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A PILOT STUDY OF STUDENT ATTITUDES IN A
CLOSED-CIRCUIT TELEVISION COURSE BY USE
OF STIMULATED RECALL

Thesis for the Degree of Ph. D.
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Norma Ruth Walton
1962

This is to certify that the

thesis entitled

A PILOT STUDY OF STUDENT ATTITUDES
IN A CLOSED-CIRCUIT TELEVISION
COURSE BY USE OF STIMULATED RECALL

presented by

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ABSTRACT

A PILOT STUDY OF STUDENT ATTITUDES IN A CLOSED-CIRCUIT TELEVISION COURSE BY USE OF STIMULATED RECALL

by Norma Ruth Walton

Problem

The purpose of this study was to investigate possible behavioral differences between students attending a college lecture course by means of closed-circuit television and those who attended the lecture in the room from which the lecture originated. Areas to be investigated were students' concentration on the subject matter presented in the lecture, their relevant participation in group discussions about the lecture material, their attitude toward the course, and scholastic achievement in the course.

Null Hypotheses

I. It was hypothesized that the students' concentration on the subject matter would be independent of the method of receiving instruction.

II. It was hypothesized that the attitude of the students toward the course in the control and experimental groups at the end of the quarter also would be independent

of the method of receiving instruction.

III. It was hypothesized that the contributions to the discussion sessions over the content of the lectures by students in the two groups would be independent of the method of receiving the lectures.

IV. There would be no significant difference between the two groups in scholastic achievement as measured by final grades obtained in the course.

Methodology

Students were randomly selected for the television group by use of alternate names on the class roll. The television group consisted of sixty-two students and the control group in the lecture hall contained sixty students. The two groups were very similar in scholastic aptitude, previous scholastic achievement, and in their attitudes toward the course at the beginning of the course.

The students' concentration on the subject matter of the lectures was investigated by use of stimulated recall. Tape recordings were made of four of the lectures and on the subsequent class meeting portions of the tape recording were played back to the students and they were asked to describe in writing what had happened next and what they had been

thinking about at the time. These responses were then judged by three judges as being subject-matter centered, self-referent, or not falling into either of these categories.

Students' participation in the class discussions was judged by the instructors as being excellent, average, or poor.

Attitudes of the students toward the course at the end of the term were obtained from their responses to the Michigan State University Test for Attitude Toward any College Course.

Results

All null hypotheses were accepted since the experimental and control groups did not show any significant differences in their concentration on the subject matter of the lectures, participation in class discussions, attitude toward the course at the end of the term, or in scholastic achievement in the course.

**A PILOT STUDY OF STUDENT ATTITUDES IN A CLOSED-CIRCUIT
TELEVISION COURSE BY USE OF STIMULATED RECALL**

By

Norma Ruth Walton

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CHAPTER I

INTRODUCTION

The use of closed-circuit television for teaching of formal classes on university campuses has been increasing rapidly in recent years. Since this method of teaching is still fairly new, however, some questions have arisen regarding the effect that teaching by television may have on students' behavior and attitude. Inherent in the attempt to teach by this method are questions about scholastic achievement, attitudes toward the course, and attitudes toward the subject matter being presented.

Statement of the Problem

In an unpublished study at Michigan State University, after the completion of a course offered by closed-circuit television some instructors expressed the opinion that students who participated in courses using this method of instruction tended to be more passive in their reactions to group discussions following the lecture than were students in conventionally taught classes. This contention seemed to merit investigation by comparing the contributions made to class discussions by students who received instruction by

means of televised lectures with the contributions made by students who received the same lecture in a conventional lecture hall.

In this same study when the students were asked to express opinions about this method of instruction at the end of the quarter of televised lectures some students stated that they found it easier to concentrate on the subject matter in the television viewing room than they did in a conventional lecture room.

The present study, therefore, was designed to determine whether more passivity in group discussions is associated with receiving instruction by television than by conventional lecture and whether televised instruction is associated with better ability to concentrate on the subject matter presented in the lecture.

It also appeared to be desirable to determine whether the students in a television lecture room would differ from students in a regular lecture room in their attitude toward the course at the end of the quarter.

It was also proposed to determine whether any difference in scholastic achievement in the course existed between the two groups.

Null Hypotheses

I. It was hypothesized that the students' concentration on the subject matter would be independent of the method of receiving instruction.

II. It was hypothesized that the attitude of the students in the control and experimental groups, at the end of the quarter also would be independent of the method of receiving instruction.

III. It was hypothesized that the contributions to the discussion sessions over the content of the lectures by the students in the two groups would be independent of the method of receiving the lectures.

IV. There would be no significant difference between the two groups in scholastic achievement as measured by final grades obtained in the course.

Definition of Terms Used

In this study the students who attended the class lectures in the television viewing room are referred to as the television group or experimental group. Those students who attended in the lecture hall from which the lecture originated are referred to as the control group.

The measures obtained at the beginning of the course

are denoted as the pre-experimental measures, while those obtained at the end of the course are denoted as the post-experimental measures.

Limitations of the Study

The students who served as subjects for this study were enrolled in Foundations of Education 200, a course in educational psychology for Teacher Education majors at Michigan State University. Since the learning and achievement of these students must take precedence over all other considerations, the investigators were not permitted to do anything in experimental studies which would in any way interfere with classroom procedure.

The content of the course in which these students were enrolled was in the process of change. Therefore the learning achieved by the students in this course could not be compared with that of students in a similar course where the present experimental conditions did not prevail.

In accordance with an agreement that nothing would be done in the way of experimentation which would interfere with classroom procedure or student acceptance of the course it was agreed that any students who had been assigned to the television viewing room but did not wish to accept that

assignment could be reassigned to the main lecture hall. Nine students did decline assignment to the television group. Students who entered the class after the first day of class were automatically assigned to the main lecture hall. These factors resulted in some imbalance in the number of students in the two groups with eighty-eight students in the control groups and sixty-two students in the television group.

