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THE EFFECT OF VARIOUS FACTORS ON ACHIEVEMENT OF STUDENTS
IN THE FIRST AND LAST FOUNDATION COURSES OF
PROFESSIONAL EDUCATION PREPARATION AT THE
UNIVERSITY OF OKLAHOMA

A DISSERTATION
SUBMITTED TO THE GRADUATE FACULTY
in partial fulfillment of the requirements for the
degree of
DOCTOR OF EDUCATION

BY
HAROLD BURTON HUNNICUTT
Norman, Oklahoma
1962

THE EFFECT OF VARIOUS FACTORS ON ACHIEVEMENT OF STUDENTS
IN THE FIRST AND LAST FOUNDATION COURSES OF
PROFESSIONAL EDUCATION PREPARATION AT THE
UNIVERSITY OF OKLAHOMA

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CHAPTER I

THE PROBLEM: ITS BACKGROUND AND DEFINITION

Introduction

During the past decade public education received more critical attention than in any period of twice the length in the nation's history. Schools were faced with the problem of not only accommodating a tremendously expanding enrollment but of providing the quality of education for that enrollment which would be appropriate to the times and contributive to national survival.

The quality of educational programs is related in high degree to the character of teacher preparatory programs in institutions of higher learning. That these programs are not of consistently high quality is well known. To improve public education, therefore, critical attention must be devoted to the improvement of pre-service programs for the preparation of teachers.

The College of Education at the University of Oklahoma has as its major purpose the preparation of qualified teachers. More specifically, the purposes of the College of Education are:

. . . to plan, organize, and conduct programs of teacher education; to furnish professional courses in education included in the curricula for students preparing to teach; to collaborate with the other colleges of the University in matters pertinent to teacher education; to furnish advisory services for students concerning teacher education, to conduct experimental and research studies in education, and to collaborate with educational agencies, professional groups, school personnel, and others interested in the evaluation and improvement in educational opportunities, programs, and services.¹

Requirements for graduation from the College and for obtaining teaching certificates include elements of general education, specialization and professional education.

All students enrolled in the College and in the teacher education program were required to complete a common core of courses in the professional education sequence as a prerequisite to enrollment in student teaching. Hereafter in this study the common core courses will be referred to as foundation courses. These courses were described as follows:

Education 52--The School in American Culture. Units of Study: development of public education in the United States; relationships of schools to the culture and influence of schools in the processes of cultural

¹Bulletin of the University of Oklahoma, Issue for the College of Education, New Series No. 1308 (Norman: University of Oklahoma Press, November 8, 1960), pp. 29-30.

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.

Education 151--Human Growth and Development. Units of Study: sources and methods of gathering data; physical growth; intellectual development; social and emotional development; and introduction to learning.

Education 222--Educational Evaluation and Guidance. Units of Study: characteristics of effective evaluation and guidance; the classroom teacher's use of the materials and techniques of evaluation and guidance in the improvement of teaching and learning processes and familiarization with standardized tests and preparation of teacher-made tests.¹

When these courses were originally established it was assumed that each would include three lecture and discussion periods per week and one period devoted to the observation of educational situations at the University Laboratory School and other schools. Many people however closely related to the teacher education program in the University have felt that other kinds of experience might be as valuable as the direct observational experiences planned for these courses. The hypothesis was, therefore, developed that carefully selected vicarious experiences in the form of "film and slide sequences" might be as fruitful as direct observational experience at the University Laboratory School in developing some of the objectives and concepts contained in the courses in the common professional education core.

¹Ibid., p. 50.

A research project supported by the New Educational Media Branch of the United States Office of Education was conducted at the University of Oklahoma from September, 1959, to August, 1961, to test the above hypothesis.¹

Hereafter, the above project will be referred to as the research project. The writer participated in the research project as a research assistant from the inception to the completion including the writing of the report.

Briefly, the design of the research project was as follows. Students were assigned randomly to four sections of each of the three foundation courses during the normal enrollment period for the fall semester 1960-61. Two instructors who normally taught one or more sections of each of the foundation courses were selected to teach the sections included in the research project. Each instructor was assigned randomly to two sections of the same foundation course. Students in one section observed the carefully selected film and filmstrip sequences which depicted similar educational situations as directly observed by the other section at the University Laboratory School. Achievement tests for each course were constructed and administered to

¹W. R. Fulton and 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, A Report of Research Project Funded by New Educational Media Branch, United States Office of Education, Department of Health, Education and Welfare, College of Education, University of Oklahoma, Norman, Oklahoma, 1961.

determine the initial understanding of concepts and the final post-experiment understanding of concepts of each student. The Cooperative School and College Ability Tests Form 1C, the Minnesota Teacher Attitude Inventory Form A, and the Sims Social Class Identification Occupational Rating Scale were administered to each student. Hereafter, the tests will be referred to as SCAT, MTAI, and SCI, respectively. The research project data were treated statistically in the following ways: (1) correlational analysis, (2) regression analysis, and (3) testing differences among means by analysis of covariance.

An analysis of the data collected by the research project indicated that students who observed film and slide sequences in the foundation course, The School in American Culture, demonstrated a significantly greater understanding of concepts than did those students who observed directly at the University Laboratory School. No statistically significant differences between mean achievement of understanding of concepts of students participating in the two methods of observational experience in the other two foundation courses, Human Growth and Development and Educational Evaluation and Guidance were found. A statistically significant difference was found between instructors when testing differences among the means by analysis of covariance in Human Growth and Development. No difference between instructors was found in the first foundation course, The School in American Culture, and the last foundation course, Educational Evaluation and

Guidance. Hereafter, these two foundation courses will be referred to as the first and last foundation courses, respectively.

The findings of the research project suggested other possible areas of investigation. The investigators involved in the research project recognized that levels of ability frequently affect the results of an investigation where achievement is involved. But since the number of students involved in the research project in each section was approximately 40, a treatment by levels of ability could not meet the requirements of sample size.

The understanding of concepts in the basic foundation courses among students involved in the two observational experiences might be greatly affected by individual differences, particularly differences in scholastic ability, attitude and social class identification. And, since no statistically significant differences were found between students' understanding of concepts participating in the same observational experience with different instructors in the first and last foundation course, the two sections of the same observational experience could be combined in each course. The combined sections would more nearly meet the requirements for sample size if differences in ability, attitude and social class identification were to be compared. The findings of a study in the area of individual differences should have implication for more effective teacher education

programs.

