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ABSTRACT

Instructional television (ITV) has generally not shown significant differences in instructional effectiveness when compared to conventional instruction techniques. In an effort to gather more conclusive data about these previous findings, this study sought to compare two instructional modes, ITV and textual presentation. Eleven juniors in a teacher education program participated in the study. They received instruction in questioning techniques in preparation for the subsequent presentation of a videotaped microteaching lesson. The student teacher's performance was observed and analyzed from a variety of statistical viewpoints, and the results indicated that the more expensive ITV instruction failed to produce a criterion performance which differed significantly from that produced by the less expensive textual instruction. (MC)

A COMPARISON OF THE EFFECTS OF TEXTUAL AND TELEVISED MODES OF INSTRUCTION IN TEACHER EDUCATION

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INTRODUCTION

Since its introduction in the field of educational technology, instructional television has been a source of controversy for educational researchers. For the purpose of clarification, Brown, Lewis, and Harcleroad (1969) describe ITV as the application of television in formal courses, regardless of age or grade, and regardless of whether or not they are given for credit. This includes in-school instruction in parts of courses for direct teaching or for facilitating lecture-demonstrations. Instructional television may be distributed by open or closed-circuit, or by both simultaneously.

At the university level, Briggs, Campeau, Gagne', and May, (1967) found that no reliable differences in the instructional effectiveness of ITV, as compared to conventional instruction, were obtained in teaching a variety of subjects. Research studies cited in the above work (p.104) included the areas of spanish, calculus, meteorology, advertising, mathematics, physics, psychology, sociology, chemistry, political science, english humanities, and

music appreciation. The authors (p.105) did continue, however, that on occasion, significant differences in a ievement have been found to favor either televised instruction or conventional instruction.

Ives (1971) stated that closed-circuit television may be considered separately as a medium of instruction because it tends to be expensive, popular, demands a specialized staff to operate and maintain it, and has absorbed--in many instances--the bulk of available capital for educational technology. It also deserves special consideration in view of its singularly disappointing record. Allen (1971) found the predominate trend from hundreds of evaluative studies in instructional television was that of its overall equal effectiveness when compared to face-to-face instruction.

The systematic and comprehensive work of Schramm (1962) showed instructional television is at least as effective as ordinary classroom instruction when the results are measured by the usual final examinations or by standardized tests. More recently, the

existing literature was reviewed by Anderson (1972) who states that although the recurring finding of no significant difference when television has been compared to conventional instruction has been disappointing, instructional television is being used in many cases for it multiplicative and logistical advantages rather than for learning advantages.

Positive factors for utilization, other than learning factors, are also supported by Thornton (1968) who claims television has often been seen primarily as a means of increasing efficiency by multiplying the professor's audience. He adds the present problem is still that of developing course materials that are worth televising. Other problems are cited by Smith and Nagel (1972) who believe the present impasse in educational television is due to costs, scheduling, "canned instruction," and program quality and that these problems present serious barriers to effective u iz tion of instructional television.

The research study designed and reported herein differs markedly from the bulk of instructional television research undertaken to date. The specific purpose of the study was to compare two instructional modes involving questioning strategies in the undergraduate curriculum with one of the modes being that of an ITV series. The first significant difference in the design of the study involved the mode of instruction to which ITV was compared. Briggs (p.106) found relatively few studies have compared the effectiveness of instruction by ITV with instruction by a medium other than a teacher, or by a combination of media. Additional studies cited above continually refer to conventional, or face-to-face, teacher instruction. In short, the bulk of the studies have investigated whether or not ITV can teach better than a teacher. The teacher is not used in this study; rather, printed materials were used in a modular form. Experimental Group A read the materials while Experimental Group B viewed exactly the same instruction via

an ITV series thereby eliminating a comparison to the conventional approach.

The second significant difference in the organization of this study involved the methods used to measure gain, if any. Anderson (pp. 46, 47) claims learning has been traditionally defined in ITV film research as factual information gain measured by paper and pencil tests. Ives (p. 151) discusses the problems of using paper and pencil criterion tests and concludes that tests measuring abilities that owe little to formal instruction will prove unsatisfactory in assessing the differences between presentations. He further states that no interpretation of norm-referenced measures can adequately be used in the task of assigning definite standards that should be achieved during instruction.

To summarize, the bulk of ITV research has been measured by paper and pencil tests. The method used in this study was the quantification of observable and desirable behaviors undertaken during the practice

teaching experience of the students involved in the study. Therefore, a major emphasis in this study was found in the attempt to determine instructional effects in terms of behavior as exhibited in a practical situation.