No roll was taken of student attendance so that it was possible for students who had been assigned to one room to attend class in the other room. Thus, students who had been assigned to the main lecture hall but were late to class sometimes elected to attend the lecture in the television viewing room so that their tardiness would not be observed by the instructor. Conversely, some students who had been assigned to the television viewing room would sometimes attend class in the main lecture hall in order to observe for themselves a comparison of the effect of receiving the lecture under these differing conditions. When this occurred at the times when the stimulated recalls were elicited it was necessary to discard the data obtained from that student since its validity was questionable.

The experimenters did not know until the first day of class the names of the students who would be enrolled in the

course, nor even the number of students who would be enrolled. Since it had been agreed that there would be no interference with classroom procedure and the instructors wished to have the students assigned to their respective groups immediately the assignment had to be made by using alternate names on the class roll rather than by use of the Table of Random Numbers.

It might have been desirable to have had an equal proportion of Television and Control Group students in each of the six discussion groups but this could not be accomplished as it would have delayed assignment of students to their respective groups and would, therefore, have interfered with class procedure.

The focus of this study is entirely upon determine whether any differences are found in the behavior of the students in the two groups. No effort was made to determine the superiority of one method of receiving instruction over the other method.

Organization of Study

A review of the literature on televised instruction, the advantages and disadvantages of this method of instruction, and a review of previous experimental studies will be found in Chapter II.

The selection of the experimental and control groups, description of the groups, and pre-experimental measures of the groups are described in Chapter III. This chapter also contains a description of the procedure for obtaining the stimulated recalls, the judges who sorted the responses, the post-experimental measures, and the statistical methods used in analysis of the data.

Chapter IV is given to analysis of the data obtained in comparing the activeness or passiveness of responses to the stimulated recall, orientation toward subject matter, self or other topics, comparison of sortings when separated by sex, post-experimental shift in attitude toward the course, instructors' evaluation of the students' contributions to class discussions, and comparison of final grades of the television and control group students.

A summary of the problem, methodology, results, and implications for further study are found in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

When television moved from its experimental infancy to a position of importance as an audio-visual means of communication its potentiality for educational purposes was quickly recognized by many leaders in the field of education.

Advantages of Televised Instruction

Bogart, (1:280) in his excellent book, The Age of Television, notes,

Television is a natural medium for teaching purposes. It permits visual demonstration and illustration which radio cannot provide. It allows the extraordinarily good teacher to influence a great number of students instead of confining him to a single class at a time. It permits teaching techniques to be standardized at a high level. It can correlate, with the smoothest of transitions, many different teaching devices: direct personal lecturing and demonstration, motion pictures, slides, specimens, drawings and charts.

Wischner and Sheier (20:611-12) also comment that television possesses certain administrative and logistic advantages in relation to education.

By this medium it is quite possible to multiply our best instructor, that is, to select a single best instructor and give all students the benefit to be derived from superior instruction. Television

provides a front-row seat for all students. This may be particularly advantageous in the learning of certain kinds of material. There is experimental evidence that television is particularly suitable for teaching material involving small parts and their interrelationships. This is probably due to the close-ups which television makes possible. The by-product of television, the kinescope recording, offers a permanent record which may be used repeatedly for its original objective, or which can be extremely useful for training and education purposes.

Smyth (18:41-52) quotes chairman Coy of the FCC in an address to the Theatre Owners of America in September, 1948 as stating,

I foresee the day when television will be the most powerful instrument of communication ever devised, the most universal and most effective purveyor of education, information, culture and entertainment.

Advantages of Use of Closed-Circuit Television

Smyth goes on to say,

The closed-circuit television system has many advantages of cost and utility over either the co-operative or the full station operation. It also has the important advantage of requiring no frequency assignment and hence may be installed in a city where all television frequencies are already taken up. Its principal disadvantage is the fact that its assured audience is limited to the schools in which it is installed; for access to the general viewing audience it is dependent on the program plans of the commercial television stations and on the use of the necessary relay equipment.

In the book, TV and Our School Crisis, Siepmann (17:49-50) states that in 1958 some one hundred forty closed-circuit television systems were in operation in our schools and

universities. He comments,

It offers some special advantages over open circuits. It is less costly to install and maintain, is more economical where limited audiences are aimed at, and is better adapted to experimental work, providing in effect a laboratory situation rather than the fish-bowl conditions of open circuit broadcasting. Static and interference of all kinds are eliminated. If the equipment is sound, perfect reception is assured. And it had the further advantage that multiple programs can be transmitted simultaneously. For these reasons, where limited or specialized audiences are to be served, or where experimental work, involving trial and error and freedom from any fixed time schedule is the goal, closed-circuit is the preferred system.

Carpenter (3:609) notes that limitations at the receiving end are generally well within the range of perceptual capabilities of human perception.

In general, film research indicated that technical qualities or standards have surprisingly low correlations with learning scores after these surpass minimum threshold requirements. In general, engineering standards for television reception seem to be above the minimum psychological requirements for perception and intelligibility.

The University of Chicago Committee on Education Television (19:209) reports,

The versatility of television distribution is due to its combination of the communicative powers of the sound motion picture with the flexibility and economy of a radio distribution system. The electronic form of television distribution makes possible the direct and instantaneous transmission of an image of on-going events; it cuts out the time-consuming, cumbersome, and expensive distribution procedure required by the film and the printed media.

Disadvantages of Televised Teaching

Despite the many advantages of televised educational material described above, however, some disadvantages of televised teaching have merited comment by several authors. McIntyre and Greenhill (12:600) states,

The most frequently voiced objection both by faculty and students is that television places yet another barrier between the teacher and his students. Class participation and student-teacher interaction, generally considered to be important, are severely reduced. Education, it is said, loses its broader meaning and becomes a rather sterile dissemination of fact and opinion. True, interroom communication systems can be established, but these are rather cumbersome and inhibiting as well.

This objection is to some extent replied to in the report of the Dartmouth Television Committee (15:297-8) in which the questions is asked,

Are there reasons to believe that a teacher can convey more or better instruction to his students by standing before them in person than by delivering precisely the same lecture from a screen? Many interesting forecasts have been made by those who believe that there is no factor other than habit which would control a choice between these two kinds of exposure. Thus, the view has been earnestly advanced by thoughtful people that television will in fact provide more, rather than less, classroom situations of the intimate kind, because it will make it possible for one televised lecture, after it has been transferred to kinescope or tape, to serve on numerous occasions in lieu of the professor himself and thus free his time for more instruction to small groups.

