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THE EFFECT OF PROFESSIONAL LABORATORY OBSERVATIONAL EXPERIENCES ON ACHIEVEMENT IN A BASIC FOUNDATION COURSE IN EDUCATION AT THE UNIVERSITY OF OKLAHOMA

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THE EFFECT OF PROFESSIONAL LABORATORY OBSERVATIONAL EXPERIENCES ON ACHIEVEMENT IN A BASIC FOUNDATION COURSE IN EDUCATION AT THE UNIVERSITY OF OKLAHOMA

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CHAPTER I

THE PROBLEM: ITS BACKGROUND AND SCOPE

Introduction

There is currently in this country, due to a number of factors in the social setting, an almost unprecedented interest in the educational system. Particularly since the launching of the Russian satellite, Sputnik I, a growing awareness has developed concerning the relationship of education to the world leadership position of the United States. This has resulted in a critical appraisal of the school, its purposes, the content of the curriculum, methods of teaching, and teachers. As an inevitable consequence, programs designed to prepare teachers have also been subjected to increased scrutiny. This interest has stimulated critical evaluation of the teacher education program to provide improvement.

Professional laboratory experiences in the education of prospective teachers are not new. The earliest normal

schools in this country maintained schools for children where students might observe and practice the techniques of teaching. At the time when many teacher education programs consisted of one year's work, a large part of that year was spent with children in the model school. As the one-year program was extended to a four-year program the time given to professional laboratory experience was in many instances confined to one period of the four year curriculum and consisted of a course in student teaching.

In 1946 a sub-committee of the Committee on Standards and Surveys of the American Association of Teachers Colleges[1] went on record in support of professional laboratory experiences prior to student teaching in the program of professional education. This group adopted, among other recommendations, a set of standards governing laboratory experiences in teacher education. These standards, to be used as a guide in developing and improving programs, suggested that professional laboratory experience should be an integral part of the four or five year teacher education program.[2]

This sub-committee sent a questionnaire to member institutions of the American Association of Teachers Colleges

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[1]Now the Committee on Studies and Standards of the American Association of Colleges for Teacher Education.

[2]John G. Flowers et al., "School and Community Laboratory Experiences in Teacher Education," American Association of Teachers Colleges (Oneonta, New York: The Association, 1948), pp. 6-7.

to determine their general practices regarding professional laboratory experiences prior to student teaching. One hundred and fifty-seven of the one hundred and eighty-two member institutions returned the questionnaire. The data revealed that in most instances professional laboratory experiences prior to student teaching emphasize observation. This observation activity had these characteristics: (1) most often done as a part of professional courses--seldom in connection with academic courses, (2) generally done in close groups--infrequently on the basis of individual assignments, (3) usually confined to school situations and, in most cases, to the campus school, and (4) usually guided by the laboratory teacher.[1]

The data also indicated that there was a great diversity of opinion regarding the placement of these observational experiences in the four year program. A variety of opinions were stated regarding the type of experiences that were of the most value. The data indicated that many schools placed these experiences first in the freshman year, later the sophomore year, and still later abandoned the experiences. Hence, it would seem there was some doubt as to the value and purposes of the observations on the part of the institutions.

The Association for Student Teaching reported in its 33rd yearbook that 47 percent of the member institutions of the American Association of Colleges for Teacher Education

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[1]Ibid., pp. 64-141.

reported a 25 percent increase in the amount of professional laboratory experiences provided for their students. These same reporting institutions stated that the increased amount of professional laboratory experiences had created problems in providing adequate physical facilities for observation, in providing the quality of experiences desired, and in determining what experiences prior to student teaching were of the most value.[1]

Lucins[2] stated, on the basis of an analysis of reports made of observational experiences by students, that the value of many observations were questionable because of a lack of readiness on the part of the students. In many of the observations reported the students were not able to relate what had been observed to educational theory and practice. This she felt was possibly due to lack of adequate orientation prior to the observations.

A more recent study by Frantz[3] at the University of Nebraska found that 83 percent of the institutions preparing

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[1]Wayne R. Adams and Robert B. Touloure (eds.), Facilities for Professional Laboratory Experiences in Teacher Education, 33rd Yearbook (Athens, Ohio: Association for Student Teaching, 1954), pp. 56-100.

[2]Sister Mary Lucins, "Readiness for Professional Laboratory Experiences," The Journal of Teacher Education, X (September, 1959), pp. 310-314.

[3]Melvin L. Frantz, "An Analysis of Professional Laboratory Experiences Provided Prior to Student Teaching for Students Preparing to be Secondary School Teachers," Dissertation Abstracts, XX (Ann Arbor, Michigan: 1959), p.3232.

teachers provided opportunities for professional laboratory experiences in the form of observations to precede actual student teaching. In practically all institutions these observations were a part of the basic foundation courses in education. The proponents of this practice are convinced that only through these experiences can the student sense the true meaning of the educational principles and theories that in themselves are often uninteresting and not infrequently meaningless to the student.

A review of the research done in the area of professional laboratory experiences indicates the trend is toward providing more time for observational experiences in the teacher education program prior to student teaching. The view is widely held that direct observational laboratory experiences for students are essential in developing many of the basic concepts in teacher education. Research however is needed to answer questions such as: How much do professional laboratory experiences in the form of observation contribute to an understanding of educational principles and theories? Until satisfactory answers are found to questions such as this it is felt that research as described in this problem will be of value.

Statement of the Problem

This study was concerned with the problem: What is the effect of professional laboratory observational

experiences on student achievement in the social foundation course, The School in American Culture, a part of the basic foundation program in teacher education at the University of Oklahoma?

More specifically it was intended to compare the achievement of the following groups enrolled in the basic social foundation course, The School in American Culture, who:

1. did not have any professional laboratory observational experiences as a part of the course.

2. had professional laboratory experiences in the form of direct observational experiences at the University Laboratory School.

3. had professional laboratory experience in the form of vicarious observations through the use of specially prepared motion picture sequences and slides.

4. had professional laboratory experience in the form of vicarious observations through the use of specially prepared motion picture sequences and slides and also direct observations at the University Laboratory School.

A brief description of the course, The School in American Culture, is as follows:

> Units in the course of study are concerned with the development of public education in the United States; relationships of schools to the culture and influences of schools in the processes of cultural change; influence of cultural changes on schools and their curricula; and attitudes of various groups in American society toward public schools and their

purposes in terms of democratic ideals.[1]

The data used in making these comparisons were obtained from the administration of an achievement test which consisted primarily of items that reflected an understanding of educational concepts by students. In order to facilitate the analysis of the data the following specific null hypotheses were formulated:

H_{0_1} There is no statistical difference in achievement between those students who have no professional laboratory experiences in the form of observation as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of direct observation at the University Laboratory School.

H_{0_2} There is no statistical difference in achievement between those students who have no professional laboratory experiences in the form of observation as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials.

H_{0_3} There is no statistical difference in achievement between those students who have no professional laboratory experiences in the form of observation as a part of the

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[1]Bulletin of the University of Oklahoma, Issue for the College of Education, New Series No. 1388, (Norman: University of Oklahoma Press, November 8, 1960), p. 50.

course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials and direct observations at the University Laboratory School.

H_{0_4} There is no statistical difference in achievement between those students who have professional laboratory experiences in the form of direct observations at the University Laboratory School as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials.

H_{0_5} There is no statistical difference in achievement between those students who have professional laboratory experiences in the form of direct observations at the University Laboratory School as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials and also have direct observations at the University Laboratory School.

H_{0_6} There is no statistical difference in achievement between those students who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials as a part of the course, The School in American Culture, and those who

have vicarious experiences through the use of specially prepared audio-visual materials and also have direct observations at the University Laboratory School.

Limitations of the Study

1. This study was limited to the selected groups of students enrolled in the course, The School in American Culture during the fall semester of the school year 1960-61 at the University of Oklahoma.

2. This study was limited to the validity and reliability of instruments used as a part of the study.

3. This study was limited in the lack of complete control of the instructor variable. Instructors of relatively equal qualifications were assigned to each group. These instructors were all in the periphery of research project #73403100 of which this study was an extension. Treatments were randomly assigned to each group and information for the control variable was secured during the first week of class, thereby reducing the effect of the treatment and instructor on the data used as a control. This however, results in only partial control of this variable and must be considered a limitation in any results of the study.

4. This study was limited to only considering the effect on achievement in the understanding of educational concepts. Concepts, as defined by English and English, are knowledge that is not directly perceived through the senses

but is the result of the manipulation of sensory impressions.[1]

Procedure

This study was an extension of research project #73403100 funded by the New Educational Media Branch, United States Office of Health, Education and Welfare.[2]

Selection of Sample

The subjects for this study were from four sections of the six sections of students who were enrolled in the basic foundation course, The School in American Culture, during the fall semester of the school year 1960-61. These students were randomly assigned to each section during the regular enrollment period. Since many students tend to show preferences for instructors and for the time at which courses are offered, randomness of sample with respect to these factors was effected by eliminating the instructor's name from the class schedule and by assigning students to the various sections as they appeared for enrollment.

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[1]Horace B. English and Ava C. English, Dictionary of Psychological and Psychoanalytical Terms (New York: Longmans, Green and Co. 1958), pp. 105-106.

[2]W. R. Fulton, O. J. Rupiper, Selected Vicarious Experiences Versus Direct Observational Experiences of Pre-Service Teachers in the Foundation Areas of Professional Preparation at the University of Oklahoma, Report of Research Project funded by New Educational Media Branch United States Office of Education Department of Health, Education, and Welfare, (Norman, Oklahoma: University of Oklahoma, College of Education, 1961), pp. 105.