Statement of the Problem

The basic problem of this study was to determine the differential effect of two types of observational experience on the understanding of concepts by selected students enrolled in the first and last foundation courses in the professional education sequence at the University of Oklahoma. The problem was: Can an understanding of educational concepts presented to students enrolled in the first and last foundation courses be attained as well by those who display low scholastic ability, undesirable attitudes and low social class identification as those who display high scholastic ability, desirable attitudes, and high social class identification when direct observation experiences at the University Laboratory School and explicitly prepared audio-visual materials are employed to aid in the understanding of these concepts?

Since the basic problem of this study was an extension of the previously discussed research project, sub-problems were similar in the two studies. The sub-problems were isolated as follows:

1. To formulate a list of conceptual principles which represent understandings of primary importance for students in the first and last foundation courses.
2. To prepare observational goals for each of the

two courses involved in the study which would serve as specific directions in both vicarious and direct observational groups.

3. To select suitable evaluative instruments to discover needed information concerning students' ability, attitude, and social class identification.

4. To develop experimental instruments which would measure students' understanding of formulated concepts in each of the two courses.

5. To provide comparable vicarious observational experiences by selecting and producing film and slide sequences.

6. To select the high- and low-ability, attitude, and social class identification levels from subjects enrolled in the first and last foundation courses in pre-service professional education at the College of Education of the University of Oklahoma during the fall semester of the 1960-61 school year.

Hypotheses

The general hypothesis was: There are no statistically significant differences in mean gain of the understanding of concepts of high- and low-ability, attitude, and social class identification levels of students within and between types of observational experience in the first and last foundation courses in the professional education sequence at the

University of Oklahoma.

The general hypothesis included thirty-six specific null hypotheses. This study involved the testing of the following specific null hypotheses.

H_{O_1} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course of high- and low-ability levels who participated in direct observational experience.

H_{O_2} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation courses of high- and low-ability levels who participated in direct observational experience.

H_{O_3} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course of high- and low-ability levels who participated in selected vicarious observational experiences.

H_{O_4} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course of high- and low-ability levels who participated in selected vicarious observational experiences.

H_{O_5} There is no statistically significant difference between mean gain in understanding of concepts by

students enrolled in the first foundation course who were in the high-ability level and participated in direct observational experiences and those who were in the high-ability level and participated in selected vicarious observational experiences.

H_{06} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the high-ability level and participated in direct observational experiences and those who were in the high-ability level and participated in selected vicarious observational experiences.

H_{07} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the low-ability level and participated in direct observational experiences and those who were in the low-ability level and participated in selected vicarious observational experiences.

H_{08} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the low-ability level and participated in direct observational experiences and those who were in the low-ability level and participated in selected vicarious observational experiences.

H_{0_9} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the high-ability level and participated in direct observational experiences and those who were in the low-ability level and participated in selected vicarious observational experiences.

$H_{0_{10}}$ There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the high-ability level and participated in direct observational experiences and those who were in the low-ability level and participated in selected vicarious observational experiences.

$H_{0_{11}}$ There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the low-ability level and participated in direct observational experiences and those who were in the high-ability level and participated in selected vicarious observational experiences.

$H_{0_{12}}$ There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the low-ability level and participated in direct observational experiences and those who were in the high-ability

level and participated in selected vicarious observational experiences.

H_{013} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course of high- and low-attitude levels who participated in direct observational experience.

H_{014} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course of high- and low-attitude levels who participated in direct observational experiences.

H_{015} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course of high- and low-attitude levels who participated in selected vicarious observational experiences.

H_{016} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course of high- and low-attitude levels who participated in selected vicarious observational experiences.

H_{017} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the high-attitude level and participated in direct obser-

vational experiences and those who were in the high-attitude level and participated in selected vicarious observational experiences.

H_{018} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the high-attitude level and participated in direct observational experiences and those who were in the high-attitude level and participated in selected vicarious observational experiences.

H_{019} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the low-attitude level and participated in direct observational experiences and those who were in the low-attitude level and participated in selected vicarious observational experiences.

H_{020} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the low-attitude level and participated in direct observational experiences and those who were in the low-attitude level and participated in selected vicarious observational experiences.

H_{021} There is no statistically significant difference between mean gain in understanding of concepts by

students enrolled in the first foundation course who were in the high-attitude level and participated in direct observational experiences and those who were in the low-attitude level and participated in selected vicarious observational experiences.

H_{022} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the high-attitude level and participated in direct observational experiences and those who were in the low-attitude level and participated in selected vicarious observational experiences.

H_{023} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the low-attitude level and participated in direct observational experiences and those who were in the high-attitude level and participated in selected vicarious observational experiences.

H_{024} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the low-attitude level and participated in direct observational experiences and those who were in the high-attitude level and participated in selected vicarious observational experiences.

H_{025} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course of high- and low-social class identification levels who participated in direct observational experiences.

H_{026} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course of high- and low-social class identification levels who participated in direct observational experiences.

H_{027} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course of high- and low-social class identification levels who participated in selected vicarious observational experiences.

H_{028} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course of high- and low-social class identification levels who participated in selected vicarious observational experiences.

H_{029} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the high-social class identification level and participated in direct observational experiences and those who were in the high-social class identification level and participated

in selected vicarious observational experiences.

H_{030} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the high-social class identification level and participated in direct observational experiences and those who were in the low-social class identification level and participated in selected vicarious observational experiences.

H_{031} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the low-social class identification level and participated in direct observational experiences and those who were in the low-social class identification level and participated in selected vicarious observational experiences.

H_{032} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the low-social class identification level and participated in direct observational experiences and those who were in the low-social class identification level and participated in selected vicarious observational experiences.

H_{033} There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the high-social class identification level and participated

in direct observational experiences and those who were in the low-social class identification level and participated in selected vicarious observational experiences.

H₀₃₄ There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the high-social class identification level and participated in direct observational experiences and those who were in the low-social class identification level and participated in selected vicarious observational experiences.

H₀₃₅ There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the first foundation course who were in the low-social class identification level and participated in direct observational experiences and those who were in the high-social class identification level and participated in selected vicarious observational experiences.

H₀₃₆ There is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the low-social class identification level and participated in the direct observational experiences and those who were in the high-social class identification level and participated in selected vicarious observational experiences.

