20 = VIEW; 21 = ITVU; 22 = DAVE; 23 = ACH; 24 = BHDA; 25 = BHWM; 26 = BHSH; 27 = BHTA; 28 = BHEA; 29 = BHSA; 30 = BHSO; 31 = GPA.

13	14	15	16	17	18	19	20	21	22	23	24
84											
37	40										
23	33	68									
47	42	51	32								
08	13	47	39	33							
18	06	21	11	31	42						
24	19	26	27	29	10	42					
-14	-17	-11	-03	-10	01	09	-07				
12	06	-01	05	01	18	17	-18	-19			
-08	-07	14	04	01	30	35	-16	11	15		
30	36	27	19	20	04	08	24	19	-23	-15	
08	16	23	16	-07	16	02	13	16	-31	-03	63
23	30	28	20	10	10	06	21	20	-29	-11	94
06	09	26	18	10	13	-03	05	22	-20	-22	41
00	09	32	15	23	07	05	09	17	-27	-22	72
04	10	32	19	17	12	00	08	21	-25	-25	60
15	23	33	21	15	12	04	16	23	-30	-20	86
-14	-12	27	18	13	27	10	-19	20	-04	30	12

Variables	25	26	27	28	29	30	31
26	86						
27	38	44					
28	59	73	67				
29	52	62	93	90			
30	77	90	75	91	90		
31	12	13	-12	14	00	08	

APPENDIX G: TABLES OF VARIABLES THAT PREDICT ACHIEVEMENT, OVERALL INSTRUCTOR RATING, AND TAPE EFFECTIVENESS RATING

Table 24. Variables that predict achievement[a]

Treatment one			Treatment two			Treatment three		
Variable	R	R^2	Variable	R	R^2	Variable	R	R^2
IRLV	0.50	0.25	GPA	0.33	0.11	ITPE	0.35	0.12
IABLE	0.56	0.31	SEX	0.45	0.21	VIEW	0.49	0.24
IVAIL	0.60	0.36	IRLV	0.54	0.30	INORG	0.55	0.30
ITIM	0.64	0.41	IPRP	0.58	0.33	BHEA	0.60	0.36
INORG	0.66	0.44	ITPE	0.62	0.38	GPA	0.63	0.39
IINT	0.69	0.46	YRSH	0.64	0.41	IRSPT	0.64	0.41
IPRP	0.69	0.47	BHSA	0.65	0.41	BHWM	0.66	0.43
IORL	0.70	0.49	BHDA	0.67	0.45	IABL	0.67	0.46
VIEW	0.71	0.50	BHTA	0.70	0.49	IGRF	0.69	0.47
DAVE	0.73	0.51	IPIC	0.71	0.51	IPIC	0.70	0.48
SEX	0.73	0.54	BHWM	0.73	0.53	DAVE	0.71	0.50
BHEA	0.74	0.55	IRAT	0.75	0.56	IPRP	0.71	0.51
IEVAL	0.75	0.56	IEVAL	0.76	0.57	IEVAL	0.72	0.52
IPIC	0.75	0.56	ITOL	0.77	0.60	ITVU	0.72	0.52
IXPL	0.76	0.58	IRSPT	0.80	0.63	IFAIR	0.73	0.53
ITPE	0.76	0.58	INORG	0.81	0.65	IVAIL	0.74	0.55
BHSH	0.77	0.59	IVAIL	0.82	0.66	IRLV	0.74	0.55
ITVU	0.77	0.59	IXPL	0.82	0.69	ITIM	0.75	0.56
BHSO	0.77	0.60	IGRF	0.83	0.69	IRAT	0.75	0.56
YRSH	0.78	0.60	ITVU	0.83	0.69	IXPL	0.75	0.56
IFAIR	0.78	0.61	VIEW	0.84	0.70			
BHDA	0.78	0.61	DAVE	0.84	0.71			
ITOL	0.78	0.61						
BHTA	0.79	0.62						

[a]Not listed are variables which together account for less than .001 percent of the variance.

Table 25. Variables that predict overall instructor rating[a]

Treatment one			Treatment two			Treatment three		
Variable	R	R^2	Variable	R	R^2	Variable	R	R^2
IORL	0.59	0.35	IINT	0.54	0.30	IXPL	0.70	0.49
IRSPT	0.66	0.44	IXPL	0.64	0.41	IRSPT	0.77	0.60
IFAIR	0.68	0.46	SEX	0.67	0.45	IINT	0.81	0.65
BHDA	0.69	0.48	GPA	0.69	0.48	YRSH	0.82	0.67
IGRF	0.71	0.51	IVAIL	0.72	0.51	ITVU	0.83	0.70
IRLV	0.73	0.53	ITOL	0.74	0.55	IVAIL	0.85	0.71
BHSH	0.74	0.55	IFAIR	0.77	0.60	BHWM	0.86	0.74
ITPE	0.75	0.57	IRSPT	0.79	0.62	BHEA	0.88	0.77
BHTA	0.76	0.58	IORL	0.80	0.63	BHSA	0.89	0.79
IINT	0.77	0.59	ITPE	0.81	0.65	BHTA	0.90	0.80
ITOL	0.77	0.60	YRSH	0.81	0.66	SEX	0.90	0.81
IXPL	0.78	0.61	IEVAL	0.82	0.67	IPIC	0.91	0.82
IPIC	0.78	0.61	IABL	0.83	0.68	ITPE	0.91	0.83
GPA	0.79	0.62	DAVE	0.83	0.69	INORG	0.91	0.84
ITIM	0.79	0.63	BHTA	0.83	0.69	IFAIR	0.92	0.84
BHEA	0.80	0.63	BHEA	0.85	0.72	IRLV	0.92	0.85
INORG	0.80	0.64	BHSO	0.86	0.74	IORL	0.93	0.86
SEX	0.80	0.64	VIEW	0.86	0.75	IPRP	0.93	0.86
ITVU	0.80	0.65	ITIM	0.87	0.75	GPA	0.93	0.87
IPRP	0.81	0.65	INORG	0.87	0.76	DAVE	0.93	0.87
DAVE	0.81	0.65	IPIC	0.87	0.76			