Approximately equal numbers of enrollees were maintained in each section throughout each registration day. The randomizing procedure gave each student an equal chance to be included in any one of the sections, regardless of the time at which the student was scheduled to enroll. This resulted in approximately 45 students being enrolled in each section. After the enrollment was completed no students were allowed to change sections.

The section having only the direct observations and the section having only the vicarious observations were two of the four sections included in research project #73403100. These two sections were randomly selected.

Organization for Observational Experiences

The treatments were randomly assigned to each section on the first day of class, which was conducted by the investigator, and the students were told the treatment which had been assigned to their group. In addition, a set of standarized instructions giving explicit directions relating to the conduct of the experiment was given to each participating student and faculty member.

Since it was not practical to arrange separate observations for each educational concept or understanding, it was necessary to group the concepts into clusters relating to a general objective for each unit in the course. This resulted in seven direct observational experiences and

seven vicarious observational experiences. Using these concept-clusters as a basis, suitable observational goals relating to these clusters were formulated. These goals were given to those students assigned to the observation groups to serve as a guide for their observations.

The time for students to make their observations was coordinated with the time that classroom consideration was being given to subject matter relating to the concept cluster. Those students having both the direct observational experiences and the vicarious observational experiences were provided with a vicarious observation prior to their making a direct observation at the University Laboratory School.

The unit objectives, together with the clusters of concepts served as criteria for selecting the film sequences which were used for the vicarious observations. These films were selected on the basis of the degree to which they depicted situations pertinent to selected concepts and understandings and the degree to which they portrayed educational situations which were also feasible for direct observational purposes. The criteria for selecting the film sequences were: (1) The objectives to be achieved should form the basis for the selection of materials. (2) Materials selected should present the sequences in logical progression. (3) Materials should be selected that will make possible the maximum utilization of length of class period. (4) Materials selected should avoid the development of negative attitudes. (5) The content

of materials selected should be free from inaccuracies. (6) Materials selected should be suitable for the level at which they are being used. (7) The materials selected must pertain to opportunities which relate to future experiences. (8) The events pictured by the film sequence should be of sufficient quality to stimulate understanding of conceptual principles. (9) The technical qualities of materials should be satisfactory. (10) Sequences should be sufficiently current to enhance understanding of conceptual principles.

Once a film sequence was identified, it was viewed and evaluated by faculty members responsible for teaching the course. Only those sequences which were considered the most illustrative of the pertinent objectives and concepts were retained. From a total of 69 films previewed in the area of The School in American Culture, fourteen sequences were selected. A list of these sequences may be found in Appendix A.

The film sequences were grouped so that the length of the vicarious observations conformed with the time allocated for direct observations. Each of the film sequence groups was then arranged in the order in which the concepts were being considered in the course.

Collection of Data

In order to assess the influences of the differences

between aptitude, attitude, and social class identification of the subjects in this study the following evaluative instruments were administered at the onset of the class sessions:

1. Cooperative School and College Ability Tests, form 1C which yield a verbal score and quantitative score designed to measure developed ability indicative of the relative academic success the student is likely to achieve in his next steps up the educational ladder.[1]

2. Minnesota Teacher Attitude Inventory designed to measure those attitudes of a teacher which predict how well he will get along with pupils in interpersonal relationships, and indirectly how well satisfied he will be with teaching as a vocation.[2]

3. Sims SCI Occupational Rating Scale designed to reveal the level in our social structure, e.g. the social class with which a person unconsciously identified himself. The scale consists of a list of forty-two occupations, representative of varying levels of socio-economic status. The SCI scale, not only disguises the purpose of the inquiry, but a numerical description of class affiliation

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[1]Examiner's Manual, Cooperative School and College Ability Tests, Cooperative Test Division, Educational Testing Service (Princeton, New Jersey: Education Testing Service, 1955), p. 3.

[2]Walter W. Cook, Carroll H. Leeds, and Robert Callis, The Minnesota Teacher Attitude Inventory Manual, (New York: The Psychological Corporation, 1951), p. 3.

is also obtained. It yields refined information and makes possible more exact investigation of the phenomenmon of class identification.[1]

In addition to the above instruments a test constructed to measure understandings and concepts for the course, The School in American Culture, was administered to all students in each section in order to measure the initial understanding of concepts by the individual subject. The understandings and concepts which were the basis for the construction of the test were formulated through the combined effort of the instructors for the course and a content analysis of the course.[2]

In constructing the test a variety of multiple choice test items with four alternate responses which related to each concept were written. The items were pooled and submitted to course instructors for their criticisms and suggestions with reference to structure, content, and adequate coverage. The one hundred items rated highest were then randomly arranged in mimeographed test booklets.

This test was administered as a final examination to all sections of the course during the 1959-60 spring semester for the purpose of determining the difficulty levels

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[1]Verner M. Sims, Sims SCI Occupational Rating Scale, Manual of Directions (New York: The World Book Company, 1952), p. 1.

[2]This test was constructed as a part of Research Project #73403100.

and discrimination indexes of items through item analysis techniques. Of the one hundred items chosen the eighty items of moderate difficulty with the highest discrimination values were retained and reassembled for the final form of the achievement test. The reliability of the final test was estimated by using scores for odd and even numbered items and applying the Spearman-Brown prophecy formula. The reliability coefficients and standard error of measurement were: $r = 0.778$ and SE measure $= 3.84$.

At the termination of the semester during the final examination period this test was administered as a post test.

In order to determine the concurrent validity of the test scores, zero-order correlations were computed between test scores and final grades in the course. Letter grades were converted to numerical values as follows: A was designated as twelve points; A- as eleven; B+ as ten; B as nine; B- as eight; C+ as seven; C as six; C- as five; D+ as four; D as three; D- as two and F as one point. The obtained correlations between the test scores and final grades for the course was: $r = 0.446$, which was significant at the 0.01 level.

Analysis of Data

Through the technique of multiple regression utilizing the independent variables of scholastic aptitude, attitude toward teaching, identification with a certain socio-economic level and the measure of initial concept and

understandings of the course, a composite score was computed for each subject. This score was used as an associated variable.

The mean achievement as measured by the post tests for all groups was analyzed through the use of analysis of co-variance. This technique permitted the adjustment of mean scores by removal of any regression effect of one or more identifiable independent variables.

An F-ratio was formed between the adjusted mean square for treatments and within-groups in order to test the significance of the differences among the means of the various treatments.

Conclusions and Recommendations

On the basis of this analysis of the data conclusions and recommendations were made and the findings were summarized.

Overview of the Following Chapters

In chapter two an analysis of related research is made and the analysis and interpretation of the data is presented in chapter three. Chapter four contains the summary, conclusions and recommendations.

CHAPTER II

REVIEW OF SELECTED RESEARCH STUDIES

Several studies relating to the value of professional laboratory observational experiences have been made. However, practically all of them were of a survey type and did not attempt to measure the effect of observational experiences on achievement in any particular course. Monroe[1] commented on the lack of such research in Vol. VI 1950 Editions of Encyclopedia of Educational Research.

The studies selected for review in this chapter, although not all directly related to this particular study were considered to be on the periphery. These were selected for detailed review because of their relationship to this study in such matters as population, course area, and the fact that they were concerned with professional laboratory experiences in the form of observation, either direct or vicarious.

Wey[2] conducted a study at Appalachian State Teachers

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[1]Walter S. Monroe (ed.), Encyclopedia of Educational Research (New York: The Macmillan Co., 1950), p. 1366.

[2]Herbert W. Wey, "A Study of the Difficulties of Student Teachers and Beginning Teachers in the Secondary Schools as a Basis for the Improvement of Teacher Education," Educational Administration and Supervision, XXXVII (February, 1951), pp. 98-107.

College during the school year of 1948-49. The purpose of this study was to do an analysis of the difficulties of student teachers and beginning teachers in order to use their difficulties as a basis for improving the teacher education programs.

A check list was devised for the subjects to use in reporting their difficulties. One hundred and thirty-eight student teachers, thirty-eight supervisors for student teachers, ninety-five beginning teachers who had graduated in 1948, and seventy-eight supervisors of beginning teachers completed this check list. Each group reported at three intervals during the school year.

The composite reports of these groups indicated that in general student teachers and beginning teachers had fifty-five specific difficulties. The five difficulties reported the greatest percentage of the time by all groups were, in order of times reported: (1) handling problems of pupil control and discipline, (2) motivating pupil interests and responses, (3) handling routine phases of classroom management, (4) adjusting to deficiencies in school equipment and materials, and (5) handling broader aspects of teaching techniques.

The student teachers felt that if they had had more observational experiences in the classroom prior to their student teaching assignment they would have had fewer difficulties. The beginning teachers reported a need for

more student teaching experience before going out on the job.

As a result of this study Appalachian State increased student teaching to full time for one semester. The institution has also inaugurated a program of professional laboratory experiences beginning during the freshman year.

The University of Wisconsin inaugurated a "September Experience" for senior students, in coordination with a professional education course which was a part of the secondary teacher education program. Mauth[1] reported on an attempt to analyze statistically the extent and nature of the value of this program.

The "September Experience" provided students preparing to be secondary teachers an opportunity to spend time in public schools prior to their enrollment for the fall term in their college. Directed observation and participation in classroom activities characterized this program.

The course with which this experience was coordinated had a duel aspect. One phase involved student teaching in an affiliated high school and was directed by the supervising teacher under whom the student worked. The other phase was

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[1]L. J. Mauth, "An Evaluation of the 'September Experience'," The Journal of Teacher Education, III (September, 1952), pp. 192-200.

concerned with the psychology of learning and was taught by staff members of the school of education.