Operational Definitions

1. Ability was considered as the verbal factor measured by the SCAT upon the results of which subjects were divided into two ability groups defined in the following manner:

a. The high-ability level consisted of those subjects whose scores on the SCAT Verbal were 0.675 of one standard deviation above the mean of the subjects involved in the research project in each of the courses.

b. The low-ability level consisted of those subjects whose scores on the SCAT Verbal were 0.675 of one standard deviation below the mean of the subjects involved in the research project in each of the courses.

The coefficient of reliability of the SCAT is 0.92 or above. The validity of the SCAT was given in terms of its correlation with other intelligence tests. The raw scores were converted to percentiles using appropriate national norms as established by the publishers. These percentiles were transformed into McCall's T-score equivalents.

2. Attitude was considered as 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 career as measured by the MTAI. The raw scores were converted to percentiles using appropriate national norms as established by the test publishers. The percentiles were converted to McCall's T-score equivalents. Means were computed for subjects involved in the research project in the two basic courses. The subjects were divided into two attitude groups defined in the following manner on the basis of MTAI results.

a. The high-attitude level consisted of those subjects whose MTAI T-scores were 0.675 of one standard deviation above the mean.

b. The low-attitude level consisted of those subjects whose MTAI T-scores were 0.675 of one standard deviation below the mean.

Students in the high-attitude level displayed desirable attitudes toward teaching while the low-attitude level displayed undesirable attitudes toward teaching as measured by the MTAI.

3. Social Class Identification was considered as the level in our social structure with which a person unconsciously identifies himself as measured by SCI. Scores were in raw score form. Means were computed for the subjects involved in the research project in each of the basic courses. Upon the results of the SCI the subjects were divided into two social class identification groups in the following

manner.

a. The high-social class identification level consisted of those subjects whose SCI scores were 0.675 of one standard deviation above the mean.

b. The low-social class identification level consisted of those subjects whose SCI scores were 0.675 of one standard deviation below the mean.

4. Vicarious observational experience groups were considered as the groups that viewed film sequences, filmstrips, and slides illustrating concepts in each of the courses.

5. Direct observational experience groups were considered as the groups that observed the concepts basic in each of the courses at the University Laboratory School.

6. Gain in understanding of concepts was considered as the difference between performance on the pre- and post-achievement tests constructed in the first and last foundation courses in the College of Education at the University of Oklahoma.

7. A concept was considered as knowledge that is not directly perceived through the senses but it is the result of the manipulations of sensory impressions.¹

¹Horace B. English and Ava C. English, A Comprehensive Dictionary of Psychological and Psychoanalytical Terms. (New York: Longman, Green and Company, 1958), p. 104.

Limitations of the Study

The study was limited as follows:

1. The selected groups of students enrolled in the first and last foundation courses during the fall semester of the school year 1960-61 at the University of Oklahoma were representative of the population normally enrolled.
2. The instruments used in the study were reliable and valid.
3. The analysis of the data and findings of the research project were valid and reliable.
4. Formulation of the objectives in the form of concepts and understandings for the courses was appropriate and adequate.
5. Film sequences used in vicarious observational experiences were appropriate and adequate for the development of adequate concepts and understandings.
6. The direct observation provided opportunity for the development of adequate concepts and understandings.

Methods of Procedure and Sources of Data

This study was an extension of the research project and the procedure of the study paralleled the procedure followed in the research project.

In approaching the basic problems of this study certain sub-problems were encountered which guided the

methods of procedure and the methods of collecting and evaluating data:

1. A list of conceptual principles which represented understandings of primary importance for the students of the courses was developed.

A content analysis of basic textbooks, references and outside readings, and lecture notes of instructors was made to identify the principles covered in the regular courses. These principles were referred to as concepts. Group conferences and informal discussions were held with each faculty member teaching the foundation courses in professional education. As a result of the content analysis and discussions, a list of concepts was formulated for each course in the study.

Each faculty member responsible for teaching the course ranked the concepts in order of importance and evaluated the concepts. A final list of concepts for each course was obtained by this procedure and was considered adequate for the purpose of this study.

2. Observational goals for each of the two courses involved in the study were prepared for students and were the same for either type of observational experience.

It was impractical to arrange separate observations for each concept; therefore, it was necessary to group the concepts into clusters relating to a general objective for each unit in the first and last foundation courses. On the

basis of the clustered concepts a list of illustrative situations was made. Upon the basis of the illustrations and clustered concepts a tentative list of observational goals was developed. The faculty members who had cooperated in the formulation of the concepts evaluated and made constructive revisions of the observational goals. The final list for each course was given to each student to guide his observation of educational situations.

3. Suitable evaluative instruments were selected to discover needed information concerning students' ability, attitude and social class identification.

The appropriateness of the instruments with reference to adequate norms, reliability, validity and practicality of administration were used as criteria in the selection of the instruments. The following standardized instruments were chosen:

Cooperative School and College Ability Tests 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

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

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

satisfied he will be with teaching as a vocation.¹

Sims SCI Occupational Rating Scale designed to reveal the level in our social structure--i.e., 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 . . . With the SCI Scale, not only is the purpose of the inquiry disguised but a numerical description of class affiliation is obtained . . . It yields more refined information and makes possible more exact investigation of the phenomenon of class identification.²

During the first two class meetings the SCAT, MTAI, and SCI were administered to all students involved in this study.

4. Experimental instruments which would measure understanding of established concepts of each participating student were developed for the first and last foundation courses.

The achievement tests designed to measure understanding were based on the concepts that were identified and selected for each course. A variety of multiple-choice test items with five alternate responses were constructed for first and last foundation courses and submitted to instructors of these courses for their criticism and suggestion. One hundred best items for each course were randomly arranged in test booklets and administered as a final examination to all students enrolled in the two

¹Walter W. Cook, Carroll H. Leeds, and Robert Callis, The Minnesota Teacher Attitude Inventory Manual (New York: The Psychological Corporation, 1951), p. 3.

²Verner M. Sims, Sims SCI Occupational Rating Scale, Manual of Directions (New York: World Book Company, 1952), p. 1.

courses in the spring semester of the 1959-60 school year. Difficulty levels and discrimination indices of the items were determined through item analysis techniques. Eighty items were retained and assembled for the final form of the achievement test. Each item had four alternate responses. The Spearman-Brown prophecy formula was used to estimate the reliability of the final test. The reliability coefficients and standard errors of measurements were the first foundation course, The School in American Culture, $r = 0.0778$ and $S.E._{meas} = 3.84$, and the last foundation course, Educational Evaluation and Guidance, $r = 0.616$ and $S.E._{meas} = 4.28$.