McKeachie (13:504) described difficulties in educational

television with laymen as, "Lack of time to give conflicting points of view," although this is not true with closed-circuit television; and another difficulty is, "limitations of space for vigorous floor pacing and broad sweeping gestures," which would apply to both open and closed-circuit television.

A further objection is raised by some that the student participating in a televised lecture may tend to adopt an attitude of passivity toward the subject matter presented. Thus, Meerboo (14:291) makes the statement, "Preoccupation with television prevents active inner creativity-the children and adults merely sit and watch the pseudo-world of the screen instead of confronting their own difficulties."

Johnson (9:40-41) points out,

Traditionally books have been the tools of teaching and learning. Reading and recitation have been, in the main, the ritual of school practice. But as the problem of pupil learning has become the subject of psychological study, we have accumulated convincing data to show that the best learning (that is, learning which lasts and which functions in use) results from active experience and varied experience, rather than from passive assimilation and recitation of fact.

Previous Experimental Studies

Efforts to determine the effectiveness of televised lectures have led to a number of experimental studies. Harris (7:593) reports,

Some experimentation has been undertaken to compare results of instruction by television with the direct lecture method. Various modifications of the television procedure have been used, some involving kinescopes and some with audiences in the studios themselves. In a number of reports television students have achieved significantly better results than those taught by conventional procedures. Statements agree that television is a successful medium for instruction.

In a study at the University of Houston, Evans, Roney, and McAdams (6:279) compared the achievement of students enrolled in elementary psychology and biology courses using television instruction and non-television instruction. No significant differences were found and they concluded that the efficiency of the classroom teacher is apparently not hampered by presenting lectures on television.

A study by Husband (8:182) at Iowa State College used four groups; television at home, studio class, kinescope class, and two campus classes. He found that the television class earned better grades than three of the campus classes but were exceeded by the kinescope group. The kinescope group, however, had some advantages over the television at home group and the studio class, which might account for the difference. This study, moreover, does not report the statistical differences found between the difference groups.

Thus, although it has been suggested that a televised lecture course might result in passivity on the part of the

students in the class, none of the comparative studies found in the literature thus far appear to have made an attempt to discover whether this may be a valid objection to this method of presentation of lecture material. For this reason, the present study is devoted largely to this question.

Summary

Many leaders in the field of education express interest in the use of televised lectures because of the advantages it offers in permitting a single lecturer to reach a larger number of students at a single time than could be reached in a usual lecture hall, allows all of the students to have a better view of demonstrations than is possible in the usual class room, and the relatively low cost of closed-circuit television system.

Disadvantages mentioned by some authors are that televised lectures result in reduced class participation and student-teacher interaction as well as the possibility that students participating in a televised lecture may tend to adopt an attitude of passivity toward the subject matter presented.

CHAPTER III

METHODOLOGY

Selection of Experimental and Control Groups

The subjects participating in this study were all of the students enrolled in the course, Foundations of Education 200, at Michigan State University in the Spring quarter of 1957. Most of these students were sophomores who planned to teach in secondary education after graduation. Students were assigned to the television group by selection of alternate names on the class list. Any student who had been assigned to the television lecture room but did not wish to accept this assignment was permitted to remain in the regular lecture hall. Students who enrolled in the course after the first day of classes were assigned to the regular lecture hall. The final television group consisted of sixty-two students and the control group contained eighty-two students.

Pre-experimental Measures

After the two samples were drawn they were compared on a number of measures to determine whether differences existed between the groups before the experiment was carried out. The differences in the mean scores for the two groups were tested

for significance of difference by means of the "t" test.

One of the necessary comparisons for this purpose was with regard to scholastic aptitude. Scholastic aptitude test scores on the American Council on Education Linguistic Scale were compared by application of the "t" test for significance of difference of the mean scores of the two groups. The use of this test for prediction of scholastic aptitude is well known. A study by Juola (10) of the predictive validity of various tests of scholastic aptitude notes that the American Council on Education Linguistic Scale correlated .59 with grade point average. This test is referred to in Table I as A. C. E. Linguistic.

The Michigan State University Reading Test was also used to determine whether the two groups were similar with respect to reading performance. This is a forty-five item test which was developed at Michigan State University to measure the students' ability to comprehend thoughts expressed in reading passages. This test is administered to the freshmen entering Michigan State University in order to identify students who may be deficient in reading performance so that they may be given special training in this skill if it is needed. A publication by Lehmann, Ikenberry, and Dressel (11:65) states, "It would appear that reading ability is definitely related to

general scholastic performance." This test is referred to in Table 1 as Michigan State University Reading Test.

Previous scholastic achievement of the students in each group was measured by the mean grade point averages the students in each group had obtained.

The attitudes of the students toward the course were measured by the Michigan State University Test for Attitude Toward any College Course. This scale is described by Dressel (6:286) as having been developed to measure student reactions to the general education program. The scale was developed by the Michigan State University Board of Examiners, using the techniques developed by Thurstone and Remmers for scaling an attitude on the basis of equal appearing intervals. It contains twenty-one statements, ranging from extremely favorable to extremely unfavorable, with each statement having a scale score. The scale ranges from zero to eleven, with the neutral point being six. The scale was developed so that some of the instructional departments might measure changes in the attitudes of students toward their courses at various stages of the students' progress through the basic program. In the present study the attitude scale was administered at the beginning of the course and again at the end.

Statistical Methodology

In each instance in which the obtained data was parametric in nature the "t" test for significance of difference was used because, as noted by Seigel (16:19), the most powerful tests are those which have the strongest or most extensive assumptions. When those assumptions are valid these tests are the most likely of all tests to reject the null hypothesis when the null hypothesis is false. The conditions which must be satisfied are that the observations must be independent, must be drawn from normally distributed populations, (although this is not really necessary, as noted by Boneau (3), the populations must have the same variance, and the means of the populations must be approximately equal. In those instances in which the "t" test was used in this study the data were assumed to meet these requirements.