In the spring prior to the experimentation, students anticipating registration in this course the following autumn were offered the opportunity to take part in a voluntary September public school visitation program prior to the opening of the semester. Assistance and direction were provided during the summer by sending observation guides and instructions to the students. Participants were asked to record the amount of time spent in visitation and the nature of their activities. Examination of these reports showed that thirty-six students had spent ten or more hours in classroom visitation and conferences with teachers. Thirty-four from this group (group I) were used in the experimental group for the analysis. Their achievement in the two aspects of the course was compared with that of two other groups of students enrolled in the same course.

Students who in May expressed an interest in the September opportunity but were unable to follow through on their intentions composed the first group in the control aspect of the experiment. This group resembled the experimental group in expressed interest and attitude but differed in not having the experience. They were designated as group II. The other control group (group III) was composed of students who neither expressed an interest nor participated in the experience.

The achievement of group I students was compared with the achievement of group II students to determine if the experience program itself had measurable effects. A comparison was made of the achievement of group I with that of group III to determine the possible advantages of an expressed interest plus participating in the program over the absence of both factors.

Thirty-four cases were selected for each of the three groups. The thirty-four students of group I spent a mean of twenty hours in observation of classroom activities and in conference with teachers. A mean of fourteen hours with a range from eight to thirty-six hours was spent in observation alone. Achievement in the course was evaluated by the supervising teachers and school of education instructors, degree of success being inferred from grades earned.

Grade data for the three groups were analyzed by comparing group means. The results showed no statistical difference in either the class or student teaching aspect of the related course. To determine if, for the experimental group, course success was related to the number of hours of time spent in the experience a correlational analysis was undertaken to determine the relationship between grades earned and total hours spent in the "September Experience". Results showed that coefficients of correlation approached significance, but were not significant. When only hours

spent in observation were analyzed, significance at the .04 level was attained for the student teaching aspect.

In further analysis of the data subjects from group I who had observed a total number of hours in excess of the group median of fourteen were compared to an equated group of subjects from group III. In this comparison there was a significant difference in achievement in favor of group I. A correlational analysis of the relationship of hours spent in classroom observation to grades received for these selected students from group I indicated a highly significant correlation.

Two major conclusions were formulated on the basis of the analysis. (1) A mean of nineteen hours of classroom observation in a "September Experience" resulted in a significant advantage to participating students, and (2) advantages of the "September Experience" were reflected primarily in the student teaching phase of the related college courses.

Robert B. Toulouse[1] made an analysis of student reports on direct observational laboratory experiences. These reports had been collected over a period of years and were required of students doing observation in their early professional education foundation courses. The

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[1]Robert B. Toulouse, "Student Evaluation of Laboratory Experiences in Education," Educational Administration and Supervision, XXXIX (March, 1953), pp. 155-160.

following pattern of reactions to observations appears in the report: (1) reduced fear of student teaching, (2) increased desire to teach, (3) increased understanding of individual differences, (4) increased understanding of importance of motivation and how to motivate students, (5) understanding need for depth in areas of specialization, and (6) recognized deficiencies of self, such as personal habits, lack of sense of humor, developing favoritism for certain students, and shyness.

In an attempt to determine what competencies and traits were developed by students through direct professional laboratory experiences a check list was constructed by Bradley.[1] The check list was filled out by students making the observations and by supervisors of thirteen agencies including the school where students observed. Each subject in this study was required to do twenty hours of observation.

The evidence compiled from an analysis of the check lists and by follow-up conferences held with supervisors and class instructors indicated that the following competencies and traits were checked by the students. (1) An increased realization that the school is only a part of the community, not all of it, (2) an appreciation of various community agencies, (3) an increased understanding of the behavior of

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[1]Gladyce H. Bradley, "Community Participation in Teacher Education," Educational Administration and Supervision, XXXIX (April, 1953), pp. 218-224.

children and adults, (4) an increased understanding of individual differences, (5) development of interests similar to those of the individual and the group with which one worked, (6) development of personal attitudes such as patience, self-control, imagination, a sense of humor and leadership abilities, (7) the ability to work cooperatively, (8) an increased understanding of the process of growth and maturation, (9) an understanding of how the school could work more effectively with various organizations, and (10) development of skill in the indirect control of behavior.

A study was done by Caruthers[1] at Maryland State Teachers College to determine (1) whether students were getting the proper kind of laboratory experiences and in the proper amount, and (2) to what extent these experiences were influenced by concurrent professional courses. The major conclusions reached by the study were: (1) range of experiences appeared to be satisfactory but amount of time spent in each subject area should be increased, (2) the professional courses simultaneously in progress with the laboratory experiences gave broader significance to the total educative situation, and (3) the keeping of records required by the study made students aware of relationships they had never noticed at any other time.

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[1]L. J. Caruthers, "Influences of Professional Courses on Laboratory Experiences," The Journal of Teacher Education, IV (September, 1953), pp. 222-226.

The University of Texas experimented with a junior level, six semester hour laboratory course for students preparing to be elementary teachers. This course was a prerequisite to student teaching and required each student to observe and participate for six hours per week for one semester in a particular classroom. Three hours of each week were spent in a session with a university professor interpreting and discussing what the student had observed during the week. The professors were asked to visit the classrooms each week when the students were observing.

Guide sheets giving suggestions for observation were provided for each student. These sheets included a list of specific things that students were to observe and record. Students were assigned in pairs to the classroom for observation.

The analysis of the course was done through the use of a diary kept by the students and by having students respond to the following statement. "If the course has changed or modified any of the ideas you formerly held about teaching children, please describe briefly what the change has been or is like."

The most pertinent reactions to this statement were: (1) Learned how many materials other than books were used. (2) Learned that children must be taught through the use of concrete things. (3) Learned that many of the duties of a teacher can be assumed by children. (4) Learned how to

interrelate units of work. (5) Learned something of the range of interests of elementary children, particularly primary. (6) Developed an ability to work with children.[1]

Nash[2] did a study in which two plans for the preparation of secondary school teachers were compared. Plan A was an experimental, combined courses plan, consisting of two courses in psychology and in education. It was so arranged that students had two consecutive hours of class time with the same instructor. The plan also provided a period of time for students to observe at various high schools. Plan B was the conventional approach to professional education and there was no time provided for observation. It consisted of six required courses in psychology and education and two elective courses. Students met for the conventional one hour period for a particular course.

Two criteria were used as the basis for comparison of the two plans. These criteria were: (1) teacher performance on the job, and (2) the ability of prospective teachers to apply principles of teaching to hypothetical teaching situations.

The data for criterion two were collected through a specially constructed test administered to fifty-one subjects

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[1]Clyde Martin, "Growing into Teaching," The Journal of Teacher Education, V (December, 1954), pp. 311-314.

[2]Curtis E. Nash, "A Comparison of Two Plans for the Preparation of Secondary School Teachers," Journal of Educational Research, XLVIII (May, 1955), pp. 687-692.

under Plan B and one hundred and forty-three subjects trained under Plan A. Data for criterion one were collected on a specially constructed scale during full day visits with the subjects during the latter part of their first year of teaching; twenty-nine of these subjects were trained under Plan B and forty-eight were trained under Plan A. Data were available on all of these subjects regarding criterion two.

The groups were "statistically equalized" through the technique of analysis of co-variance. Variables such as sex, age, marital status, intelligence, size and kind of school, number of classes taught, amount of daily preparation, and the ability to apply principles of teaching to hypothetical teaching situations were considered in this equalization. After adjustment on these variables, the teacher performance scale was used to compare the two groups.

The results indicated there was no statistical difference in the two plans in so far as producing teachers who were able to make practical applications of theory and knowledge during their first year of teaching.

Michigan State University in a cooperative venture with the Kellogg Foundation and the town of Marshall, Michigan, organized a professional laboratory observational experience for prospective teachers in 1946. Troy L.

Stearns[1] did a follow up study of this "Marshall Plan" during the school year of 1955-56, ten years after it was started.

In doing the follow up study a detailed questionnaire was developed and refined after a careful review of (1) the daily log written by students while in Marshall, (2) records kept of periodic group discussions and evaluations, and (3) records of final group evaluations. The questionnaire was sent to one hundred and seventy-three former students who had participated in the plan. One hundred and fifty-five students or 88.4 per cent of the total replied.

In addition to the questionnaire the investigator interviewed forty-seven of the participants who had responded to the questionnaire. Sixteen of the forty-seven subjects interviewed by the investigator were interviewed by a second person.

The findings indicated that eighty per cent of the students felt the experience was much more productive than work done during other terms on the university campus. The data also indicated that 72.9 per cent of the students felt that a professional laboratory experience such as the one they had participated in should be required in the professional education sequence.

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[1]Troy L. Stearns, "Off-Campus Laboratory Experiences in Teacher Education," College of Education Quarterly, II (October, 1956), pp. 3-7.

The things learned in the "Marshall Plan" that had the greatest carry over, in order of frequency, as reported by the participants were: (1) learning how a group can work together effectively, (2) developing better self expression, (3) getting a variety of ideas for teaching, (4) learning how an individual can contribute to a community effectively, (5) gaining ability to analyze and evaluate one's work and the work of the group, (6) using facts to support an opinion, and (7) being given responsibilities that helped them grow as people.

In an attempt to determine the attitudes of their graduates toward required undergraduate courses the Department of Education at the University of Wisconsin sent a questionnaire to former students who had graduated in the years 1957, 1955, and 1953. A total of 1,038 questionnaires were returned. Seventy-four percent of the respondents reported that those courses requiring professional laboratory observational experience were superior to those not requiring observational experience. These students also rated the block student teaching plan as superior to any other plan.[1]

A project designed to improve elementary education was conducted in 1959 at the University of Georgia, Athens,

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[1]Lindley J. Stiles, "Attitudes Toward Education Courses," The Journal of Teacher Education, X (June, 1959), pp. 182-188.