Concurrent validities of the test scores were determined by calculating zero-order correlations between test scores and final grades in the course. The correlations for the two respective courses were 0.446 and 0.501.

The achievement tests were administered to all students during the third class meeting and during the final examination period. The number of correct responses was used as the students' scores. Scores obtained during the initial administration of the achievement test were referred to as the Pre-test scores. Likewise, scores obtained in final administration of the tests were referred to as Post-test scores.

5. In order to provide comparable vicarious observational experiences to illustrate the concepts of each of the basic courses, film and slide sequences were selected

from currently available films and produced when sequences were not available.

The concepts and illustrations for each course served as criteria in searching for existing films that might contain sequences illustrating the concepts. The sequences were evaluated by the faculty members involved in each area of the study. Only the sequences which were considered the best illustration of the concepts were retained. Concepts not covered by the existing films were also determined. Shooting scripts were developed for the production of needed new material in each area of the study. The Motion Picture Unit of the University of Oklahoma produced the sequences.

The film sequences were grouped to correspond to the clusters of concepts described earlier in this chapter and the resulting vicarious observations were approximately thirty minutes in length and were arranged in the same order as the concepts.

Students in vicarious observational experience groups viewed the film and filmstrip sequences and the direct observational experience groups spent an equal amount of time observing at the University Laboratory School. The selection and composition of the two groups is discussed in the next section.

6. The subjects for this study in high- and low-ability, attitude and social class identification levels

were selected from students enrolled in the College of Education during the fall semester of the 1960-61 school year.

The sample for the research project was selected during the four-day registration period. An alphabetical schedule predetermined by the University of Oklahoma designated the time for a student to enroll. Instructor's names were omitted from the class schedule, and an equal number of enrollment cards were reserved for each day of the enrollment to assure randomness of the sample.

Approximately 45 students were enrolled in each section. Four sections in each of the first and last foundation courses were used in this study. Two teachers who normally teach one or more sections of each of the courses were assigned two sections of each course. Following enrollment a coin toss determined which of the two sections was the vicarious observational experience group for each teacher and the remaining section was then the direct observational experience group. The two instructors had relatively comparable qualifications. No students were allowed to change sections after the enrollment was completed.

Subjects were divided into high- and low-ability, attitude, and social class identification levels according to the operational definitions of the levels.

Analysis of the Data

The data for each student consisted of the scores from the research project in areas of ability, attitude, social class identification, initial concept understanding, and final concept understanding in the course in which the student was enrolled. In order to test the hypotheses, "t" tests were computed to determine whether or not there were significant differences in the mean gain in concept understanding of the groups being compared in each hypothesis.

Before the "t" tests were computed, normality was tested by the use of chi square technique and equality of variance was tested by F tests.

Conclusions and Recommendations

On the basis of the analysis of the data, conclusions and recommendations will be made and the findings summarized.

Overview of the Following Chapters

Chapter two consists of an analysis of related studies and the presentation and analysis of the data is reported in chapter three. The summary, conclusions, and recommendations are presented in chapter four.

CHAPTER II

REVIEW OF RELATED STUDIES

Numerous studies related to the value of professional laboratory experiences in foundation courses in professional education have been reported. But generally these studies have been in the form of surveys which did not attempt to measure the effects of various factors involved on achievement of students in pre-student teaching courses. In 1948 the sub-committee of the Standards and Surveys Committee of the American Association of Teachers Colleges reported:

"There is perhaps no phase of professional laboratory experiences where practices are more confused and more in need of study and experimentation than that of experiences that should precede student teaching."¹

In regard to research in laboratory experiences the Joint Committee of the American Association of Colleges for Teacher Education and the American Educational Research Association stated:

"The general status of evaluative research on laboratory experiences . . . cannot be regarded favorably. This status is due historically to lack of interest in the area until quite recently,

¹John G. Flowers et.al., School and Community Laboratory Experiences in Teacher Education (Oneonta, New York: The American Association of Teachers Colleges, 1948), p. 139.

and also to the real difficulty of doing reasonably conclusive research in such a diverse and varied field. . . . Most of the studies were rather fragmentary, are not well controlled, and do not yield very useful results."¹

The present study was concerned primarily with the effect that high- and low-ability, attitude and social class identification levels of students participating in direct or selected vicarious observational experiences would have on achievement in the first and last foundation courses in the professional education sequence at the University of Oklahoma. Therefore, the references to studies were confined to those relating to: (1) professional laboratory experiences of a direct or vicarious nature in foundation courses, and (2) an attempt to measure progress or achievement by instruments comparable to those used in this study of ability, attitude and social class identification of students in foundation courses.

Studies Relating to Professional Laboratory Experiences

In 1954 the Association for Student Teaching²

¹American Association of Colleges for Teacher Education, Needed Research in Teacher Education, A Report of the Joint Committee of the American Association of Colleges for Teacher Education and American Educational Research Association (Oneonta, New York: American Association of Colleges for Teacher Education, 1954), p. 45.

²R. Wayne Adams and Robert B. Toulouse (eds.) "State Programs for Providing Good Laboratory Facilities in Teacher Education," Facilities for Professional Laboratory Experience in Teacher Education, Thirty-Third Yearbook of the Association for Student Teaching, eds. Garold D. Holstine and Frank L. Steeves (Lock Haven, Pennsylvania: The Association for Student Teaching, 1954), pp. 58-59.

reported that members of the American Association of Colleges for Teacher Education estimated the growth in laboratory experiences for their state. Fewer than ten per cent estimated there had been no increase in laboratory experiences for prospective teachers. Most members of the latter organization estimated an increase of twenty-five per cent or more. Chief state school agencies agreed with these estimates.

Black¹ studied the laboratory experiences in the pre-service preparation of secondary teachers at six four-year institutions in Florida. The variations among and within institutions were noted. The organization of the program prior to the internship was found to depend upon the availability and adequacy of facilities both at the institution preparing teachers and the receiving community, and upon working relationships existing among personnel of the various agencies involved.

Sharpe² pointed to the great diversity of practice with respect to professional laboratory experiences. He stated that adequate programs of pre-student teaching laboratory experiences were almost non-existent--"merely pious hopes." Sharpe hypothesized that the future emphasis

¹Marian Watkins Black, "Programs of Laboratory Experiences in Teacher Education," Educational Administration and Supervision, XLI (November, 1955), pp. 431-439.

²Donald M. Sharpe, "New Horizons in Professional Laboratory Experiences," Journal of Teacher Education, XII (December, 1961), pp. 485-489.

would be on exploiting fewer experiences more completely.