The Chi-Square test was used in those instances in which the data were categorized in terms of observed frequencies which could be tested against expected frequencies.

In one instance the discrete data could not be analyzed by the Chi-Square test because of the small size of the sample. In this instances the Fisher exact probability test was used.

Pre-experimental Measures of the Groups

When the data on the two groups for grade point average,

scholastic aptitude, reading ability, and attitude toward the course were obtained at the beginning of the course, it was not possible to obtain all of these measures on every student because of student absentees or recent transfer of the student from another college. This is a limitation of the pre-experimental measures found in Table 1 but because of the small number of students on whom some measures were not obtained and the large number on whom all measures were obtained the assumption was made that the obtained data would be representative of the total group in each case. This would seem from the obtained "t" values in Table 1 to be a safe assumption.

TABLE 1

Comparison of Control and Television Groups in Scholastic Achievement, Scholastic Aptitude, Reading Ability, and Attitude Toward the Course*

Pre-experimental Measures	Control Group			TV Group			"t"
		S. D.	N		S. D.	N	
Grade point average	2.40	1.42	81	2.56	1.08	61	.58
A. C. E.							
Linguistic	5.75	1.56	83	5.97	2.13	60	.22
M. S. U. Reading Test	5.63	1.61	83	5.98	2.40	60	.94
Attitude toward the Course	7.46	1.10	63	7.60	1.11	54	.68

*A "t" value of 1.98 is required for significant difference at the five percent level for 120 df.

The data in Table 1 indicate that the control and experimental groups do not differ significantly when their means on each of these measures were tested by "t."

It was noted earlier in this chapter that not all of the subjects in the control group in the regular lecture room were members of the random sampling by selection of alternate names on the class list. Nine students refused the assignment to the television room and thirteen students entered the course after the room assignments had been made.

These students are not included in the subsequent analyses. A total of fifty-eight students then remained in the television group and sixty in the control group. The sample of television students was not a completely random sample since it lacked those students who refused assignment to the television viewing room.

Comparison of Control and Television Groups for Sex Distribution

The control and experimental groups were also compared for sex distribution. The results are summarized in Table 2 on page 21.

The results in the table indicate that the distribution of sex in the control and experimental groups does not differ significantly from the expected distribution.

TABLE 2

Comparison of Groups for Sex Distribution

	Control Group	Television Group	Total
Male	20 (16.78)*	13 (16.22)	33
Female	<u>40</u> (43.22)	<u>45</u> (41.78)	<u>85</u>
	60	58	118

* (expected frequencies in parentheses)

df = 1

Chi Square is 1.75

A Chi Square value of 3.84 is required for significance at the five percent level of confidence.

p is more than .20

Description of Television Viewing Room
and Lecture Room

The main lecture hall, from which the televised lectures originated, contained two television viewing screens which were used occasionally when the instructor wanted the students to see illustrative charts which could not otherwise be easily seen by students who were seated toward the rear of the room. This room did not entirely duplicate a regular classroom because it contained the television cameras and bright light was focused on the lecturer in order to televise the lecture.

The television viewing room contained three television screens which were adjusted at angles so that at least one screen was clearly visible to every student in the room.

This room also contained a portable microphone to enable the students in the television room to ask questions or participate in group discussions when the instructor requested them to do so.

Procedure for Class Discussions

All of the students enrolled in the course were assigned to one of the five discussion groups which met once a week to discuss the course material. The students were assigned to these groups without regard to which room they had been assigned for the lectures. At the end of the quarter each instructor in charge of these groups was asked to rate each student in his group in regard to that student's relevant participation in the class discussions. Each student was to be rated as "poor," "average," or "excellent."

Procedure for Stimulated Recall

On four different occasions during the course a tape recording was made of the lecture. This recording was made in another room so that neither the instructor nor the students was aware that the lecture was being recorded. At the lecture session on the following day a portion of the previous lecture was played back to the students. The recording was stopped at a point just before the lecturer had made some

specific point. The students were then asked to state in writing, "What happened next?" and then, "What were you thinking of at that time?" This procedure was repeated from a later portion of the same lecture on four occasions so that a total of eight stimulated recalls was obtained from those students who were present at both the original lecture and the subsequent lecture.

The purpose of asking the students to describe what had happened next when the tape recording of the lecture was interrupted was intended to assist the student to recall more vividly what he had been thinking about at this point in the lecture. The students were assured that their responses would be seen only by the research staff conducting the study and would not be seen by their instructors.

Judgment of Student Responses to Stimulated Recall

These responses were later typed on three inch by five inch cards and identified only by a number which had been assigned to each student by the investigator. In this way the identity of the student and the room he attended for the lectures could be known only to the investigators and could not be known to the judges who sorted the responses.

Three judges were asked to judge each student's response

to the question of what he had been thinking about as being subject-matter centered (e.g. directed primarily toward the content of the lecture), self-referent (e.g. primarily concerned with personal reaction to the material presented), or other (e.g. irrelevant, pertaining to the lecturer, or not falling clearly into the other two categories).

The judges who cooperated in this study were Dr. James Tintera, Associate Professor, College of Education, Michigan State University; Dr. David Krathwohl, Professor in the Bureau of Research and Publications, College of Education, Michigan State University; and Mr. Ralph Walton, Clinic Administrator, Michigan State Department of Mental Health. It had originally been planned that all three of the judges were to be members of the staff of Michigan State University but one of the original choices was unavailable and Mr. Walton was substituted because of his knowledge of test construction and his awareness of the purpose of this study by virtue of being the husband of the investigator.

Rater reliability was checked by computing Chi-Square values where two of the three judges were in agreement and where all three were in complete agreement regarding the category to which the response should be assigned.

Post-experimental Measures

At the end of the course the control and experimental groups were again given the Michigan State University Test for Attitude Toward Any College Course.

The students' relevant participation in the class discussion sessions about the lecture material was rated by their instructors as being poor, average, or excellent. These instructors were not told which lecture room the students attended.

Final grades obtained in the course were tabulated for the students in each group.

