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This study proposed to examine the effectiveness of television instruction as compared with three other methods of instruction. Twenty-six sections of Speech 116 at Purdue University were divided into five groups of five or six sections each. All sections met 3 times weekly, and the research was conducted during a consecutive 8-day period. The students were exposed to expository material on small group discussion through one of four ways: observing a television lecture, listening to the identical lecture read from a manuscript by their regular instructors, reading the televised lecture individually, or receiving normally scheduled instruction by their instructors. A control group received no instruction on the topic. A true experimental pre-test--post-test control group design was employed, with the use of "t" test and analysis of variance (single factor) procedures. Results showed that televised instruction was just as efficient as the other methods used, and that no method was superior to any other one. Although certain limitations might have influenced the results, it is concluded that there is no reason to condemn television as an inferior method of instruction. (SW)

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SOME EFFECTS OF TELEVISED INSTRUCTION ON A BASIC SPEECH COURSE[1]

Robert S. Goyer and Earl R. Harlan

THE effectiveness (measured by degree of learning) of television as a medium of instruction over a wide spectrum of subject matter content has been well established, although by no means is the verdict unanimous. Though systematic research in this area has employed a variety of study techniques of variable rigor and effectiveness, surveys by Allen[2] and Kumata[3] indicate that learning is typically as great from television instruction as from more conventional methods, and sometimes significantly greater. These results have derived from studies at virtually all grade levels of instruction; the subject matter areas involved in the reports have included primarily the physical and social sciences, the biological sciences, and mathematics. Such research typically has been motivated by the attempt to discover and perfect ways and means of dealing with increased student populations without a commensurate increase in the teaching population.

Although research in our discipline on the effects of televised instruction has not been extensive, some has been reported in the areas of oral interpretation, general communication skills, and fundamentals of public speaking. In addition, Central Michigan Universty in 1960 embarked on an extensive three-year program of teaching its beginning speech course via closed circuit television under a grant from the Ford Foundation. Broadly summarized, the results of these studies suggest that experienced teachers make the most effective television instructors;[4] students can achieve skill in speaking, writing, reading and listening equally well from "normal," "bibliography," or "kinescope" methods of instruction;[5] although students achieved as well from televised instruction as from other conventional instruction, they didn't "like" the former as well as the latter;[6] adapting the basic course to the medium of television resulted in improved dissemination of content materials through better quality lecture-demonstration techniques.

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1 Credit is deserved by many who made contributions to the study on which this report is based. Especially to be noted is the assistance of Professor Bruce Kendall, who prepared and delivered the televised lecture; and Mr. Raymond Wolf, instructional television supervisor at Purdue.

2 William H. Allen, "Audio-Visual Communication," *Encyclopedia of Education Research* (New York: The Macmillan Co., 1960), pp. 115-37.

3 Hideya Kumata, *An Inventory of Instructional Television Research* (Ann Arbor: Educational Television and Radio Center, 1956), 155 p.

Purposes of the Study

The basic question examined in this research was, With the existing physical

4 Martin T. Cobin and Theodore Clevenger, Jr., "Television Instruction, Course Content, and Teaching Experience Level: An Experimental Study in the Basic Course in Oral Interpretation," *Speech Monographs*, XXVIII (March 1961), 16-20.

5 Samuel L. Becker and Carl A. Dallinger, "The Effect of Instructional Methods Upon Achievement and Attitudes in Communication Skills," *Speech Monographs*, XXVII (March 1960), 70-76.

6 King Broadrick, Charles J. McIntyre, and Richard Moren, "TV Teacher's Report," *The Speech Teacher*, XI (March 1962), 153-157.

facilities at Purdue University, can a selected body of expository material typically offered in Speech 116 (Fundamentals of Expression) be offered as effectively by television instruction as by selected other means? "Effective television instruction" is defined here as that which results in measured student achievement which is not significantly different from that obtained with comparable students instructed by other selected means. Specifically, the following hypothesis was generated:

Student achievement as measured will not be different in comparable student groups receiving televised and other forms of instruction concerning expository material pertaining to small group discussion.