In 1959, Williams, Deever and Flynn¹ surveyed the professional laboratory experiences in seventeen institutions in Oklahoma. In relation to the philosophy and purpose of pre-student teaching experiences the following points were noted: (1) observation of theory in practice, (2) understanding of child growth and development, and (3) development of broad understanding of total school situations. The institutions surveyed did not agree on the number of observation hours required to achieve these purposes with the variations ranging from 6 to 32 hours. Approximately one half of the institutions wanted a fixed number of observation hours required.

The sub-committee of the Standards and Surveys Committee of the American Association of Teachers Colleges reported the results of responses to a questionnaire by 157 persons from member institutions. One hundred twenty-one persons agreed, two disagreed and 20 persons agreed with reservation to the following principle:

"The nature and extent of professional laboratory experiences should be planned in terms of the abilities and needs of the student and should be an integral part of the total program of guidance."²

¹Chester S. Williams, R. Merwin Deever, Edward B. Flynn, Jr., "Professional Laboratory Experiences in Oklahoma," Journal of Teacher Education, XI (December, 1960), pp. 497-505.

²Flowers et. al., op. cit., p. 19.

The sub-committee¹ concluded that programs of professional laboratory experiences should recognize individual differences at the point of beginning laboratory experiences, in the nature of the experiences themselves, in their sequence, and in the length of time of continuing the activity. This same sub-committee stated that the amount and kinds of professional laboratory experiences included in the programs of each teachers college should be determined by the purposes to be served by such experiences, the needs of the individual student in the program, and the over-all design of the curriculum at each teacher education institution.

In discussing individual differences Stratemeyer and Lindsey stated that:

Each student is unique with respect to his individual capacity, his readiness, his purposes and needs. If learning from laboratory experiences is to be maximum, each experience must be selected on the basis of the characteristics and needs of the individual student. Hence, student teaching and other laboratory experiences which are rigidly set up with the same requirements for all students do not meet this principle.²

Lucina³ observed that successful professional laboratory experiences must be preceded by a readiness on the

¹Ibid., p. 22.

²Florence B. Stratemeyer and Margaret Lindsey, Working with Student Teachers (New York: Bureau of Publications, Teachers College, Columbia University, 1958), p. 47.

³Sister Mary Lucina, "Readiness for Professional Laboratory Experiences," Journal of Teacher Education, X (September, 1959), pp. 310-314.

part of the future student teacher. The factors listed in acquiring readiness included: (1) ability to observe and comprehend the relationship between principle and action expressed in the behavior of children, (2) the possession of a suitable vocabulary for self-expression and communication of the observation and reaction, and (3) the acquisition of desirable attitudes toward the learning situation. Lucina concluded that these purposes can be developed by college teachers of education courses.

Colvin¹ attempted to develop a series of direct experiences prior to student teaching which would enable future teachers to increase their readiness for supervised teaching and to observe and record what occurred as the planned program was put into effect. Students, teachers, principals and college supervisors helped to evaluate the learning experience of the students and the effectiveness of the project. The project consisted of one-half day of observation and participation in teaching-learning situations per week. One class period per week was devoted to discussions based on the experiences of students, utilization of materials of instruction, the principles of planning and evaluation, and the qualities which contribute to successful teaching.

¹Cynthia M. Colvin, "Achieving Readiness for Student Teaching Through Direct Experience," (Detroit: Wayne State University, 1958), 375 p. Abstract: Dissertation Abstracts XIX (1959), p. 3229.

The effects of Colvin's project were that students generally showed professional growth, although striking differences among students were noted in the degree of understanding and the extent of competence revealed. Most students were less anxious about teaching, more eager to assume responsibility for guiding children and more able to identify factors involved in effective teaching. Weaknesses of the project were primarily due to insufficient time for direct observation of students and for analyzing the teaching-learning process. Another major weakness was that student growth was dependent upon the classroom practices of the teacher who was observed.

Bedna and Hahn¹ recognized three weaknesses of professional laboratory experiences: (1) observation was not being offered to students early enough in their program, (2) not enough total hours were devoted to observation, and (3) the observation that was taking place was too detached, lacking involvement. One section of the author's class were participant-observers and the other section did not observe. Ninety per cent of the students who participated and observed reported that this phase was the most valuable part of the course. Classroom teachers were enthusiastic but criticized the program for lack of continuity since students only observed and participated one day per week.

¹David B. Bedna and Robert O. Hahn, "Participating and Observing," Journal of Teacher Education, X (September, 1959), pp. 319-322.

Darrow¹ investigated the effects of a participation program on the attitude of prospective teachers enrolled in Human Growth and Development. She pointed to the need for preparation for observation and participation, and the evaluation and review of the student's experiences. No recommendation was made from the statistical treatment of three administrations of the MTAI. However, Darrow used a questionnaire to evaluate the participation and observation experience which consisted of one hour per day for two weeks at the laboratory school under one teacher. The results of the questionnaire showed that 76.79 per cent of prospective elementary teachers rated the experience as being of great value and 67.9 per cent of the secondary teachers rated the experience the same way. The remainder of each group rated the experience to be of moderate value.

Mauth² reported the results of an evaluation of a supplement, the "September experience," of the traditional type of demonstration school laboratory experience. Students preparing to be teachers were provided opportunities to spend time in public schools prior to enrollment for the fall term. Direct observation and participation character-

¹Harriet Driskell Darrow, "The Effects of a Participation Program on Attitude of Prospective Teachers," Teachers College Journal, XXXI (November, 1959), pp. 18-21.

²L. J. Mauth, "An Evaluation of the 'September Experience'," Journal of Teacher Education, III (September, 1952), pp. 197-200.

ized the programs. Materials and information gained were analyzed and used as a springboard during the ensuing term. Three groups were formed. Group I was interested in participating in the "September experience" and was able to do so. Group II was interested but did not participate. Group III was not interested in participating and did not do so. Thirty-four subjects were selected from each group so that age, total college credits earned, grade point average, number of credits in education, and rank in high school class were reduced to insignificance between the three groups. Group I spent a mean of 20 hours in observation. No statistical significance was found between groups in the grades received in the course following the "September experience." However, the hours spent in school visitation were found to be related to grades earned in student teaching. A mean of 19 hours of observation resulted in statistical significance while 14 hours of observation was not significant.