Summary of Methodology

The subjects participating in this study were students enrolled in a course in educational psychology at Michigan State University. Students were assigned to the television group by selection of alternate names on the class list. The groups were compared for scholastic aptitude by means of the A.C.E. Linguistic Scale and the Michigan State University Reading Test and the means of the groups were found to show no significant difference.

The statistical tests employed were the "t" test for parametric data and the Chi-Square test for discrete data

except in one instance in which, due to the small size of the sample, the Fisher exact probability test was employed.

The results of the stimulated recall were categorized as Subject-matter centered, Self-referent, and Other. The students' contributions to the discussion were categorized as poor, average, or excellent. Final grades of the students were categorized as A, B, C, D, and F.

The procedure for the stimulated recall was to make tape recordings of the lecture on four different occasions during the course. At the lecture session on the following day before the beginning of the lecture a portion of the previous lecture was played back to the students and stopped twice at a point just before the lecturer had made a specific point. The students were asked to state in writing, "What happened next?" and, "What were you thinking of at the time?" A total of eight stimulated recalls were requested of the students.

Three persons were asked to judge each student's response to the question of what he had been thinking about at that time as being subject-matter centered, self-referent, or falling into neither of these categories. The responses had been typed on cards and were identified only by the number which had been assigned to each student.

The categories of subject-matter centered and self-referent were used because the majority of the student responses fell into these two categories.

As there were two instructors giving the lectures the tape recordings were alternated between them.

At the end of the course the control and television groups were again given the Michigan State University Test for Attitude Toward any College Course to determine whether any significant differences in attitude toward the course was found between the two groups.

CHAPTER IV

ANALYSIS OF THE DATA

Throughout the study it was hypothesized that no significant differences would be found between the television and control groups on any of the measures obtained. The five percent level of significance was accepted as the level at which the null hypothesis would be rejected and significant differences considered to be found.

Response to Stimulated Recall

The first hypothesis stated that there were no significant differences between the television and control groups with respect to being able to concentrate on the subject matter being presented. The hypothesis was tested by means of the method of stimulated recall.

The results of the stimulated recall in Table 3 includes a summary of the sortings in which at least two of the three judges were in agreement in the category assignment. There were no instances in which the judges were in complete disagreement.

Data from the table indicate that the control and experimental groups do not differ significantly in their

TABLE 3

Summary Results of Sorting Experimental and Control Group Responses into Three Categories with Two of Three Judges in Agreement. Groups not Divided by Sex

Stimulated Recall	Control Group	Television Group	Totals
Subject-matter centered	15 (12.71)*	10 (12.29)	25
Self-referent	15 (14.75)	14 (14.25)	29
Other	13 (14.75)	16 (14.25)	29
No Response	<u>17</u> (17.80)	<u>18</u> (17.20)	<u>35</u>
	60	58	118

* (expected frequencies in parentheses)

df = 3

Chi Square is 1.27

A Chi Square value of 7.82 is required for significance at the five percent level of confidence

p is more than .80

responses to the stimulated recall.

Consideration was given to the possibility that lack of inter-judge reliability in sorting the responses might affect the final category to which a subject was assigned. The data, therefore, were reanalyzed utilizing only those responses in which all three of the judges were in complete agreement.

The results of this analysis are found in Table 4.

Table 4 shows that the two groups do not differ significantly when only those sortings are included in which all three judges were in complete agreement on the category in which the responses belonged. Seven control and seven

TABLE 4

Summary Results of Sorting Experimental and Control Group Responses into Three Categories with All Judges in Complete Agreement. Groups not Divided by Sex

Stimulated Recall	Control Group	Television Group	Totals
Subject-matter centered	9 (7.64)*	6 (7.36)	15
Self-referent	12 (14.78)	17 (14.25)	29
Other	13 (12.74)	12 (12.26)	25
No Response	<u>19</u> (17.84)	<u>16</u> (17.16)	<u>35</u>
	53	51	104

* (expected frequencies in parentheses)

df = 3

Chi-Square is 1.73

A Chi-Square value of 7.82 is required for significance at the five percent level of confidence.

p is more than .70

television students were omitted from this table because they did respond but the judges were not in complete agreement so that they could be assigned to a category.

The possibility remained that differences might be found between the groups if the sortings were analyzed separately for each group when divided by sex. This analysis may be found in Table 5.

As may be seen from the data in Table 5 the females in the experimental group do not differ significantly from the females in the control group in their responses to the stimulated recall.

TABLE 5

Results of Sorting Experimental and Control Females'
Responses into Three Categories with all
Judges in Agreement

Stimulated Recall	Control Group	Television Group	Totals
Subject-matter centered	10 (8.47)*	8 (9.53)	18
Self-referent	10 (8.47)	8 (9.53)	18
Other	9 (10.82)	14 (12.18)	23
No Response	<u>11</u> (12.24)	<u>15</u> (13.76)	<u>26</u>
	40	45	85

* (expected frequencies in parentheses)

df = 3

Chi-Square is 1.88

A Chi-Square value of 7.82 is needed for significance at the
five percent level of confidence.

p is more than .80

The males in the television group were compared with the
males in the control group for their responses to the stimula-
ted recall. A summary of these results may be found in
Table 6.

The results when employing the Fisher Exact Probability
test show that in both subject-matter centered and self-
referent responses these could have occurred by chance more
often than the five percent level which was set at the
required level for this study.

The judges were also asked to sort the subjects' responses
into categories of Active, Passive, or Uncertain. When these

TABLE 6

Results of Sorting Experimental and Control Males'
Responses into Three Categories with Two of Three
Judges in Agreement

Stimulated Recall	Control Group	Television Group
Subject-matter centered	5	2
Self-referent	6	6
Other	4	2
No Response	<u>5</u>	<u>3</u>
	20	13

$p = .3986$ that the obtained or more extreme frequencies would occur by chance in subject-matter centered versus others

$p = .2840$ that the obtained or more extreme frequencies would occur by chance in self-referent versus others

sortings were tabulated, however, only two subjects in each group had been classified as being predominately passive, therefore no attempt was made to present the results in this study. It would appear that either (a) the great majority of subjects in both groups were active in their attitude toward the lecture material or, (b) sorting of the subjects' responses for activity or passivity of attitude does not discriminate between the groups.