Procedures of the Study

Twenty-six sections of Speech 116 were divided into five groups (A, B, C, D, E) of five or six sections each. Students taking the course are assigned to sections by computer on no systematic basis other than the avoidance of schedule conflicts with other courses. At the time of the study, sections ranged in size from 15 to 20 students each. All sections met three times weekly: eighteen met on Monday-Wednesday-Friday, the other eight on Tuesday-Thursday-Saturday. The research was conducted during a consecutive 8-day period.

During the first three days an achievement test measuring knowledge of principles of small group discussion as taught in Speech 116 was administered to all students in all sections. The unit of instruction on small group discussion had *not* been taught as yet by any instructor in the course. The test consisted of 23 items, each one of the multiple-choice objectively scored type. Upon receipt of the test data, difficulty indices and discrimination indices (phi coefficients) were computed for each item. On the basis of this analysis three items were rejected as unsatisfactory, leaving a test of 20-items in length. All papers were then rescored on the basis of this 20-item test, which was subsequently restructured with the identical items and used as the post-treatment test.

During the fifth and sixth days, three groups (A, B, C) of sections as previously divided were exposed to the stimulus material in one of three ways, as follows:

Group A observed a television lecture (videotaped) on the topic of group discussion in one of several television-receiver-equipped classrooms located in the building in which all Speech Department courses are taught at Purdue. This room was not their regular classroom, but almost identical to it physically. The lecture was observed during their regular class period. Six sections comprised Group A. Immediately following the presentation, the post-test was administered.

Group B sections (six in all) *listened* to the identical lecture read from manuscript by their regular instructor, at their regular classroom and meeting time. Immediately following the presentation, the post-test was administered.

Group C sections (five in all) *read* the televised lecture individually and silently to themselves, at their regular classroom and meeting time. During the last 15 minutes of the period, the post-test was administered.

Of the remaining sections, *Group D* (consisting of five sections) received its normally scheduled instruction by its own instructors, which included for all sections in this group the presentation by the individual instructors of the discussion material covered in the televised lecture. These instructors did *not* have access to the televised lecture manuscript, and presumably presented the material in their typical or "normal" manner. All sections in this group received this instruction on the last day; during the last 15 minutes of the period, the post-test was administered.

Group E, consisting of four sections, received *no* instruction on the topic either before or during the research period. Two sections in this group received the post-test during their regular class meeting on the fifth day, and the other two sections during their regular class meeting on the last day.

Analysis of Results

1. *The Test Instrument.* The reliability (internal consistency) of the pre-treatment test form was determined based on the analysis of the combined answer sheets of five sections, one section chosen randomly from each of the five groups (A,B,C,D,E). A similar procedure was employed to determine the reliability of the post-treatment form. The results are noted in Table I.

TABLE I

INTERNAL CONSISTENCY CORRELATION COEFFICIENTS FOR PRE-TREATMENT AND POST-TREATMENT TESTS OF ACHIEVEMENT*

	N	*r*
Pre-Treatment	80	.65 + .07**
Post-Treatment	72	.68 + .06**

*Coefficients computed by the split-half technique, and corrected for length.

**Significantly different from zero beyond the .01 level of confidence.

By employing Fisher's[7] z conversion to each obtained *r*, the standard t-ratio test to measure the significance of the difference between the correlations was computed, producing a *t* value of .305. Since this value does not approach significance, it was concluded that the two forms were equally reliable in the situations employed.

2. *The Hypothesis.* In order to maximize the precision of the analysis, it was decided to select randomly for purposes of comparison the responses of 25 subjects who had completed both tests, from each of the five groups. A summary of the test performances of each group is found in Table II.

Before analyzing the effects of the experimental treatments on learning, the *pre* and *post* scores of the control group were compared for possible significance by means of the t-test for related measures. The computed *t* value was 1.18 (24 d.f.), which does not approach significance. It therefore was concluded that there was no reason to assume that the act of taking the pre-treatment test would significantly affect the post-treatment test scores.

In order to determine the probability that the pre-treatment test samples from each group were indeed from a common population, the *t* test was applied to the difference between the largest mean (Group *D*, 13.00) and the smallest mean (Group *A*, 11.88) on the pre-treatment test scores. The computed value was 1.33 (48 d.f.), which does not approach significance. It was therefore concluded that all the samples used in the experiment were indeed from a common population, based on a comparison of sample means on the pre-treatment test.