Research in the use of films and filmstrips in place of direct observations was limited. Gould¹ explored the usefulness of closed-circuit television as a medium for classroom observation in a beginning professional education course at the University of Minnesota. Three contrasting

¹Orrin 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.

media were used to provide observational experiences-- direct observation, closed-circuit television, and instructional films.

The three observational media were compared on what students saw and interpreted as significant, the activity of student's perceptions in a "standardized" classroom situation following training under each method, and student evaluation of the effectiveness of each medium as an aid to understanding instruction. Three instruments were constructed to make the above comparisons. Gould concluded from an analysis of his findings that: (1) closed-circuit television, direct observation, and instructional films best served different observational objectives and tended to supplement each other rather than replace one another, (2) no major differences were found among the media with respect to the usual instructional objectives for observation, and (3) students tend to favor direct observation over television and both of these observational methods were preferred over film observation.

Thompson¹, using the same groups as Gould, studied the use of closed-circuit television in teacher education and its relationship to professional attitudes as measured by the MTAI and interests inventories. No statistically

¹Franklin 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.

significant differences were found between the observational methods and gain in student's attitudes toward children. Student's attitudes were more directly related to differences in instructors than to differences in observational technique. Thompson concluded that the three media used were dependent upon skillful use by adequately prepared instructors for their effectiveness.

Voorhies¹ analyzed the opinions of pupil and college students concerning the use of closed-circuit television for observation of classroom instruction as compared to direct observation. Direct observation was judged slightly superior.

Driscoll² tested the null hypothesis that a survey course, Introduction to Education, could not be taught appreciably better by a visual method, closed-circuit television and films, and that such a method would yield no significant advantage over lecture or lecture-discussion methods, and that such visualized methods would be equally

¹William T. Voorhies, "An Analysis of Pupil and College Student Opinions Concerning the Use of Closed-Circuit Television for Observation of Classroom Instruction at Indiana University," (Bloomington: Indiana University, 1960), 284 p. Abstract: Dissertation Abstracts, XXI (1960), p. 558.

²John P. Driscoll, "The Comparative Effectiveness of High and Low Degrees of Visual Reinforcement of Concepts in a Survey Course in Education Utilizing Two Class Sizes," University Park: Pennsylvania State University, 1957), 121 p. Abstract: Dissertation Abstracts, XVII (1957), p. 1010.

effective in teaching a small or large group. The visual method group had a higher mean score on final objective examinations. The gain in factual learning was in favor of the controlled group but neither was significant. The MTAI was used as a pre- and post-test. The visually taught group gained 22.2 points while the controlled group gained 13 points. The difference was significant at the .001 level of significance.

Three institutions of higher education in Georgia attempted to improve elementary education in Georgia by having prospective teachers view slides. The slides depicted activities in which students would likely be engaged during their student teaching. The project reported that direct observational experiences were of more value to the students than the vicarious observational experiences.¹

Casper² measured the effect of different patterns in the use of sound motion pictures on teacher attitude and achievement in educational psychology courses in programs of teacher education in Kansas. The effect of using one, two, four or no films was compared. Achievement in the

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

²Wesley Casper, "An Experimental Evaluation of Certain Motion Picture Films in Selected Educational Psychology Classes in Kansas Colleges," (Minneapolis: University of Minnesota, 1956), 239 p. Abstract: Dissertation Abstracts, XVI (1956), pp. 1105-1106.

subject matter area was directly related to the greater use of films. Attitudes as measured by the MTAI gained significantly during the semester for all groups. However, no significant differences in attitudes were determined between the groups. Casper concluded that films were effective in undergraduate professional courses.

Fancher¹ at the University of Oklahoma compared the achievement of students enrolled in the first foundation course 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 observations at the University Laboratory School, (3) had professional laboratory experiences in the form of vicarious observations by viewing specially prepared audio-visual materials, (4) had professional laboratory experiences in the form of vicarious observations followed by direct observations. This study was an extension of the research project. No statistically significant differences were found in achievement between the groups.

Sizemore² used gain in pre- and post-scores on the

¹Billie E. Fancher, "The Effect of Professional Laboratory Observational Experiences on Achievement in a Basic Foundation Course in Education at the University of Oklahoma," (unpublished Ed.D. dissertation, University of Oklahoma, 1962), 81 p.

²Oral G. 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), 132 p.

MTAI in attempting to determine whether viewing of selected films caused viewers to change their attitudes positively toward teacher-pupil relationships. Comparisons by use of analysis of covariance of the control and experimental educational classes yielded an F ratio which was almost significant at the .05 level of confidence. A like comparison in the psychology classes was not significant. Sizemore concluded that when intrinsic interest in film content was present, since films were of teaching situations, attitude changes occurred. The comparison of males and females in the experimental group yielded an F ratio significant at the .05 level of confidence. This difference was not surprising in relation to research on the MTAI. Comparison of students in the experimental group having an IQ score over 100 on the Otis Gamma Test, Form FM with students in the control group of the same intelligence level were significant at the .10 level of confidence in both the education and psychology classes.

Studies Relating to the Affects of Ability,
Attitude and Social Class Identification
on Achievement

An investigation by Lunn¹ sought to determine the relationship between success in one of the three foundation

¹Mervel S. Lunn, Jr., "The Prediction of Success of Students Enrolled in Professional Education Courses at the University of Oklahoma," (unpublished Ed.D. dissertation, University of Oklahoma, 1961), pp. 143.

courses at the University of Oklahoma as measured by the achievement tests of the research project and scholastic aptitude and other selected characteristics. The sample used in the study was selected from the 632 subjects who participated in the research project.

Intercorrelations were reported between the achievement tests, Ohio State Psychological Examination Total and Reading Comprehension scores, Iowa High School Content Examination English and History scores, freshman grade point average at the University of Oklahoma, Cooperative School and College Ability Tests Verbal score, Minnesota Teacher Attitude Inventory scores, and Sims Social Class Identification Occupational Rating Scale. The numbers of subjects included in each sample were 113 and 75 for the first and last foundation courses, respectively. The 0.01 level of significance was established for this study. The SCI did not correlate significantly with any of the variables in either course. In the first foundation course, the MTAI correlated significantly with only the achievement test, the SCAT Verbal correlated significantly with all variables except the MTAI and SCI, and the achievement test correlated significantly with all variables except the SCI. In the last foundation course, the MTAI correlated significantly with all variables except the IHSC History and SCI, and the SCAT Verbal and achievement test correlated significantly with all variables except the SCI.