Attitude Toward the Course

The second hypothesis in this study stated there would be no significant difference between the groups in their

attitude toward the course at the end of the quarter. At the end of the term the students in each group were retested for their attitude toward the course by use of the Michigan State University Test for Attitude Toward Any College Course. The results of this post-experimental measure are given in Table 7.

TABLE 7

Comparison of the Attitude of the Control and Television Groups Toward the Course at the End of the Term on the Michigan State University Test for Attitude Toward Any College Course

	Control Group	N	Television Group	N	Signif.
Attitude Toward Course	6.51	63	6.41	54	t .39
Standard deviation	1.10		1.11		

A "t" value of 1.98 is required for p of .05 at 120 df.

From Table 7 it may be seen that the control and experimental groups did not differ in their attitude toward the course at the end of the quarter to a significant degree.

Although not a part of the original plan of this study the shift in attitude of the subjects in the two groups was analyzed by the "t" test and found not to show a significant difference between the groups.

Evaluation of Participation in Class Discussions

The third hypothesis was that there would be no significant difference between students in the television classroom in regard to their relevant participation in discussions. The results of the instructors ratings may be found in Table 8.

TABLE 8

Evaluation of Control and Television Groups in Relevant Participation in Class Discussions

Discussion Evaluation	Control Group	Television Group
Poor	22 (19.51)*	11 (13.49)
Average	33 (39.02)	33 (26.98)
Excellent	<u>26</u> (22.47)	<u>12</u> (15.53)
	81	56

* (expected frequencies in parentheses)

df = 2

Chi-Square equals 4.41

Chi-Square value of 5.99 is required for a p of .05 or more

Data from Table 8 indicate that no significant difference is found.

Comparison of Final Grades in the Two Groups

The fourth hypothesis was that there would be no significant difference between the two groups in scholastic achievement as measured by final grades obtained in the

course. Grades obtained by students in the two groups are found in Table 9.

TABLE 9

Final Grade Obtained by Control and Television
Students at the End of the Course

	Mean	S. D.	"t"
Control Group	2.68	.91	.063
Television Group	2.67	.95	

df = 136

A "t" value of 1.98 is required for significant difference at the five percent level of confidence

The data in Table 9 indicates that the control and television groups do not differ significantly in regard to the final grades received.

Summary of Analysis of Results

Analysis of the data obtained from the students in the control group and the television group shows that the groups were very similar in scholastic aptitude, reading ability, and grade point averages. The two groups had similar attitudes toward the course both at the beginning and at the end of the course. During the course they did not differ significantly in their contributions to the class discussions. No significant differences were found between experimental and

control subjects in their concentration on the subject matter being presented as indicated in their responses to the stimulated recall; and they did not differ significantly in final grades obtained.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS FOR FURTHER RESEARCH

Summary

Statement of the Problem

Because of the rapidly increasing use of closed-circuit television in teaching lecture courses on university campuses this study was undertaken to attempt to ascertain possible effects that this method of teaching may have on students and on the learning process. Particular areas of investigation were:

1. The possibility that the students might find it easier to concentrate on the subject matter when receiving the lecture by means of television than when in the regular lecture hall.
2. Students receiving the lecture by television might differ from students in the regular lecture hall in their attitude toward the course at the end of the term.
3. Students in the control group might differ from the students in the television group in relevant participation in class discussions about the lectures.
4. Scholastic achievement in the course might be different for the two groups.

For statistical purposes it was hypothesized that the students in the television viewing room would not differ from those in the main lecture hall on any of these measures.

Description of the Groups

The subjects participating in this study were the students enrolled in Foundations of Education 200 in the Spring quarter of 1957. Students were assigned to the television group by selection of alternate names on the class list. The television group consisted of sixty-two students and the control group in the lecture hall contained sixty students.

The two groups were found to be very similar in scholastic aptitude as measured by the A. C. E. Linguistic test and the Michigan State University Reading Test. They were also similar in scholastic achievement as measured by their grade point averages, and they were very similar in attitude toward the course at the beginning of the course.

Methodology

On four different occasions during the course a tape recording was made of the lecture. A portion of the lecture was played back to the students at the lecture session on the following day then was stopped at a point just before the

instructor had made some specific point. The students were then asked to state in writing what had happened next and what they were thinking of at the time. Three persons were asked to judge each student's response to the question of what he had been thinking of as being subject-matter centered, self-referent, or falling into neither of these categories. They were also asked to rejudge the responses as being active, passive, or uncertain.

Post-experimental Measures

At the end of the course the control and television groups were again given the Michigan State University Test for Attitude Toward any College Course to determine whether any significant differences in attitude toward the course was found between the two groups. Upon completion of the course the groups were also compared for grades obtained in the course, and evaluation by their instructors of their relevant participation in the class discussions.

Null Hypotheses

I. It had been hypothesized that the students ability to concentrate on the subject matter would be independent of the method of receiving instruction.

II. It had been hypothesized that the attitude of the

students in the control and experimental groups at the end of the quarter also would be independent of the method of receiving instruction.

III. It had been hypothesized that the contributions to the discussion sessions over the content of the lectures by the students in the two groups would be independent of receiving the lecture.

IV. There would be no significant difference between the two groups in scholastic achievement as measured by final grades obtained in the course.

Conclusions

Null hypothesis I was accepted since the results of the stimulated recall indicated that ability to concentrate on the subject matter of the lectures was independent of the method of receiving the lecture.

Null hypothesis II also was accepted inasmuch as the attitude of the control and experimental students toward the course at the end of the quarter was independent of the method of receiving the lecture.

Null hypothesis III, that the contributions of the students to class discussions would be independent of the method of receiving the lectures also was accepted.

Null hypothesis IV was also accepted because no significant differences were found between the television and groups in scholastic achievement as measured by final grades obtained in the course.

It cannot, of course, be concluded that no differences occur when the students receive the lecture by the different methods but can only be concluded that no significant differences were found in this investigation by the methodology used in this study.