As a final precaution before applying the analysis of variance technique to the treatment data, both the pre-treatment and post-treatment test data were

[7] James B. Mayhew, "The Beginning Course in Fundamentals of Speech as Taught by Closed Circuit Instructional Television at Central Michigan University," Mimeographs (Mount Pleasant, Michigan: Central Michigan University, 1963), 9 p.

TABLE II

SUMMARY PERFORMANCE DATA ON PRE-TREATMENT AND POST-TREATMENT TESTS OF ACHIEVEMENT

Group	Score Range		Mean Score		Standard Deviation	
	Pre	Post	Pre	Post	Pre	Post
A	5-19	11-20	11.88	16.28	3.14	2.54
B	6-18	10-18	12.20	15.52	2.51	2.18
C	6-18	13-20	12.52	16.52	2.83	1.77
D	9-19	12-20	13.00	16.08	2.70	2.00
E	8-17	9-18	12.48	13.04	2.79	2.84

examined for homogeneity of variance. Since all samples involved equal numbers of cases, Bartlett's test as described by Edwards[8] was applied, producing results confirming the fact of homogeneity of variance among all samples in the pre-treatment test situation ($x^2 = .04$, with 4 d.f.), and in the post-test situation ($x^2 = 1.2$, with 4 d.f.). Thus, any differences that appeared among the sample means on the post-treatment test could be attributable to the treatment itself.

A simple analysis of variance (single factor) procedure was applied to the data from the experimental samples (Groups A,B,C,D), with results as summarized in Table III.

Clearly, there was no advantage for any one method of presenting the expository material on small group discussion for the students used in this experiment.

The final question to be asked was whether or not the difference between the mean gains in performance for the control group and the experimental groups was significant. In other words, did the treatments have any real effect on the amount of learning that occurred? Since the analysis of variance involved but a single factor, and since the samples were randomly drawn, an appropriate test to employ here was, once again, the *t* test. In this situation the mean gain in test score for the control group (0.56) was compared with the *smallest* mean gain among the four experimental groups, which was that of Group *D* (3.08). The computed *t* value was 3.86 (48 d.f.), which was significant beyond the .01 level of confidence. Thus, it was concluded that the experimental treatments had a significantly positive effect on the immediate learning (recall) of the subjects involved.

8 Allen L. Edwards, *Experimental Design in Psychological Research* (New York: Rinehart and Co., Inc., 1950), p. 285.

Summary

This study proposed to examine the relative effectiveness of four different methods of presenting expository material on small group discussion to randomly chosen groups of students in the Speech 116 program at Purdue University, compared with a control group receiving no instruction. A true experimental pre-test—post-test control group design was employed, with the use of *t* test and analysis of variance (single factor) procedures.

The results of the experiment clearly suggest that the hypothesis presented earlier cannot be rejected; that is, for the subjects in this experiment televised instruction proved as efficient as having the material read aloud, reading the material silently to oneself, or receiving the material in "normal" ways, as measured by a test of immediate recall. *No* method was superior to any other one.

To what extent can these conclusions be generalized? Certainly there are limitations here. In the first place this was a "one-shot" affair, and the attendant possible novelty effects might have influenced unduly the televised instruction group, although it would be difficult to

TABLE III

Analysis of Variance

Source of Variation	Sum of Squares	d.f.	Mean Square	F
Between Treatments: A,B,C,D.	13.64	3	4.55	.96*
Within Treatments	457.36	96	4.76	

*Not Significant

say in what direction! This question has been examined in a number of other settings, however, with variable results.[9] Secondly, it may be that the lecture content, the lecturer himself, or the unique nature of the audience—independently or in combination—can account for the "no difference" results. Thirdly, there was no effort in this study to measure the delayed recall effects of the various modes of presentation.

The conclusions do suggest, however, that we need not be fearful of exposing our students to televised instruction on an *ad hoc* basis, in terms of their ability to learn from such instruction. In fact, it may be the most efficient method in terms of time and energy, when the material to be presented is especially pertinent or unique in some way and the television lecturer is particularly expert and competent. The use of televised instruction obviously assumes that a choice of instructional media is possible—that the physical facilities for transmitting and receiving such instruction exist. Although the results of this study cannot speak to the question of whether or not televised instruction is desirable as a regular diet, they do confirm the point that there is no reason to condemn it as an inferior method of instruction, within the boundaries of this experiment.

[9] Allen, *op. cit.*