Georgia. One of the major phases of this project was to provide students with vicarious observational experiences through the use of projected slides. These slides depicted activities in which the prospective teacher would be engaged. The analysis of the data gathered in this project indicated that direct observational experiences were significantly of more value to the students than were the vicarious observational experiences.[1]

Hillson, Wylie and Wolfenberger[2] did an experimental study to determine if a direct observational experience in the form of a field trip to a mental hospital would result in a change of attitude toward mental hospitals. The subjects for this study were undergraduates enrolled in a required psychology course in a teacher education program. Subjects were randomly assigned to the experimental and control groups.

A scale measuring attitudes toward mental hospitals was administered to both groups on the same date. Three days later the experimental group observed at the hospital for one day. Three days after the observation both groups were without forewarning re-tested using the same scale.

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[1]Ben A. Bohnhorst et al., Some Promising Practices in Improving the Education of Teachers (Athens: University of Georgia, 1957).

[2]Joseph S. Hillson et al., "The Field Trip as a Supplement to Teaching, An Experimental Study," Journal of Educational Research, LIII (September, 1959), pp. 19-22.

The results of this measure showed that the control group's attitude remained constant while there was a change toward a more favorable attitude to mental hospitals by the experimental group. This change was significant at the 0.01 level of confidence.

An action research project was done to determine the value of professional laboratory observational experiences at Ball State Teachers College, Muncie, Indiana, under the auspicies of the Horace Mann-Lincoln Institute of School Experimentation, Teachers College, Columbia. This project was in process for a period of three years. In the writing of the final report of the study the investigators were unable to list any specific findings but did present some general implications formulated as a result of the study. Summarized briefly these implications were: (1) There was no factual data in the study supporting professional laboratory observational experiences early in the student's program, although students considered them desirable. (2) Students did respond favorably to opportunities for professional laboratory experience. Even where observation was on a voluntary basis the response of students was surprisingly positive. (3) Free discussion of professional laboratory experiences in classes and conferences was necessary to stimulate interest and to test student's powers of application and interpretation. (4) Early professional laboratory experience must

concentrate heavily on "how to observe." (5) Students must be taught to learn from their experiences.[1]

Gould[2] used three contrasting methods to provide observational experiences in an introductory education course. The three media used were direct observation, observation via closed-circuit television, and instructional films as vicarious observations. The purpose of this study was to compare these three observational media on (1) what students saw and interpreted as educationally significant under each median, (2) the acuity of student's perceptions in a "standardized classroom" following training under each medium, and (3) student's evaluation of the effectiveness of each medium as an aid to instruction.

Three instruments were developed to make the comparison in this study: (1) an instrument for summarizing student reports of incidents perceived as educationally significant during observations, (2) a film test of observational skills, and (3) the student report on observational experiences. The experimental design used was an incomplete

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[1]Margaret Lindsey et al., Improving Laboratory Experiences in Teacher Education (New York: Bureau of Publications, Teachers College, Columbia University, 1959), p. 261.

[2]Orrin E. Gould, "The Character of Observation Under Closed-Circuit Television, Classroom Visitation, and Instructional Films in an Introductory Education Course," (unpublished Ph.D. dissertation, University of Minnesota, 1960), pp. 293.

block arrangement with subjects being randomly assigned to the three treatments.

The statistical analysis of the data yielded the following findings: (1) the three media best served different observational objectives, i.e. they tended to supplement rather than replace each other, (2) no major differences emerged among the three media with respect to the visual instructional objectives for observation, and (3) students tended to favor direct observation over television, but either of these over instructional films.

A companion study to Gould's was done by Thompson[1] at the University of Minnesota. This study had as a purpose to compare possible relationships among three techniques of providing observational experiences and selected attitudes of students enrolled in a beginning professional education course. The three techniques of providing experiences were direct observation in the classroom, observation via closed circuit television, and vicarious observation using instructional films.

The attitudes of the subjects was measured using the Minnesota Teacher Attitude Inventory. A course rating scale was used to measure the attitude of the subjects in

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[1]Franklin J. Thompson, "Use of Closed-Circuit Television in Teacher Education: Relationship to Professional Attitudes and Interests," (unpublished Ph.D. dissertation, University of Minnesota, 1960), pp. 220.

regard to the lecture and laboratory observational experiences. A survey of opinions was used for measure of perceptions of directiveness in lecture and laboratory instruction. The preferences for method of instruction was determined by the Preferred Instructor Characteristics Scale.

The statistical techniques of analysis of variance and analysis of co-variance were used. The analysis of the data showed that there was no statistically significant difference in so far as the method of providing observational experiences effecting the attitudes of the subjects toward children. The subjects preferred direct observation to closed-circuit television and observation of closed-circuit television to instructional films as a method of observation.

Sizemore[1] investigated the effect on attitudes of prospective teachers toward teacher-pupil relationships through the use of vicarious observations in the form of selected films at Northeastern State College, Oklahoma. The subjects for this study were students enrolled in a course entitled, Introduction to Education, and a course entitled, General Psychology. Both of these courses were

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[1]Oral Glen Sizemore, "An Investigation of the Effects of Selected Films on Attitudes of Prospective Teachers Toward Teacher-Pupil Relationships," (unpublished Ed.D. dissertation, Oklahoma State University, 1961), pp. 132.

required in the teacher education program.

The Minnesota Teacher Attitude Inventory was administered to six sections of students during the first week of the term. Three sections of the subjects, two sections from the Introduction to Education course and one section from the General Psychology course, were then required to view six documentary films produced by the National Education Association. These films were selected because each illustrated some aspect of teacher-pupil relationship. These sections of subjects were designated as the experimental group. The three sections which comprised the control group did not make any observations. The Minnesota Teacher Attitude Inventory was administered again to all subjects at the end of the term.

The comparison of the data from the control and experimental classes yielded an F-ratio which indicated that viewing the films did not cause a statistically significant change of attitude toward teacher-pupil relationships. The comparison of data from the subjects enrolled in the course Introduction to Education approaches significance with the experimental group having a more positive attitude.

A further analysis of the data was done in which attitude change of males and females in the experimental group was compared. This analysis showed that there was a statistically significant difference in the attitude change

of females. This change was toward a more positive attitude.

Research project #73403100 of which the ensuing study was an extension was conducted at the University of Oklahoma during the fall term of 1960-61. This project investigated the effect of vicarious observational experiences as compared to the effect of direct observational experiences on achievement in the three basic foundation courses that constituted the professional education sequence at the University of Oklahoma. These three courses were, The School in American Culture, Human Growth and Development, and Educational Evaluation and Guidance.

The subjects who were required to make vicarious observations viewed selected film sequences that depicted educational facilities, behavioral situations, and developmental problems as they were emphasized in the three courses. The subjects who did the direct observations made their observations in the classrooms of the University Laboratory School. All subjects were given observational goals to use as guides while doing their observations.

The mean achievement of the treatment groups as measured by a post-test was analyzed through analysis of co-variance. An F-ration was formed for the test of significance. The results were as follows: There was a significant difference at the 0.01 level of significance in adjusted achievement means of the treatment groups for the

course, The School in American Culture. The students who had the vicarious observational experiences apparently achieved better than those who had the direct observational experience. The analysis of the data did not indicate a significant difference in the achievement of the treatment groups for the two courses, Human Growth and Development and School Evaluation and Guidance.[1]

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[1]Fulton, loc. cit.

CHAPTER III

ANALYSIS OF THE DATA

Presentation of the Analysis

The data for this study consisted of scores that were obtained from the administration of tests the first week of the semester and post-test scores obtained during the final examination period for each group. The tests that were administered during the first week of the term were designed to assess for each subject the influence of the differences between ability, attitude, social class identification, and initial understanding of concepts for the course, The School in American Culture. The post-test scores were used as the criterion variable.

In order to more easily use this data, the following symbolic equivalents were assigned.

Y Post-test

X_1 Composite

X_2 SCAT verbal

X_3 SCAT quantitative

X_4 MTAI

X_5 SCI

X_6 Pre-test

The scores for each of these tests may be found in Appendix B where the distributions were tabulated separately for each treatment group. After all of the data were obtained in order to facilitate calculations, the number of subjects in each treatment group was equated so that n = 41 for each treatment. This was done through the use of a table of random numbers.

To facilitate manipulation of the data the four groups of students were designated as groups A, B, C and D. These groups received treatments as follows: Group A had no professional laboratory observational experience; Group B had professional laboratory experience in the form of direct observational experiences at the University Laboratory School; Group C had professional laboratory experiences in the form of vicarious observation by viewing specially prepared "film sequences"; Group D had professional laboratory experiences in the form of vicarious observations by viewing specially prepared "film sequences" with each vicarious observation followed by a direct observation at the University Laboratory School.

The data were treated statistically in the following ways: (1) Pearson product-moment correlations were computed to demonstrate related directional distributions of test scores and linear relationships existing between the various sets of scores. (2) The technique of multiple regression was used to utilize the independent variables of X_2, X_3,

X_4, X_5 and X_6 in calculating a predicted score, $\tilde{X}_1$, for each subject. (3) An analysis of co-variance was used to permit adjustment of mean scores by removal of any regression effect of one or more identifiable independent variables.

The data obtained from the tests for the combined treatment groups were analyzed by computing Pearson product-moment correlations which are presented in Table One. There was a significant positive correlation between the post-test (Y) and the SCAT verbal (X_2), the post-test (Y) and the pre-test (X_6). There was also a significant positive correlation at the 0.01 level of significance between the SCAT verbal (X_2) and the pre-test (X_6). These results gave support to the assumption that in the case of these variables Y, X_2, and X_6 the scores would vary in the same direction. The coefficients of partial correlations shown in Table Two lend further support to this assumption.

The coefficients of correlation between the MTAI (X_4) scores and scores from the other variables were not significant. This was also true for the SCI (X_5) scores and the scores from the other variables.