METHOD

The population of this study consisted of students who were enrolled in the Indian Teacher Training Project (ITTP) in the undergraduate teacher education program in the Department of Social Science Education at The University of Georgia. The experimental study was composed entirely of students who had volunteered to participate in the ITTP Program. All students in both groups, composed of 6 and 5 students, entered the teacher education program at the junior level.

The experimental study began in the Winter Quarter of the 1971-72 school year with the administration of a questioning strategies module. This module was developed at Arizona State University and field-tested and revised at both Arizona State University and the University of Georgia.

Students randomly assigned to Group A began their sequence by receiving information and instruction on redirecting, probing, and framing higher levels of questions in an expository mode. After reading these materials the students were expected to

demonstrate minimum proficiency regarding the following instructional objectives:

1. Upon the conclusion of a unit of instruction on questioning strategies, the student will be able to prepare and exhibit redirection and probing techniques during a five minute videotaped microteach.

2. Upon the conclusion of a unit of instruction on questioning strategies, the student will be able to demonstrate the framing and use of comprehensive, analytical, and evaluative levels of questioning during a five minute videotaped microteach.

Students randomly assigned to Group B began their sequence by receiving information and instruction on redirecting, probing, and framing higher levels of questions in a videotaped or televised mode. After viewing these programs (the expository materials become scripts for the television series) the students in Group B were expected to demonstrate minimum proficiency regarding the same instructional objectives listed for Group A above.

Production quality was discounted on the basis of studies undertaken by Chu and

Schramm (1967) who found production treatments do not contribute to learning although interest and enjoyment may increase. However, Becker (1963) found attitude and interest to be poor indicators of retention and Gage (1963) presented studies from Miami University which showed student ratings of television instruction are inversely correlated with student ability. It was further concluded, in support of the above and additional studies, that attitudes toward television do not greatly affect achievement.

The microteach sessions were used to determine the legitimacy of the module and to provide information in selected verbal and nonverbal areas. No discussion, feedback, etc. was provided regarding the specific areas presented in the module, i.e., redirecting, probing, and framing questions.

The data presented in Table I reveals that minimum proficiency in all areas was exhibited by all the students of both Group A and Group B.

TABLE I

QUANTITATIVE COMPILATION OF QUESTIONING STRATEGIES
UPON THE CONCLUSION OF TREATMENTS
FOR BOTH GROUPS A AND B

Group/Student	#R	#P	#C	#A	#E
A					
1	2	2	3	1	2
2	2	4	1	2	3
3	3	5	1	1	3
4	3	2	2	1	4
5	1	3	2	1	4
6	2	1	3	2	3
B					
1	4	3	2	2	2
2	5	6	3	1	1
3	2	1	2	1	1
4	2	1	3	2	1
5	2	2	2	1	4

#R = amount of redirections
#P = amount of probes
#C = amount of comprehension questions
#A = amount of analytical questions
#E = amount of evaluative questions

ne Spring Quarter of the

study, students in Group A and Group B were observed in their practice teaching classrooms for three twenty minute observation periods. Each observation was begun five minutes after the start of the classroom period and all observations entailed live codings. The on-site situations were all located in either the Bureau of Indian Affairs School in Choctaw, Mississippi or the Bureau of Indian Affairs School in Cherokee, North Carolina. All observations were coded by a single observer who did not have knowledge of the group to which each subject belonged. Results of the posttests were subjected to a statistical analysis to ascertain various behavioral differences between the two groups.

HYPOTHESES

In order to determine whether or not the mode of instruction had any effect upon the desired behavior of the students in Groups A and B, the following null hypotheses were formulated:

H_1 There will be no significant difference between the mean scores of Group A and Group B regarding the amount of use of redirection.

H_2 There will be no significant difference between the mean scores of Group A and Group B regarding the amount of use of probes.

H_3 There will be no significant difference between the mean scores of Group A and Group B regarding the amount of use of comprehension questions.

H_4 There will be no significant difference between the mean scores of Group A and Group B regarding the amount of use of analysis questions.

H_5 There will be no significant difference between the mean scores of Group A and Group B regarding the amount of use of evaluative questions.