Implications for Further Research

Investigation of scholastic achievement has generally revealed that students learning through televised lectures learn as well as those learning by the direct lecture method. So far as this investigator has been able to ascertain, however there have not been any studies to determine whether the information obtained through televised lectures is retained as well as that obtained from direct lectures. Since most television viewing is directed toward the field of entertainment which usually does not involve effort toward later recall of the material presented, the question may be raised whether lecture material obtained by the television medium is retained as well as that obtained from direct

lectures. This problem appears to merit investigation through reexamination of the students at intervals after completion of the course.

Another interesting area of study, although beyond the scope of the present investigation, would be an evaluation of the personality characteristics of those students who refuse assignment to the television lecture room compared to the students who accept the assignment. Personality dimensions to be investigated might be flexibility of approach to problem solving, conformity to social mores, and attitude toward authority.

It would also appear to be worthwhile to attempt to determine whether any differences occur in the students' perception of the instructor (rather than just attitude toward the course, as was done in the present study) when the lecture is heard by television rather than in the instructor's physical presence.

Selection for special study of those students who obtain extreme scores in their attitude toward a course might reveal significant differences between students in a television lecture room and those in a regular lecture room.

In the present study it is possible that differences

between the groups was obscured by the general scholarship of the students. A detailed study of those students whose grade point averages indicate a relatively low level of academic achievement might show differences which are not revealed in the rest of the students, and thus, not showing significant differences for the groups as a whole.

The students used in the control and television groups in this study were college students who presumably are fairly set in their motivation for learning and attitudes toward the learning situation. A replication of this study, using the same instruments, but applied to young children (perhaps early elementary school children) might reveal significant differences in these two methods when motivation and attitudes, presumably are not yet well established.

A replication of this study using other instruments to measure activity-passivity, thoughts during the lecture, and attitude toward the course might reveal differences between the groups which were not revealed in the present study, possibly due to lack of sensitivity of the instruments used.

The present study was carried out in a large State University in which students do not typically have the privilege of having a close relationship with their

instructors such as is enjoyed by students in a small college. A replication of this study using students who are accustomed to frequent close contact with their instructors might reveal differences which would not appear in a group of students who do not expect personal contact with their instructors.

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APPENDIXES

APPENDIX A

EXAMPLES OF SUBJECT-MATTER CENTERED RESPONSES ON STIMULATED RECALL

"When he said most of us were intelligent, and so on, I was thinking or wondering what he was going to say next pertaining to us being intelligent and so on."

"Association of this with Humanities Class."

"He gave the other method of learning. I was thinking about the first."

"Thinking of the principals of associationism."

"I was thinking of how I formerly believed that education consisted of learning facts."

"If these concepts were or are wrong what or which way is? (Confusion)."

"I was thinking about the right and wrong of the ideas presented."

"I was listening to that part because I remember all that which was on the tape."

"I was trying to remember what he had just said as I wasn't taking notes."

"How these were related to this course (in what aspect)."

"I was thinking of my individual classes of this type."

"The content of the lecture."

"At the time I was following the lecture."

"Examples that he (lecturer) had given."

"I was relating his talk with Humanities."

APPENDIX A (Continued)

"I was thinking how true this was as often things I have written in my notes are different than what the lecturer said."

APPENDIX B

EXAMPLES OF SELF-REFERENT RESPONSES ON THE STIMULATED RECALL

"At the time I was thinking how this pertained to me."

"Wondering if I should really be here in this school."

"I was thinking at the time how disjointed my notes were--and how quoted I knew one part of my notes wasn't right. How glad I was he didn't correct them."

"I was most likely thinking of the order and condition of my notes and way back some remote thought was dwelling on the tape recorder and would it be worth the tape."

"I remember that I was hoping he wouldn't collect notes as mine exactly understandable."

"I thought perhaps I should be taking more notes and perhaps paying more attention."

"At the time I was thinking about being in school and my own ability to learn."

"I was thinking of my entrance in college and what promoted me."

"I was thinking how sometimes my notes are unorganized and lack content because my mind wanders."

"What poor notes I do take and how I wouldn't want to have to show them to anyone."

"Evaluated in my own mind how different they (my notes) are from other people's notes."

"I was thinking of my notes--I should have taken better notes and listened more closely in order to understand the facts."

"I was thinking that I didn't really have many notes."

APPENDIX B (Continued)

"About the way my notes were put down."

"I was thinking he was right and started looking over the notes I had taken."

"Glad that he wasn't looking at my notes."

APPENDIX C

EXAMPLES OF IRRELEVANT AND UNCERTAIN RESPONSES ON STIMULATED RECALL

"I haven't the vaguest idea what I was thinking about. I suppose I was thinking about what he was to do next."

"Probably either the crossword puzzle or the movie I saw Friday night."

"I was involved in trading "Smokey" Burgess to New York along with two other players for Johnny Antonelli, but the lecture was still foremost in my mind."

"Partially the lecture but mostly my next class."

"Probably day-dreamed!"

"The afternoon homework probably."

"I'm afraid that I was concentrating more on Humanities at the time."

"I was sleeping--or almost and only heard parts."

"Thinking about a paper I had to write."

"I started thinking about dates etc. but was trying to make myself listen."

"The schooling I had had in the past and that which I am undergoing now."

"I was thinking of various people I had known through school. I guess I was kind of comparing them to his ideas."

"How repeatious he was."

"The fluctuations of the speakers voice seemed annoying."

"Noticing facial expressions. Smile as mentioned tape recorder."

APPENDIX C (Continued)

"Thinking of teacher who operated this way."

"Per haps we should have had a tape recorder, it would have held interest as well."

APPENDIX D

JUDGES SORTING FOR CONTROL GROUP ON INDIVIDUAL RESPONSES

Sorting Key--Number 1 is "Subject-matter centered"

Number 2 is "Self-referent"

Number 3 is "Irrelevant and Other"

Students are identified by code number in left hand column.