A five-factor multiple regression equation was formulated utilizing the independent variables X_2, X_3, X_4, X_5, X_6, and a single composite score ($\tilde{X}_1$) was calculated for each student. The resulting equation was: $\tilde{X}_1 = 6.067 + 0.3435X_2 + 0.0775X_3 + 0.0622X_4 + 0.011X_5 + 0.4262X_6$.[1]

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[1]The multiple regression coefficients, coefficients

TABLE 1.--Matrix of Intercorrelations between Criterion and Predictor Variables (N = 164)

Variable	Y	X_2	X_3	X_4	X_5	X_6
Y	1.000	0.726**	0.355*	0.186	0.061	0.749**
X_2		1.000	0.345*	0.139	0.087	0.741**
X_3			1.000	-0.060	-0.158	0.332*
X_4				1.000	0.185	0.184
X_5					1.000	0.058
X_6						1.000
Mean	47.37	50.32	49.43	36.17	23.18	41.45
S.D.	7.706	8.048	8.884	7.334	4.768	7.982

*Significant at the 0.05 level of significance.
**Significant at the 0.01 level of significance.

Y Post-test

X_2 SCAT verbal

X_3 SCAT quantitative

X_4 MTAI

X_5 SCI

X_6 Pre-test

TABLE 2.--b-Coefficients and Partial Correlation Coefficients

Variable	b-Coefficients
X_2	0.343
X_3	0.077
X_4	0.062
X_5	0.011
X_6	0.426

Partial Correlation Coefficients	
$r_{12.3456}$	0.364*
$r_{13.2456}$	0.133
$r_{14.2356}$	0.094
$r_{15.2346}$	0.011
$r_{16.2345}$	0.434*

*Significant at the 0.01 level of significance.

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As previously stated the mean achievement as measured by the post-test for all treatment groups was analyzed through the use of co-variance. Co-variance is applicable to situations where experimental control of concomitant variables may be either impossible or impractical. Tate[1] points out in his discussion on co-variance that:

> It is possible to introduce control in two or more classes of experimental data by making allowance for initial differences among the classes which may have prejudiced the results of the treatment. Such control is possible in situations where there is available an associated measure for each of the final experimental measures. The analysis of differences among classes of final experimental data, taking into account differences existing among the associated data is conventionally known as analysis of co-variance. It ordinarily results in a substantial reduction of within-groups or error variance and thus leads to more precise results.

In the treatment of this data the composite score (X_1) for each subject was used as the associated measure for each of the final experimental measures, (Y post-test scores).

Lindquist[2] in his discussion of co-variance

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of partial and Pearson correlation, measures of central tendency and dispersions were computed by the staff of the University of Oklahoma Computing Laboratory.

[1]Merle W. Tate, Statistics in Education (New York: The Macmillan Co., 1959), p. 515.

[2]E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education (Boston: Houghton Mifflin Co., 1953), pp. 323-330.

emphasizes the importance of certain conditions underlying the test of significance for experimental treatments. These conditions are as follows: (1) The subjects in each treatment group were originally drawn either a. at random from the same parent population, or b. selected from the same parent population on the basis of their X measures only. The selection being random with reference to all other factors for any given value of X. (2) The X measures are unaffected by all treatments. (3) The criterion measure for each treatment group are a random sample from those for a corresponding treatment population. (4) The regression of Y on X is the same for all treatment populations. (5) The regression is linear. (6) The distribution of adjusted scores for each treatment population is normal. (7) These distributions have the same variance. (8) The mean of the adjusted scores is the same for all treatment groups.

In this study the assumption that condition one was met was supported by the random assignment of students to groups during the regular registration period as described in Chapter I. The assumption was further strengthened by plotting the composite scores on a frequency polygon and also applying the chi-square test of "goodness of fit" as described by Tate.[1] Condition two was met by securing the data used in computing the $\bar{X}_1$ variable for each subject

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[1]Tate, loc. cit., pp. 483-484.

during the first week of the term before the application of the treatments.

The assumption that condition three was met was supported by the random assignment of subjects to the groups and by the use of the chi-square test for small sample variances.[1] The obtained chi-square values did not fall in the 0.05 region of rejection for any treatment group.

Lindquist[2] stated that of conditions four through eight that perhaps the most critical was condition four which was that the regression of Y on X_1 was the same for all treatment populations. This assumption of homogenity of regression was tested as described by Lindquist. The obtained F values for this test did not approach significance for any of the treatment groups. Therefore, the assumption of homogeneous regression was tenable.

The condition of linerarity of regression was assumed on the basis of an inspection of the scattergrams of data. This was done in keeping with the recommendations of Lindquist because of the lack of preciseness of any statistical test for linerarity of regression. It was also necessary to assume that conditions six and eight were satisfied because of the lack of precise tests.

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[1]Tate, loc. cit., pp. 485-496.

[2]Lindquist, loc. cit., pp. 330-331.

Bartlett's Test of Homogeneity of Variance for variances with equal degrees of freedom was computed to support the assumption that condition seven was satisfied.[1] The value of the four variance estimates as presented in Table Three resulted in a chi-square value of 6.235 which failed to reach significance at the 0.05 level of confidence. Therefore, the assumption of equality of population variance was tenable.

TABLE 3.--Bartlett's Test of the Homogeneity of Variance of Four Treatment Groups with Equal Degrees of Freedom

Group	ΣX^2	df	Variance Estimates	Log S^2
A	1174.56	40	29.36	1.4677
B	968.47	40	24.21	1.3840
C	1981.08	40	49.53	1.6952
D	1681.25	40	42.03	1.6235
Sum			145.13	6.1704

In order to test the null hypotheses as they were presented in Chapter I and in keeping in agreement with the randomized design which was followed in collecting the data of the study the analysis of co-variance statistic for

[1]Allen L. Edwards, Experimental Design in Psychological Research (New York: Rinehart and Co., 1960), pp. 125-127.

completely randomized designs was applied. The procedure used was presented by Ostle.[1]

A restatement of each null hypothesis for the purpose of applying them to the data was now appropriate.

H_{0_1} There is no statistical difference in achievement between those students who have no professional laboratory experiences in the form of observation as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of direct observations at the University Laboratory School.

Data for this particular hypothesis were analyzed and are presented in Table Four. The analysis yielded a value ($F = 3.67$) which was not significant at the 0.05 level of confidence. In order to attain significance the F-value at one and seventy-nine degrees of freedom would have to be 3.97. On the basis of this analysis the hypothesis was not rejected.

H_{0_2} There is no statistical difference in achievement between those students who have no professional laboratory experiences in the form of observation as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-

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[1]Bernard Ostle, Statistics in Research (Ames, Iowa: The Iowa State College Press, 1954), pp. 386-392.

TABLE 4.--Summary of Analysis of Covariance for Group with No Observations Versus Group with Direct Observations

Source of Variation	Degrees of Freedom	Sums of Squares and Products			Deviation about Regression			F-Ratio
		ΣX^2	ΣXY	ΣY^2	$\Sigma Y^2(\Sigma XY)^2/\Sigma X^2$	df	ms	
Among Treatments	1	234.61	121.75	63.22				
Among Experimental Units Treated Alike (within treatments)	39	2143.04	2435.60	4506.59	1738.49	79	22.00	
Among Treatments								
Within Treatments (= total)	40	2377.65	2557.35	4569.81	1819.18			
Difference for testing among adjusted treatment means					80.69	1	80.69	3.67

visual materials.

The analysis of the data for this hypothesis is summarized in Table Five. In order to be significant with one and seventy-nine degrees of freedom at the 0.05 level of significance the obtained F-value must be equal to or exceed 3.97. The analysis yielded a value of ($F = 0.463$). The hypothesis could not be rejected.

H_{O_3} There is no statistical difference in achievement between those students who have no professional laboratory experience in the form of observation as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials and direct observations at the University Laboratory School.

Data for these hypotheses were analyzed and are presented in Table Six. The analysis yielded a value of ($F = 0.030$). This was not significant and on the basis of this analysis the hypothesis could not be rejected.

H_{O_4} There is no statistical difference in achievement between those students who have professional laboratory experiences in the form of direct observation at the University Laboratory School as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials.

TABLE 5.--Summary of Analysis of Covariance for Group with No Observations Versus Group with Vicarious Observations

Source of Variation	Degrees of Freedom	Sums of Squares and Products			Deviation about Regression			F-Ratio
		ΣX^2	ΣXY	ΣY^2	$\Sigma Y^2(\Sigma XY)^2/\Sigma X^2$	df	ms	
Among Treatments	1	11.56	1.75	1.22				
Among Experimental Units Treated Alike (within treatments)	39	3155.65	3083.32	4481.66	1469.21	79	18.59	
Among Treatments								
Within Treatments (= total)	40	3167.21	3085.07	4482.88	1477.82			
Difference for testing among adjusted treatment means					8.61	1	8.61	.4631

TABLE 6.--Summary of Analysis of Covariance for Group with No Observations Versus Group with Vicarious Observations and Direct Observations

Source of Variation	Degrees of Freedom	Sums of Squares and Products			Deviation about Regression			F-Ratio
		ΣX^2	ΣXY	ΣY^2	$\Sigma Y^2(\Sigma XY)^2/\Sigma X^2$	df	ms	
Among Treatments	1	8.11	10.38	13.28				
Among Experimental Units Treated Alike (within treatments)	39	2855.82	2822.40	4632.83	1843.46	79	23.33	
Among Treatments								
Within Treatments (= total).	40	2863.93	2832.78	4646.11	1844.15			
Difference for testing among adjusted treatment means					.69	1	.69	.0295

The summarization of the analysis of this data is presented in Table Seven. The obtained value of ($F = 1.536$) was not significant with one and seventy-nine degrees of freedom.[1] The hypothesis was not rejected on the basis of this analysis.