The experimental design applied to this study was the randomized group design. Conditions of randomization were met that the total experimental sample was composed of Indian students who had volunteered to partake in ITTP Project and who were assigned, at random, to the two treatment groups. According to Lindquist (1953) once the experimental subjects are randomized with reference to treatments, it is fairly contended that the experimental groups are random samples from the same hypothetical parent population. After the administration of the treatments, each group was then regarded as a simple random sample from a hypothetical treatment population. Campbell and Stanley (1963) discuss the strength of the randomized group design which controls all internal threats to validity and eliminates or reduces all external threats to validity.

The instrument used to collect the data involved a sheet used by the observer

to quantify the student's verbal behavior in the five areas discussed in the hypotheses formulated for this study. The sheet was designed and field tested by Professor James W. Bell of the Department of Secondary Education, Arizona State University.

Posttest data from the Questioning Strategies Analysis Sheets was used to determine whether the mean behaviors of Group A and Group B were significantly different with regard to the formulated hyotheses. The t test was used to test the null hypotheses that the means of Group A and Group B were not significantly different. Neidt and Ahmann (1954) state whenever only two groups are being compared for differences between uncorrelated means in two samples, "t" is appropriate for the test of significance of the difference between the groups. Because of the sample size, is it important to note that, according to Guilford (1956), assumptions underlying use of the t test are met by randomization of the experimental population and the interpretation of normal distribution which applies to statistic t regardless of the size of the sample.

Because the groups were unequal in size, the t model used was the pooled variance formula.

RESULTS

The results of an analysis of the collected data served the purpose of either confirming or rejecting the null hypotheses presented earlier in this report. The .05 level of confidence was established as the criterion for accepting or rejecting the null hypotheses.

Hypothesis 1:

As show in Table II, the redirection mean of Experimental Group A was 9.7167 and the redirection mean of Experimental Group B was 8.8600. The application of these means and the appropriate degrees of freedom yielded a t score of .2307 which was not significant at the .05 level.

TABLE II

A COMPARISON OF REDIRECTIONS FOR EXPERIMENTAL GROUPS A AND B

Group	Number	Standard Deviation	Mean Redirection	t
A	6	6.8350	9.7167	.2307
B	5	5.1228	8.8600	

Hypothesis 2:

According to the data in Table III, the probing mean of Experimental Group A was 11.7667 and the probing mean of Experimental Group B was 11.0000. The application of these means and the appropriate degrees of freedom yielded at t score of .3596 which was not significant at the .05 level.

TABLE III

A COMPARISON OF PROBINGS FOR
EXPERIMENTAL GROUPS A AND B

Group	Number	Standard Deviation	Mean Probing	t
A	6	3.3237	11.7667	.3596
B	5	3.7537	11.0000	

Hypothesis 3:

The data presented in Table IV shows the comprehensive questions mean of Experimental Group A was 4.5500 and the comprehensive questions mean of Experimental Group B was 6.2800. The application of these means and the appropriate degrees of freedom yielded a t score of 1.2390 which was not a significant t at the .05 level. The separate variance formula was applied to this hypothesis.

TABLE IV

A COMPARISON OF COMPREHENSIVE QUESTIONS
FOR EXPERIMENTAL GROUPS A AND B

Group	Numb r	Standard Deviation	Mean Comprehensive	t
A	6	3.2691	4.5500	
				1.2390
B	5	.9176	6.2800	

F = 12.693

Hypothesis 4:

The data cited in Table V revealed that the analytical questions mean of Experimental Group A was 2.2833 and the analytical questions mean of Experimental Group B was 1.9200. These figures resulted in a t score of .4459 which was not a significant t at the .05 level.

TABLE V

A COMPARISON OF ANALYTICAL QUESTIONS
FOR EXPERIMENTAL GROUPS A AND B

Group	Number	Standard Deviation	Mean Analytical	t
A	6	1.5079	2.2833	.4459
B	5	1.1100	1.9200	

Hypothesis 5:

Table VI showed the evaluative questions mean of Experimental Group A was 1.0500 and the evaluative questions mean of Group B was 1.5200. The application of these means and the appropriate degrees of freedom yielded a t score of .9320 which was not significant at the .05 level.

TABLE VI

A COMPARISON OF EVALUATIVE QUESTIONS
FOR EXPERIMENTAL GROUPS A AND B

Group	Number	Standard Deviation	Mean Evaluative	t
A	6	.7259	1.0500	.9320
B	5	.9497	1.5200	

DISCUSSION

The data presented in Tables II-VI represent a comparison of mean group performances in selected behavioral areas. Each mean score represents the mean of individual performances as shown in Tables VII and VIII. A quantitative breakdown of the utilization of question levels is shown in Table IX.