Student Number	1a	1b	2a	2b	3a	3b	4a	4b	Final Rating
1.									
10.	2, 3, 2	3, 2, 3	2, 2, 1						2
13.		1, 2, 1	2, 2, 2	1, 1, 1					1
16.	3, 3, 2	3, 3, 3	1, 2, 2	1, 1, 2					3
19.			2, 2, 2	1, 2, 2					2
25.	1, 1, 1		2, 2, 2	1, 2, 2	1, 3, 1				3
28.			2, 2, 2	2, 2, 2		2, 2, 2	1, 2, 2		2
31.	1, 2, 2		2, 2, 1	1, 1, 2	2, 2, 2	2, 2, 2	2, 2, 2	1, 1, 1	2
34.		1, 2, 2	2, 2, 2	1, 3, 3			1, 1, 1		2
37.	3, 3, 3	3, 3, 3	1, 2, 1	2, 2, 2					3
49.	1, 1, 1	1, 2, 1	2, 2, 2	1, 1, 2	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1
52.									
55.			2, 2, 2			1, 2, 1			3
61.									
64.	1, 1, 1	1, 2, 2	1, 2, 1	1, 1, 1	1, 1, 2				1
70.									
73.									
79.									
85.									
88.	1, 3, 1	3, 1, 3							3
97.	3, 2, 2	1, 1, 1	2, 2, 2	1, 2, 2	2, 2, 2	1, 3, 1	1, 1, 2	1, 1, 1	3
103.	1, 1, 1		2, 2, 1	1, 1, 1					1
106.	3, 3, 3		2, 2, 2	1, 2, 2	1, 2, 2	1, 1, 2	1, 1, 2	3, 2, 2	2
109.		3, 3, 3							3
112.			2, 2, 1	2, 2, 2					2
118.	2, 2, 1	3, 2, 3			1, 1, 2	1, 1, 2			1
121.	1, 3, 1	3, 1, 3			1, 3, 3		1, 1, 1		1

APPENDIX D (Continued)

Student Number	1a	1b	2a	2b	3a	3b	4a	4b	Final Rating
124.									
127.									
130.			2, 2, 2	2, 2, 2					2
139.	2, 2, 3	1, 2, 2		1, 1, 1					2
142.						2, 2, 1			2
145.									
148.	2, 1, 2	1, 2, 1	1, 2, 2	1, 2, 2					2
154.	2, 3, 3	1, 2, 1							3
157.			2, 2, 2						2
160.			2, 2, 2	1, 1, 2					3
163.	3, 2, 3	1, 2, 2	1, 2, 1		1, 1, 1	1, 1, 1		1, 1, 1	1
166.									
172.	1, 1, 1	1, 2, 2	2, 2, 2	1, 1, 1	1, 1, 1	1, 1, 2			1
178.									
184.	1, 1, 3	1, 3, 1	2, 2, 2	2, 2, 2					3
187.	3, 3, 3	3, 3, 3	3, 3, 3						3
190.							1, 1, 1	1, 1, 2	1
193.									
196.	2, 2, 3	1, 2, 1							3
199.	1, 1, 1	1, 3, 1	1, 2, 2			3, 3, 3	1, 1, 1	1, 1, 1	1
211.	1, 2, 1	1, 2, 1							1
214.	1, 1, 1	1, 3, 1	1, 2, 2	1, 1, 1			1, 1, 2	1, 1, 3	1
220.	1, 1, 3	1, 3, 1	2, 2, 1	1, 1, 1	1, 1, 2		2, 1, 2	2, 2, 2	1
223.			1, 1, 2	3, 3, 2				1, 1, 1	2
229.	3, 1, 3	1, 3, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 2	3, 3, 3	1, 2, 2	1
232.	2, 2, 2	1, 2, 1	2, 2, 2	2, 2, 2				2, 2, 2	2
235.									
241.	1, 2, 2						1, 1, 2	2, 2, 2	2
250.									
256.	3, 3, 3	2, 3, 2							3
259.	2, 2, 2		2, 2, 2						2

*Column numbers refer to the four tape records. Letter "a" refers to first stimulated recall on each tape recording. Letter "b" refers to the second stimulated recall on that tape recording.

APPENDIX E

JUDGES SORTINGS FOR TELEVISION GROUP ON INDIVIDUAL RESPONSES

Sorting Key--Number 1 is "Subject-matter centered"

Number 2 is "Self-referent"

Number 3 is "Irrelevant and other"

Students are identified by code number in left hand column.

Student Number	1a	1b	2a	2b	3a	3b	4a	4b	Final Rating
2.	3,1,1	1,3,1	2,2,2						1
8.	2,2,2		2,2,2	2,2,2	3,3,3			2,2,2	2
11.									
14.					3,3,3	1,1,1	1,1,1		1
17.	1,1,1	1,1,1							1
20.									
23.	3,1,1	3,2,3		3,3,3		3,3,3			3
26.	2,2,2		2,2,1	1,2,1	1,1,1		1,1,2	1,1,1	1
29.	2,2,2				1,2,1				2
32.			2,2,2	1,1,1	3,3,3	3,3,2	1,1,1	2,2,2	3
35.	2,2,2		2,2,2	1,2,2			1,1,1	1,1,1	2
38.									
47.	1,2,2	2,3,2	2,2,2	1,1,1			1,1,2		2
50.	1,3,1	3,1,3	1,1,2	1,1,1			1,2,2	1,1,1	1
53.		3,3,3	2,2,2	2,2,2					2
56.									
59.		1,1,2	2,2,2						3
62.									
68.	3,1,1	1,3,1	2,2,2	2,2,2	1,1,3	3,3,3	1,1,2	1,1,2	1
71.			2,2,2	1,2,1					3
74.	1,1,3	1,1,2	2,2,1	1,2,1					1
77.	3,3,3	3,3,3							3
80.									
82.			1,2,2	1,1,1	3,3,3				3
86.			2,2,2		2,3,2	2,2,2			2
89.									
92.	2,3,3	3,2,3							3
95.	2,2,1	1,2,2	1,2,2	1,2,2					2

[illegible]

ROOM USE ONLY

~~JAN 20 1968~~

~~FUL 20 1968~~

~~AUG 2 1968~~

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