H_{O_5} There is no statistical difference in achievement between those students who have professional laboratory experience in the form of direct observations at the University Laboratory School as a part of the course, The School in American Culture, and those who have professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials and also have direct observations at the University Laboratory School.

Table Eight is a summary of the analysis of the data for this particular hypothesis. The analysis of the data resulted in an obtained value of ($F = 2.283$). This was not significant with one and seventy-nine degrees of freedom. The hypothesis could not be rejected.

H_{O_6} There is no statistical difference in achievement between those students who have professional laboratory experiences in the form of vicarious observations through

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[1]This finding was different from Research Project #73403100 of which this study was an extension. Further analysis indicated this difference was probably due to the difference in the number of subjects involved in the respective studies.

TABLE 7.--Summary of Analysis of Covariance for Group with Direct Observations Versus Group with Vicarious Observations

Source of Variation	Degrees of Freedom	Sums of Squares and Products			Deviation about Regression			F-Ratio
		ΣX^2	ΣXY	ΣY^2	$\Sigma Y^2(\Sigma XY)^2/\Sigma X^2$	df	ms	
Among Treatments	1	141.98	81.58	46.88				
Among Experimental Units Treated Alike (within treatments)	39	2949.56	3128.85	4966.69	1647.66	79	20.85	
Among Treatments								
Within Treatments (= total)	40	3091.54	3210.43	5013.57	1679.68			
Difference for Testing Among Adjusted Treatment Means					32.02	1	32.02	1.536

TABLE 8.--Summary of Analysis of Covariance for Group with Direct Observations Versus Group with Vicarious Observations and Direct Observations

Source of Variation	Degrees of Freedom	Sums of Squares and Products			Deviation about Regression			F-Ratio
		ΣX^2	ΣXY	ΣY^2	$\Sigma Y^2(\Sigma XY)^2/\Sigma X^2$	df	ms	
Among Treatments	1	330.01	210.64	134.45				
Among Experimental Units Treated Alike (within treatments)	39	2649.72	2869.92	5117.85	2009.42	79	25.44	
Among Treatments								
Within Treatments (= total)	40	2979.73	3080.56	5252.30	2067.50			
Differences for Testing Among Adjusted Treatment Means					58.08	1	58.08	2.283

the use of specially prepared audio-visual materials as a part of the course, The School in American Culture, and those who have vicarious experiences through the use of specially prepared audio-visual materials and also have direct observations at the University Laboratory School.

The data for this hypothesis was analyzed and yielded an obtained value of ($F = 0.069$). A summarization of this analysis is presented in Table Nine. The obtained value of ($F = 0.069$) was not significant therefore the hypothesis was not rejected.

Interpretation of Analyzed Data

The primary objectives of this study were to determine the effect of professional laboratory experience on achievement as measured by a post-test in the course, The School in American Culture, and to compare the effectiveness on achievement, as measured by a post-test, of direct observational experiences, vicarious observational experiences, and a combination of vicarious and direct observational experiences at the University Laboratory School. The analysis of the data indicated there were no significant differences between the adjusted mean achievement of students in any of the treatment groups as measured by the post-test. This study seems to support some of the earlier findings which showed that professional laboratory observational experience had no apparent effect on achievement.

TABLE 9.--Summary of Analysis of Covariance for Group with Vicarious Observations Versus Group with Vicarious Observations and Direct Observations

Sources of Variation	Degrees of Freedom	Sums of Squares and Products			Deviation about Regression			F-Ratio
		ΣX^2	ΣXY	ΣY^2	$\Sigma Y^2(\Sigma XY)^2/\Sigma X^2$	df	ms	
Among Treatments	1	39.07	29.68	22.52				
Among Experimental Units Treated Alike (within treatments)	39	3662.33	3515.67	5092.96	1718.08	79	21.75	
Among Treatments								
Within Treatments (= total)	40	3701.40	3545.35	5115.48	1719.60			
Differences for Testing Among Adjusted Treatment Means					1.52	1	1.52	0.069

Even though there was not enough difference in the adjusted means of the treatment groups to be statistically significant, significance was approached in some of the comparisons and seemed to be at least suggestive. (See Appendix C for table of adjusted means.) It was however impossible to form any definite conclusions based on these findings, because the differences observed were not significant at the 0.05 level of confidence.

The analysis of the data for comparing the treatment groups which had no observational experience as a part of the course with the treatment groups which had direct observational experiences at the University Laboratory School, yielded a value of ($F = 3.67$). To be significant at the 0.05 level of confidence with one and seventy-nine degrees of freedom the value would have to be ($F = 3.97$).

In evaluating this data it was determined that the treatment group with no observational experience had a higher adjusted mean achievement even though it was not significant at the 0.05 level of confidence.

In further study of the data it was found that the adjusted treatment mean of the treatment group which had the vicarious observations was higher than the adjusted treatment mean of the treatment group having the direct observations at the University Laboratory School. This also was the case when the adjusted treatment mean of the group having both the vicarious observations and the direct observations at

the University Laboratory School was compared to the adjusted treatment mean of the direct observation group.

The direct observations made by the subjects of this study did not appear to contribute significantly to their understanding of the effect of cultural level on education. Selective enrollment at the University Laboratory School may have resulted in a more homogeneous student body than is normally found in public schools.

The analysis of the data in testing all other hypotheses yielded an F-ratio of less than one. It was, however, observed that the adjusted mean achievement of the treatment group having both the vicarious observations and the direct observations at the University Laboratory School was higher than the treatment group having only the vicarious observations.

This observation tended to support previous research which state that because of lack of orientation students often fail to relate what they observe to educational principles. The treatment group which had both the vicarious observations and the direct observations had a vicarious observation before going to the University Laboratory School for a direct observational experience; hence, it could possibly have served somewhat as a media to orientate the students for the direct observation.

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CHAPTER IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study was designed to investigate the effect of professional laboratory observational experiences on achievement in a basic foundation course in Education at the University of Oklahoma. Specifically, it was to compare the achievement of the following groups enrolled in the course, The School in American Culture, who had: (1) no professional laboratory experiences as a part of the course, (2) professional laboratory experiences in the form of direct observation at the University Laboratory School, (3) professional laboratory experiences in the form of vicarious observations through the use of specially prepared audio-visual materials, (4) professional laboratory experiences in the form of vicarious observation through the use of specially prepared audio-visual materials and direct observational experiences at the University Laboratory School.

The data for this study were collected during the fall semester of the school year 1960-61. The subjects for the study were those students enrolled in four of the six

sections of the basic foundation course in Education, The School in American Culture. During the regular registration period the students were randomly assigned to the various sections. The randomness of sample was further assured by eliminating the instructors name from the class schedules and also by reserving an equal number of enrollment cards for each section for each day of enrollment. This gave each student an equal chance to be included in any one of the sections. After the enrollment was completed no students were allowed to change sections. This resulted in approximately 45 students in each section. After all data had been collected the number of subjects in each section were equated to facilitate the manipulation of the data. This was done randomly and resulted in each section having an ($n = 41$). The four different treatments were randomly assigned to the four sections.

Objectives and concepts based on a content analysis of the course were used for developing observational goals which were distributed to those students making observations, whether direct or vicarious. These observational goals also served as guides in selecting the "film sequences" which were used as material for the vicarious observations.

Subjects in those treatment groups that were required to make observations, direct and/or vicarious, made seven direct observations and/or seven vicarious observations. Subjects required to do both the direct and the vicarious

observations did a vicarious observation prior to doing a direct observation. The observations were coordinated so that the goals for a particular observation related to the subject content being discussed in the regular class.

In order to assess the influences of the differences between aptitude, attitude, social class identification, and initial knowledge of course content selected tests were administered to the students participating in this study at the onset of the class sessions. The Cooperative School and College Ability Tests, Form 1 C, the Minnesota Teacher Attitude Inventory, Form A, the Sims Social Class Identification Occupational Rating Scale and an achievement test were administered to each subject.

The achievement test was constructed through the combined efforts of the instructors for the course, The School in American Culture. It was based on a content analysis of the course and was administered at the onset of the class sessions to measure initial concept understanding and was administered at the end of the semester to measure final post-experiment concept understanding.

Pearson product-moment correlations were computed to demonstrate related directional distribution of test scores and linear relationships existing between the sets of scores. Through the technique of multiple regression utilizing the independent variables of scholastic aptitude, attitude toward teaching, identification with a certain

socio-economic level and initial concept understanding of the course, a composite (X_1) score was computed for each subject. The mean achievement as measured by the post-test for all treatment groups was analyzed through the use of analysis of co-variance. This technique permitted the adjustment of mean scores by removal of any regression effect of one or more identifiable variables. An F-ratio was formed between the adjusted mean square for treatments and within-groups in order to test the significance of the differences among the treatment means.

Conclusions

Under the conditions of this study and on the basis of an analysis of the data the following conclusions seem warranted:

1. Direct observational experiences at the University Laboratory School at the University of Oklahoma did not appear to contribute significantly to achievement as measured by the post-test.

2. Vicarious observational experiences by viewing specially prepared audio-visual materials did not appear to contribute significantly to achievement as measured by the post-test.

3. Vicarious observational experiences with each vicarious observation followed by a direct observation at the University Laboratory School at the University of

Oklahoma did not appear to contribute significantly to achievement as measured by the post-test.

4. Students who had direct observational experiences at the University Laboratory School at the University of Oklahoma did not achieve significantly more than students who had vicarious observational experiences by viewing specially prepared audio-visual materials.

5. Students who had direct observational experiences at the University Laboratory School at the University of Oklahoma did not achieve significantly more than students who had both the vicarious observational experiences and the direct observational experiences.