Abritrary minimum performance criteria were established, a priori, for each of the five criterion variables. As shown in Table X mean performances of the textual group during micro-teaching exceeded all criteria. Mean performance of the TV group during micro-teaching exceeded all criteria except the criterion for evaluative questions. Mean performance of the

TABLE VII

INDIVIDUAL PERFORMANCE DATA: GROUP A

Behavior Categories	A1	A2	A3	A4	A5	A6
Observation 1						
#Redirections	5	24	3	15	7	2
#Probes	0	14	4	6	10	9
#Comprehensives	0	7	1	4	10	3
#Analyticals	0	4	0	2	4	0
#Evaluatives	0	2	0	0	1	1
Observation 2						
#Redirections	7	13	2	28	10	5
#Probes	17	13	22	30	15	21
#Comprehensives	5	5	3	8	17	0
#Analyticals	1	0	1	6	3	1
#Evaluatives	1	0	0	1	1	0
Observation 3						
#Redirections	0	24	14	2	13	1
#Probes	1	14	14	10	5	7
#Comprehensives	1	1	3	4	5	5
#Analyticals	1	3	4	0	8	3
#Evaluatives	0	2	5	1	4	0
Individual Means						
#Redirections	4.0	20.3	6.3	15.0	10.0	2.7
#Probes	6.0	13.7	13.3	15.3	10.0	12.3
#Comprehensives	2.0	4.3	2.3	5.3	10.7	2.7
#Analyticals	0.7	2.3	1.7	2.7	5.0	1.3
#Evaluatives	0.3	1.3	1.7	0.7	2.0	0.3

TABLE VIII

INDIVIDUAL PERFORMANCE DATA: Group B

Behavior Categories	B1	B2	B3	B4	B5
Observation 1					
#Redirections	6	8	4	7	15
#Probes	13	12	8	14	6
#Comprehensives	8	4	7	9	8
#Analyticals	0	1	0	3	1
#Evaluatives	1	0	0	1	2
Observation 2					
#Redirections	12	8	2	4	13
#Probes	24	17	8	13	16
#Comprehensives	8	3	6	8	7
#Analyticals	4	0	1	4	2
#Evaluatives	3	0	4	0	2
Observation 3					
#Redirections	10	15	0	9	20
#Probes	12	5	1	6	10
#Comprehensives	5	13	1	3	4
#Analyticals	7	3	2	0	1
#Evaluatives	3	1	2	1	3
Individual Means					
#Redirections	9.3	10.3	2.0	6.7	16.0
#Probes	16.3	11.3	5.7	11.0	10.7
#Comprehensives	7.0	6.7	4.7	6.7	6.3
#Analyticals	3.7	1.3	1.0	2.3	1.3
#Evaluatives	2.3	0.3	2.0	0.7	2.3

TABLE IX

QUESTION LEVELS: RAW SCORES AND PERCENTAGES FOR EXPERIMENTAL GROUPS A AND B

Group	Knowledge	Comprehensive	Analytical	Evaluative
A	212	82	41	19
B	185	94	29	23
T	397	176	70	42
A	31%	12%	6%	3%
B	27%	14%	4%	3%
T	58%	26%	10%	6%

T = Group totals

textual group during the three periods of student teaching exceeded criteria for redirection, probes, comprehension questions and analysis questions, but not for evaluative questions. The mean performance of the TV group during the three periods of student teaching likewise exceeded the criteria for the first four criterion variables but failed to attain criterion for the last category, evaluative questions.

No significant differences between treatment groups were obtained for any of the five criterion variables when

TABLE X

BASELINE AND PRACTICE TEACHING MEANS
FOR GROUPS A AND B

	Baseline		Practice Teaching	
	A	B	A	B
R	2.16	3.00	9.72	8.86
P	2.83	2.60	11.77	11.00
C	2.00	2.40	4.55	6.28
A	1.33	1.40	2.28	1.92
E	3.16	1.80	1.05	1.52

R = redirections
P = probes
C = comprehension questions
A = analytical questions
E = evaluative questions

performances during the three student teaching periods were compared.

The results of this study indicate that, for the subject matter studied and for the population involved, the more expensive TV instruction failed to produce a criterion performance which differed significantly from

that produced by the less expensive textual instruction. The implication is clear: there is no benefit resulting from the use of TV instruction, per se, if the instruction can be presented via a textual mode. When instruction is available only in a televised form, it would be well to consider whether or not a transcribed text (or script) would produce the same results before investing in the resources which are necessary to present televised instruction.

Modifications of the study are suggested for replication and further investigation.

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