Clyde¹ reported the results of an empirical comparison of the SCAT and the American Council on Education Psychological Examination. Verbal scores for both tests were better predictors of academic success than were the quantitative scores. The SCAT was superior to the ACE in the types of predictions investigated.

Vertein² studied the personal-social and intellectual characteristics of students preparing to teach at Wisconsin State College and Institute of Technology. The subjects for the study were enrolled in an undergraduate educational psychology course. Vertein used a personal data booklet, Minnesota Multiphasic Personality Inventory, California Test of Mental Maturity, MTAI, an attitude scale toward method of teaching and course content, measure of achievement from special tests, high school percentile rank, and college grade point average.

The mean score on the MTAI was 22.87 which was lower than the mean of the MTAI norms, 44.1. The mean score on the CTMM was 112.96. Correlation between the CTMM and achieve-

¹Robert Burdette Clyde, "An Empirical Comparison of the School and College Ability Tests and the American Council on Education Psychological Examination," (Los Angeles: University of Southern California, 1961), 215 p. Abstract: Dissertation Abstracts, XXII (1961), p. 151.

²Lester Dale Vertein, "A Study of the Personal-Social and Intellectual Characteristics of a Group of State College Students Preparing to Teach," Journal of Experimental Education, XXX (December, 1961), pp. 159-192.

ment in educational psychology was 0.64.

Cox¹ used the MTAI to study the effects of laboratory experiences in professional education course prior to student teaching. One hundred and twenty-two juniors and seniors in a southwestern state teachers college who were enrolled in a professional education course, Human Growth and Development, were administered the MTAI at the beginning and end of the course. Students were randomly assigned to experimental and controlled groups. The students in the experimental group were assigned to spend one meeting per week for nine consecutive weeks assisting children and youth organizations in the community. The control group attended class but did not participate. The mean of the scores on the MTAI of the experimental group was 29.18 on the pre-test and 34.71 on the post-test while the controlled group scores were 21.85 and 28.00, respectively. The gain was significant at the .01 level of significance for both groups. The comparison of the gain of the experimental and controlled groups was not statistically significant. However, the empirical evidence was in favor of the experimental group:

Leton² evaluated the lecture, case centered, and

¹Dan Cox, "An Objective and Empirical Study of the Effects of Laboratory Experiences in a Professional Education Course Prior to Student Teaching," Journal of Experimental Education, XXIX (September, 1960), pp. 89-94.

²Donald A. Leton, "An Evaluation of Course Methods in Teaching Child Development," Journal of Educational Research, LV (November, 1961), pp. 118-122.

group centered methods for teaching a course, Child Growth and Development. The MTAI was administered as a pre- and post-test and achievement was measured by scores on the mid-term and final examinations. Achievement was not significantly related to teaching method. Significant gains in MTAI scores resulted in all methods. Differences between the mean gains of the methods were not significant. Although gains on MTAI scores correlated significantly with achievement scores.

In 1951 Downie and Bell¹ administered the MTAI to over 300 freshman and sophomore students. The freshmen were enrolled in their first education course, Introduction to Education, and the sophomores in their second education course, Child Development. The mean scores on the MTAI were 27.7 for freshman and 49.6 for sophomores. Comparisons of the mean MTAI of the freshman and sophomore groups were statistically significant.

Correlations between the MTAI scores, the ACE total score, over-all grade point average in college, and grades in education courses were computed. Correlation of the freshman MTAI scores were: ACE Total, 0.257; over-all grade point average, 0.289; and grades in education courses, 0.146. The correlations of the sophomores were 0.385, 0.296, and

¹N. M. Downie and C. R. Bell, "The Minnesota Teacher Attitude Inventory as an Aid in the Selection of Teachers," Journal of Educational Research, XLVI (May, 1953), pp. 699-704.

0.518, respectively. Only the correlation between freshman MTAI scores and grades in education courses was not significant at the 0.01 level.

Available biographical information indicated that students who scored high on the MTAI had a background of experience with young people, an interest in teaching, and were rated as good prospective teachers by their education instructors. Students with low MTAI scores tended to show the opposite of these traits.

Kearney and Rocchio¹ administered the MTAI to 612 seniors in four high schools of St. Paul Public Schools. Data sheets on occupational preference were secured. Fifty-six students who listed the occupational choice of "teacher" had a mean score of 25.38 on the MTAI. The remaining 556 had a mean score of 2.34. The difference between these means was significant at the 0.01 level.

Mueller and Mueller² used the socio-economic classification of the state population by the U. S. Census as a basis for determining the class origins of the student body of a college. Students enrolled in the school of education were in the middle groups.

¹Nolan C. Kearney and Patrick D. Rocchio, "Using the Minnesota Teacher Attitude Inventory in Counseling Prospective Teachers," Personnel and Guidance Journal, XXXIV (November, 1955), pp. 159-160.

²Kate Hevner Mueller and John H. Mueller, "Class Structure and Academic and Social Success," Educational and Psychological Measurements, XIII (Autumn, 1953), pp. 486-496.

Sims¹ administered the SCI to 726 public school teachers attending summer school at the University of Alabama. An analysis of the findings showed the following social class affiliations of the group: 2 per cent, upper; 13 per cent working class; and 85 per cent middle or upper middle.

In investigating the acceptance into one's own social class of the followers of occupations from a wide socio-economic range (occupational tolerance) Sims² reported the results of the administration of the SCI to 279 freshman at the University of Alabama. The SCI distribution of scores was skewed negatively with a mean of 20.6, a median of 22.00 and a standard deviation of 5.3. Product-moment correlation of the SCI with the American Council on Education Psychological Examination, 1949, Edition, of 0.237 was found.

¹Verner M. Sims, "The Social-Class Affiliations of a Group of Public School Teachers," The School Review, LIX (September, 1951), pp. 331-338.

²Verner M. Sims, "The Relation of Occupational Tolerance to Intelligence and Social Affiliation," Journal of Social Psychology, XL (August, 1954), pp. 17-21.

CHAPTER III

THE DATA

Presentation and Analysis of Background Data

Since the primary purpose of this study was to compare differences in the understanding of concepts, it seemed appropriate to use "t" tests between experimental groups for the means of SCAT Verbal, MTAI, SCI, Pre-test and Post-test scores. Accordingly, "t" tests for gains from the Pre-test to the Post-test were utilized.

The data consisted of scores obtained from the administration of the standardized and constructed tests. The raw and standard scores for these tests appear in Appendix A. The distributions were tabulated separately for each course by observational experience.¹

Guilford² stressed the need for testing the homogeneity of the two variances and the normality of the distributions before computing "t" tests. F tests and chi

¹Data for the two courses are listed in the final report of the research project (Fulton and Rupiper, op. cit., pp. 94-105.)