6. Vicarious observational experiences with each vicarious observation being followed with a direct observation at the University Laboratory School at the University of Oklahoma did not result in significantly higher achievement by students than the vicarious observational experience only.

7. For the purposes of this course, The School in American Culture, it appears that direct observational experiences at the University Laboratory School at the University of Oklahoma did not make a significant contribution to achievement.

8. For the purposes of this course, The School in American Culture, it appears that vicarious observational experiences do not make a significant contribution to

achievement.

Recommendations

There are many aspects of the effect of professional laboratory observational experiences for the course, The School in American Culture that were not included in the scope of this study. Other studies might well be concerned with:

1. Investigating the effect of professional laboratory observational experiences on the achievement of students with the different levels of aptitude, attitude toward students, and social class identification being considered.

2. Determining the effect of professional laboratory observational experiences on the achievement of students in this course with direct observations being made in different types of schools, i.e., with direct observations being made in selected metropolitan schools, small city schools, village schools, rural consolidated schools and rural schools.

3. Further investigation of the performance of students involved in this study in other areas of the teacher preparation program.

4. Determining if different types of professional laboratory observational experiences have an effect on student achievement on specific areas within this course.

BIBLIOGRAPHY

Books

Adams, Wayne R., and Toulouse, Robert B. (eds.) Facilities for Professional Laboratory Experiences in Teacher Education. Association for Student Teaching 33rd Yearbook, 1954.

Cottrell, Donald P. (ed.) Teacher Education for A Free People. Oneonta, New York: The American Association of Colleges for Teacher Education, 1956.

Edwards, Allen L. Experimental Design in Psychological Research. New York: Rinehart and Company, Inc., 1960.

English, Horace B., and English, Ava C. Dictionary of Psychological and Psychoanalytical Terms. New York: Longmans, Green and Company, 1958.

Flowers, John G., et al. School and Community Laboratory Experiences in Teacher Education. Oneonta, New York: American Association of Teachers Colleges, 1948.

Garrett, Henry E. Statistics in Psychology and Education. New York: Longmans, Green and Company, 1947.

Lindquist, E. F. Design and Analysis of Experiments in Psychology and Education. Boston: Houghton Mifflin Company, 1953.

Lindsey, Margaret., Mauth, Leslie., and Grotberg, Edith. Improving Laboratory Experiences in Teacher Education. New York: Bureau of Publications Teachers College, Columbia University, 1959.

McGeoch, Dorothy M. Direct Experiences in Teacher Education. New York: Bureau of Publications Teachers College, Columbia University, 1953.

Monroe, Walter S. (ed.) Encyclopedia of Educational Research. Revised Edition. New York: The Macmillan Company, 1950.

Ostle, Bernard. Statistics in Research. Ames: The Iowa State College Press, 1956.

Tate, Merle W. Statistics in Education. New York: The Macmillan Company, 1955.

Articles and Periodicals

Black, Marian Walters. "Programs of Laboratory Experiences in Teacher Education," Educational Administration and Supervision, XLI (November, 1955), 431-439.

Bradley, Gladyce H. "Community Participation in Teacher Education," Educational Administration and Supervision, XXXIX (April, 1953), 218-224.

Caruthers, T. J. "Influences of Professional Courses on Laboratory Experiences," The Journal of Teacher Education, IV (September, 1953), 222-226.

Hillson, Joseph S. et al. "The Field Trip as a Supplement To Teaching, An Experimental Study," Journal of Educational Research, LIII (September, 1959), 19-22.

Lucins, Sister Mary. "Readiness for Professional Laboratory Experiences," The Journal of Teacher Education, X (September, 1959), 310-314.

Martin, Clyde. "Growing into Teaching," The Journal of Teacher Education, V (December, 1954), 311-314.

Mauth, L. J. "An Evaluation of the 'September Experience'," The Journal of Teacher Education, III (September, 1952), 197-200.

McAuley, J. D. "A Laboratory Experience Program," The Journal of Teacher Education, III (December, 1952), 304-305.

Nash, Curtis E. "A Comparison of Two Plans for the Preparation of Secondary Teachers," Journal of Educational Research, XLVIII (May, 1955), 687-692.

Stearns, Troy L. "Off-Campus Laboratory Experiences in Teacher Education," College of Education Quarterly, II (October, 1956), 3-7.

Stiles, Lindley J. "Attitudes Toward Education Courses," The Journal of Teacher Education, X (June, 1959), 182-188.

Toulouse, Robert B. "Student Evaluation of Laboratory Experiences in Education," Educational Administration and Supervision, XXXIX (March, 1953), 155-160.

Unruch, Adolph. "What's Needed in Teacher Education," Phi Delta Kappan, XXVIII (March, 1956), 258-261.

Wey, Herbert W. "A Study of the Difficulties of Student Teachers and Beginning Teachers in the Secondary Schools as a Basis for the Improvement of Teacher Education," Educational Administration and Supervision, XXXVII (February, 1951), 98-107.

Whitney, Helen A. "Internship of Supervising Teachers and Its' Appraisal," Educational Administration and Supervision, XLIII (January, 1957), 23-32.

Reports

Bohnhorst, Ben A. Some Promising Practices in Improving the Education of Teachers. Athens: University of Georgia, 1959.

Fulton, W. R., and Rupiper, O. J. Selected Vicarious Experiences Versus Direct Observational Experiences of Pre-Service Teachers in the Foundation Areas of Professional Preparation at the University of Oklahoma. Report of Research Project funded by New Educational Media Branch United States Office of Education, Department of Health, Education, and Welfare, Norman, Oklahoma: University of Oklahoma, College of Education, 1961.

Unpublished Material

Frantz, Melvin L. "An Analysis of Professional Laboratory Experiences Provided Prior to Student Teaching for Students Preparing to be Secondary Teachers." Unpublished Ed.D. dissertation, University of Nebraska, 1959.

Gould, Orrin E. "The Character of Observation Under Closed Circuit Television, Classroom Visitation, and Instructional Films in an Introductory Education Course," Unpublished Ph.D. dissertation, University of Minnesota, 1960.

Sizemore, Oral Glen. "An Investigation of the Effects of Selected Films on Attitudes of Prospective Teachers Toward Teacher-Pupil Relationships," Unpublished Ed.D. dissertation, Oklahoma State University, 1961.

Thompson, Franklin J. "Use of Closed-Circuit Television in Teacher Education: Relationship to Professional Attitudes and Interests," Unpublished Ph.D. dissertation, University of Minnesota, 1960.

APPENDIX A

TABLE 10.--Observation Number, Film Sequence Titles, Titles of Films from which Film Sequences were obtained and Principal Distributors and/or Producers

Observation Number	Film Sequence Titles	Film Titles	Principal Distributors and/or Producers
1.	Democratic Teaching	Defining Democracy	Encyclopaedia Britannica Films
		Democracy	Encyclopaedia Britannica Films
	Controversial Issues	Freedom to Learn	National Education Association
2.	Culture	Man and His Culture	Encyclopaedia Britannica Films
	Changing Behavior	Who Will Teach Your Child	Mc-Graw Hill
	American Schools	Design of American Public Education	Mc-Graw Hill
3.	School and Community	School and Community	Mc-Graw Hill
	Schools in Transition	Who Will Teach Your Child	Mc-Graw Hill
4.	Rural Poverty	And So They Live	New York University
	Education of Migrants	A Desk for Billie	National Education Association
5.	Ethnic Prejudices	High Walls	Mc-Graw Hill
	Lower Class Culture	Learning to Understand Children, Part I	Mc-Graw Hill
6.	Drop-out	Problem of Pupil Adjustment: The Drop-Out	Mc-Graw Hill
	Consolidation	Schools March On	Mc-Graw Hill
	Inequality of Opportunity	Torchbearers of Tomorrow	Oklahoma Education Association
7.	Oklahoma Schools and Communities	Oklahoma Schools and Communities	University of Oklahoma

APPENDIX B

TABLE 11.--Distribution of Scores for Group Having No Professional Laboratory Observational Experiences

Y	$\hat{X}_1$	X_2	X_3	X_4	X_5	X_6
45	47.1	46	46	43	24	44
37	36.3	34	40	45	29	29
61	51.2	59	49	32	29	44
48	49.4	58	54	25	18	41
52	54.5	58	52	27	19	53
37	42.0	42	44	39	29	36
36	41.8	42	42	40	18	36
50	45.4	48	47	30	27	40
45	48.5	49	48	53	25	43
50	50.1	48	47	50	27	48
47	48.1	49	54	26	18	45
37	39.2	42	49	36	25	27
54	43.9	46	49	35	27	37
52	56.0	63	54	39	29	50
58	59.6	65	57	34	30	57
58	50.9	58	48	40	34	43
38	36.0	41	41	41	29	23
43	43.5	49	39	44	31	34
44	39.8	45	51	27	24	29
48	43.1	44	42	40	36	37
44	45.6	46	54	34	31	40
47	46.8	49	52	28	17	42
57	54.7	59	46	44	27	51
52	46.4	51	55	40	27	37
55	50.0	51	48	32	19	48
44	48.3	48	78	32	19	41
54	52.4	54	47	33	27	51
49	46.0	56	48	35	26	34
49	42.7	49	52	33	21	32
42	40.3	42	55	33	26	31
55	48.9	52	43	48	26	43
45	48.7	49	49	41	24	45
48	43.6	44	55	42	18	36
46	49.8	55	38	39	23	45
47	48.2	58	32	39	18	40

TABLE 11--Continued

Y	X_1	X_2	X_3	X_4	X_5	X_6
34	36.2	37	38	37	25	28
47	44.1	44	45	35	22	40
56	52.0	56	51	26	26	49
32	42.8	41	51	29	22	39
49	50.4	55	54	35	24	44
38	42.0	42	47	29	22	37