[a]Not listed are variables which together account for less than .001 percent of the variance.

Table 26. Variables that predict a tape effectiveness rating[a]

Treatment one			Treatment two			Treatment three		
Variable	R	R^2	Variable	R	R^2	Variable	R	R^2
IPIC	0.63	0.39	IPIC	0.57	0.33	IPIC	0.42	0.18
IXPL	0.70	0.48	INORG	0.63	0.39	VIEW	0.56	0.32
BHSH	0.73	0.54	ACH	0.67	0.45	ACH	0.65	0.42
VIEW	0.76	0.57	BHSA	0.70	0.49	DAVE	0.67	0.45
ITIM	0.78	0.60	IORL	0.73	0.53	SEX	0.69	0.47
ACH	0.78	0.61	IPRP	0.75	0.56	IFAIR	0.70	0.49
IGRF	0.79	0.62	ITVU	0.76	0.57	ITOL	0.73	0.53
IRAT	0.79	0.63	IGRF	0.77	0.59	IEVAL	0.74	0.55
IFAIR	0.80	0.64	IEVAL	0.78	0.60	BHEA	0.75	0.57
IVAIL	0.81	0.65	ITIM	0.78	0.61	IVAIL	0.76	0.58
IEVAL	0.82	0.67	IXPL	0.79	0.62	IRLV	0.77	0.59
ITOL	0.82	0.68	GPA	0.79	0.62	INORG	0.77	0.60
BHDA	0.83	0.68	BHDA	0.79	0.63	BHSO	0.78	0.61
INORG	0.83	0.69	IINT	0.80	0.64	IINT	0.79	0.62
IABL	0.83	0.69	ITOL	0.80	0.65	IORL	0.79	0.63
			IRAT	0.81	0.66	ITVU	0.80	0.63
			SEX	0.82	0.66	IPRP	0.80	0.64
			IVAIL	0.82	0.67	BHSA	0.80	0.65
			IRSPT	0.82	0.68	IRAT	0.81	0.66
			BHTA	0.83	0.68	BHTA	0.82	0.67
			IRLV	0.83	0.68	IXPL	0.82	0.68
			IABL	0.83	0.68			

[a]Not listed are variables which together account for less than .001 percent of the variance.

APPENDIX H: TABLES OF ANALYSIS OF VARIANCE

Table 27. Analysis of variance of differences in instructor ratings between males and females for format one

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F	
Within	1	0.11	0.11	0.128	
Residual	59	49.66	0.84		
Total	60	49.77			
			N	$\bar{X}$	S
Males			17	3.59	1.09
Females			44	3.68	0.67

Table 28. Analysis of variance of differences in instructor ratings between males and females for format two

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F	
Within	1	0.92	0.92	1.060	
Residual	54	47.01	0.87		
Total	55	47.93			
			N	$\bar{X}$	S
Males			18	3.72	0.94
Females			38	3.45	0.86

Table 29. Analysis of variance of differences in instructor ratings between males and females for format three

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F	
Within	1	0.74	0.74	1.183	
Residual	50	31.32	0.63		
Total	51	32.06			
			N	$\bar{X}$	S
Males			12	4.08	0.52
Females			40	3.80	0.64

Table 30. Analysis of variance of differences in tape effectiveness rating between males and females for format one

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F	
Within	1	0.86	0.86	1.332	
Residual	59	38.06	0.65		
Total	60	38.92			
			N	$\bar{X}$	S
Males			17	3.24	0.94
Females			44	3.50	0.91

Table 31. Analysis of variance of differences in tape effectiveness rating between males and females for format two

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F	
Within	1	0.36	0.36	0.465	
Residual	54	42.19	0.78		
Total	55	42.55			
			N	$\bar{X}$	S
Males			18	3.22	0.83
Females			38	3.39	0.98

Table 32. Analysis of variance of differences in tape effectiveness rating between males and females for format three

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F	
Within	1	0.005	0.005	0.0152	
Residual	50	18.975	0.380		
Total	51	18.980			
			N	$\bar{X}$	S
Males			12	3.50	0.67
Females			40	3.53	0.82