Y Post-test

X_1 Composite

X_2 SCAT verbal

X_3 SCAT quantitative

X_4 MTAI

X_5 SCI

X_6 Pre-test

TABLE 12.--Distribution of Scores for Group Having Professional Laboratory Experiences in the Form of Direct Observations

Y	X_1	X_2	X_3	X_4	X_5	X_6
47	47.8	49	39	31	27	46
47	47.8	49	54	28	24	44
41	45.0	56	43	26	23	34
49	53.1	59	49	42	25	47
56	58.8	60	56	38	21	59
55	55.5	60	44	48	24	52
51	46.7	51	55	44	18	37
50	52.0	52	57	51	21	47
42	45.0	42	64	30	20	41
45	49.0	59	47	35	18	39
60	54.9	60	57	35	28	50
51	47.1	45	42	45	29	45
34	44.8	45	39	47	24	40
51	48.8	49	51	35	19	46
41	43.1	42	38	32	20	41
32	46.2	54	52	33	17	36
52	52.6	51	63	35	19	51
34	36.6	35	39	26	23	32
49	48.4	55	58	33	20	39
50	48.5	45	55	54	15	45
68	55.2	62	51	37	22	50
45	47.6	45	56	36	28	45
53	58.1	65	49	42	25	54
55	49.5	48	49	39	24	48
49	50.0	48	68	32	18	47
54	48.0	46	51	51	18	44
50	56.1	65	56	47	33	47
51	49.9	54	51	43	28	43
53	51.1	55	51	37	24	46
54	54.0	54	45	43	14	54
44	44.4	42	45	41	32	41
49	52.0	59	73	24	21	43
54	54.5	62	51	26	22	50
50	50.4	54	57	40	15	44
43	48.6	48	49	37	34	46

TABLE 12--Continued

Y	X_1	X_2	X_3	X_4	X_5	X_6
32	44.2	44	63	34	23	37
41	44.1	39	51	28	18	44
60	58.1	60	73	33	26	55
56	51.0	56	56	44	26	43
62	60.0	66	49	34	19	59
42	46.5	49	49	34	19	41

Y Post-test

X_1 Composite

X_2 SCAT verbal

X_3 SCAT quantitative

X_4 MTAI

X_5 SCI

X_6 Pre-test

TABLE 13.--Distribution of Scores for Group Having Professional Laboratory Experiences in the Form of Vicarious Observations

Y	$\hat{X}_1$	X_2	X_3	X_4	X_5	X_6
56	55.1	60	51	33	20	52
62	61.3	68	54	43	24	58
43	48.4	48	49	41	24	45
31	41.8	44	38	26	25	37
50	46.6	48	43	40	28	42
56	58.1	63	73	24	19	54
54	46.1	45	49	35	20	43
46	44.2	45	43	33	21	40
41	43.7	51	42	34	22	34
59	51.0	48	49	42	26	51
40	40.9	42	64	27	14	32
43	42.8	42	48	27	26	39
54	50.6	55	63	35	19	43
54	47.7	55	60	33	23	37
55	58.3	66	49	47	21	53
41	40.1	42	38	25	18	35
46	48.8	52	54	40	29	42
32	30.6	38	49	33	12	13
61	58.2	66	60	39	18	52
46	38.6	41	57	29	28	28
46	40.5	41	39	37	06	35
43	43.3	49	46	33	25	34
50	50.6	58	35	38	30	45
55	52.7	58	49	35	26	48
48	45.7	46	45	55	26	39
44	43.5	45	52	42	33	35
46	44.5	48	43	34	25	38
49	52.2	55	56	34	26	48
50	46.3	49	47	39	23	40
42	43.1	42	56	30	18	38
61	57.0	63	64	31	23	52
35	39.0	38	37	42	25	33
50	54.2	63	60	32	20	46
39	41.7	42	45	39	30	35
43	45.6	49	48	25	31	40

TABLE 13--Continued

Y	X_1	X_2	X_3	X_4	X_5	X_6
31	35.9	42	20	27	23	28
52	56.4	59	46	46	20	55
42	39.8	42	52	23	22	32
50	56.1	62	80	44	18	46
49	53.3	63	47	40	23	45
45	42.8	46	47	41	18	34

Y Post-test

X_1 Composite

X_2 SCAT verbal

X_3 SCAT quantitative

X_4 MTAI

X_5 SCI

X_6 Pre-test

TABLE 14.--Distribution of Scores for Group Having Professional Laboratory Experiences in the Form of Direct and Vicarious Observations

Y	X_1	X_2	X_3	X_4	X_5	X_6
42	42.1	44	49	45	24	33
58	50.2	54	49	25	22	47
43	47.6	52	47	24	23	43
45	45.8	52	39	38	21	38
61	65.3	78	49	51	27	59
56	46.0	51	35	26	21	42
58	56.3	63	78	35	26	47
41	43.2	45	37	25	19	40
48	36.5	38	37	38	23	28
44	46.9	46	46	46	22	43
48	45.7	51	49	27	27	38
40	39.2	42	31	32	23	33
50	46.5	49	45	52	24	39
45	38.8	38	43	26	22	34
40	41.2	44	47	27	22	34
43	41.8	44	41	38	16	35
50	54.0	58	45	46	31	50
53	48.2	49	49	40	28	44
45	48.9	42	57	42	21	45
56	49.2	49	48	36	24	47
65	59.3	68	54	25	24	56
28	40.6	48	34	29	32	31
39	37.7	42	42	30	16	28
42	44.1	42	46	37	26	41
53	44.6	45	43	40	18	40
42	41.1	45	51	34	23	31
58	55.7	59	49	45	19	53
59	58.3	66	44	32	26	56
41	42.2	48	45	42	27	31
39	44.4	54	51	39	15	31
29	33.4	35	32	30	25	25
46	49.0	54	49	44	30	41
43	47.0	49	48	35	22	42
48	43.0	48	60	38	20	31
49	39.3	46	45	28	22	28

TABLE 14--Continued

Y	X_1	X_2	X_3	X_4	X_5	X_6
44	43.8	42	58	33	14	39
47	49.7	51	54	53	24	43
41	47.4	51	51	40	25	40
40	44.5	44	47	26	17	42
37	40.3	44	44	36	21	31
41	43.7	42	57	25	20	40

Y Post-test

X_1 Composite

X_2 SCAT verbal

X_3 SCAT quantitative

X_4 MTAI

X_5 SCI

X_6 Pre-test

APPENDIX C

TABLE 15.--Adjusted Treatment Means for Group with No Observational Experience Versus Groups with Direct Observational Experiences

($\overline{X}$ = 46.87, $\overline{Y}$ = 47.20, b = 1.06)

	Treatment A	Treatment B
$\overline{X}_i$	46.50	45.43
$\overline{X}_i - \overline{X}$	- 1.69	3.38
$b(\overline{X}_i - \overline{X})$	- 1.91	3.82
$\overline{Y}_i$	47.07	48.81
Adj. $\overline{Y}_i$	48.98	45.43

TABLE 16.--Adjusted Treatment Means for Groups with No Observational Experience Versus Groups with Vicarious Observational Experiences

($\overline{X}$ = 46.87, $\overline{Y}$ = 47.20, b = 1.06)

	Treatment A	Treatment C
$\overline{X}_i$	46.50	47.24
$\overline{X}_i - \overline{X}$	- 0.37	0.74
$b(\overline{X}_i - \overline{X})$	- 0.39	0.78
$\overline{Y}_i$	47.07	47.32
Adj. $\overline{Y}_i$	47.46	46.54

TABLE 17.--Adjusted Treatment Means for Groups with No Observational Experience Versus Groups with Vicarious Observational Experience and Direct Observational Experiences

($\overline{X}$ = 46.18, $\overline{Y}$ = 46.67, b = 0.99)

	Treatment A	Treatment D
$\overline{X}_i$	46.50	45.86
$\overline{X}_i - \overline{X}$	0.32	- 0.32
$b(\overline{X}_i - \overline{X})$	0.33	- 0.32
$\overline{Y}_i$	47.07	46.27
Adj. $\overline{Y}_i$	46.74	46.59

TABLE 18.--Adjusted Treatment Means for Groups with Direct Observational Experience Versus Groups with Vicarious Observational Experience

($\overline{X}$ = 48.56, $\overline{Y}$ = 48.07, b = 1.06)

	Treatment B	Treatment C
$\overline{X}_i$	49.88	47.24
$\overline{X}_i - \overline{X}$	1.32	- 1.32
$b(\overline{X}_i - \overline{X})$	1.40	- 1.40
$\overline{Y}_i$	48.81	47.32
Adj. $\overline{Y}_i$	47.41	48.72

TABLE 19.--Adjusted Treatment Means for Groups with Direct Observational Experience Versus Groups with Vicarious Observational Experience and Direct Observational Experiences

($\overline{X}$ = 47.87, $\overline{Y}$ = 47.55, b = 1.08)

	Treatment B	Treatment D
$\overline{X}_i$	49.88	45.86
$\overline{X}_i - \overline{X}$	2.01	- 2.01
$b(\overline{X}_i - \overline{X})$	2.17	- 2.17
$\overline{Y}_i$	48.81	46.27
Adj. $\overline{Y}_i$	46.64	48.44

TABLE 20.--Adjusted Treatment Means for Groups With Vicarious Observational Experience Versus Groups with Vicarious Observational Experience and Direct Observational Experiences

($\overline{X}$ = 46.56, $\overline{Y}$ = 46.79, b = 0.96)

	Treatment C	Treatment D
$\overline{X}_i$	47.24	45.86
$\overline{X}_i - \overline{X}$	.68	- .93
$b(\overline{X}_i - \overline{X})$	.65	- .89
$\overline{Y}_i$	47.32	46.27
Adj. $\overline{Y}_i$	46.67	47.16