²J. P. Guilford, Fundamental Statistics in Psychology and Education (3rd ed.; New York: McGraw-Hill Book Company, 1956), p. 221.

square tests for goodness of fit were computed before applying "t" tests. Where F tests indicated homogeneity of variance of the two samples the sums of squares and the corresponding degrees of freedom were pooled to calculate the standard error of the difference between the two means. However, where F tests indicated heterogeneous variances, separate estimates of the population variance were used to calculate the standard error of the difference between the two means. The formula given by Edwards¹ for determining the critical value of "t" when the variances differed was used. For the purposes of this study the 0.05 level was established as the required level of statistical significance.

The results of the chi square tests for goodness of fit for the distributions of test scores obtained from performance on the SCAT Verbal, MTAI, SCI, and Pre- and Post-tests appear in Appendix B. Statistically significant chi square values were obtained for the MTAI scores of the vicarious observational experience group in the first foundation course and the direct observational experience group in the last foundation course, and for the Post-test scores. Therefore, the null hypotheses of no difference between the observed frequencies and expected frequencies

¹Allen L. Edwards, Experimental Design in Psychological Research (rev. ed.; New York: John Wiley and Sons, 1960), p. 107.

were rejected. This indicated that the distributions were not normally distributed. This did not invalidate the application to "t" test, for according to Edwards, if the populations were not normally distributed

. . . we shall not often be in error in tests involving means by using the "t" test, if the number of observations in each sample is sufficiently large.¹

Also, F test for homogeneity of variance for the same distributions appear in Appendix B. All F tests showed that variances were homogeneous except in the case for Pre-test scores in the last foundation course where F tests indicated that variances were heterogeneous.

The "t" values for the comparison of the direct and vicarious observational experience groups on the test scores, by test variable, for each foundation course are reported in Table 1. No significant differences were found between the means of test scores for the direct and vicarious observational groups in the first and last foundation courses. This indicated the direct and vicarious observational experience groups in each foundation course were comparable with respect to test performance.

Comparisons of the mean scores of the SCAT Verbal, MTAI, and SCI for the first and last foundation courses are reported in Table 2. A statistically significant difference, between mean scores on the MTAI was found. The difference

¹Ibid., p. 112.

was highly significant in favor of the last course.

This suggested that scores on the MTAI were directly affected by the first and second foundation courses.

TABLE 1.--Comparison of the Means of Direct and Vicarious Observational Experience Groups on Scholastic Ability, Attitude, Social Class Identification, Pre-test and Post-test Scores in the First and Last Foundation Courses

Test	Mean		Mean Diff.	S.E. Diff.	t
	DOE	VOE			
SCAT Verbal					
First (N=82)	303.54	300.80	2.74	1.955	1.40
Last (N=78)	304.31	304.85	.54	1.935	.28
MTAI					
First (N=82)	21.90	15.60	6.30	4.098	1.54
Last (N=78)	41.83	33.22	8.61	4.468	1.93
SCI					
First (N=82)	22.59	23.12	.53	.756	.70
Last (N=78)	23.05	24.32	.67	.822	.82
Pre-test					
First (N=82)	43.37	41.91	1.46	1.210	1.21
Last (N=78)	42.29	40.96	1.33	1.098	1.21
Post-test					
First (N=82)	47.40	48.12	.72	1.236	.58
Last (N=78)	49.04	48.33	.71	1.112	.64

Gains between the Pre- and Post-test Scores
of the Observational Experience Groups

Chi square tests for goodness of fit and F tests for the distributions of gains of observational experience groups appear in Appendix B. The chi square test for goodness of fit were non-significant. Therefore, the distributions were

assumed to be normal. The F test between the variances of the gains in understanding of concepts in the last foundation course indicated that the variances were heterogeneous.

TABLE 2.--Comparison of SCAT Verbal, MTAI, and SCI Scores for the First and Last Foundation Courses

Test	Means		Mean Diff.	S.E. Diff.	t
	First (N=164)	Last (N=156)			
SCAT Verbal	302.17	304.08	1.91	1.372	1.39
MTAI	18.75	37.53	18.78	3.017	6.22*
SCI	22.85	23.68	.83	.556	1.49

*Significant beyond the 0.001 level of significance.

The mean gain for each of the observational experience groups in each course are reported in Table 3. The "t"

TABLE 3.--Tests of Significance of the Mean Gain in the Understanding of Concepts for Direct and Vicarious Observational Experience Groups in the First and Last Foundation Courses

Course	Mean Gain		S. E. Diff.	t
	DOE	VOE		
First (N=82)	4.11	6.18	.593 .583	6.93* 10.60*
Last (N=78)	6.74	7.37	.562 .722	11.99* 10.21*

*Significant at the 0.001 level of significance.

values obtained were significant beyond the 0.001 level of significance. The results indicated that each of the observational experience groups made significant gains in understanding of concepts in each of the courses as measured by the Pre- and Post-tests. The comparison of the mean gains of the observational experience groups appear in Table 4. A statistically significant difference

TABLE 4.--Comparison of the Mean Gains in Understanding of Concepts for Direct and Vicarious Observational Experience Groups in the First and Last Foundation Courses

Course	Mean Gain		Mean Diff.	S.E. Diff.	t
	DOE	VOE			
First (N=82)	4.11	6.18	2.07	.832	2.49*
Last (N=78)	6.74	7.37	.63	.915	.69

*Significant at the 0.05 level of significance.

was found between the mean gains of the direct and vicarious observational experience groups in the first foundation course in the direction of the vicarious observational experiences.

Presentation and Analysis of Present Data

Division of Subjects into Levels

The means and standard deviations of the standard scores of the SCAT Verbal and MTAI and the raw scores of the SCI for each course were used as a basis for dividing

subjects into levels of ability, attitude and social class identification. Subjects whose scores on the SCAT Verbal, MTAI or SCI were 0.675 of one standard deviation above the mean of the particular test for each course were considered to be in the high-ability, attitude or social class identification level, respectively. Likewise, subjects who were 0.675 of one standard deviation below the mean of the particular test for each course were considered to be in the low level group of the variable.

The distribution of gains by levels and chi square tests for goodness of fit appear in Appendix C. The only significant chi square value was obtained for the high-social class identification level in the last course. This indicated that the scores for this level were not normally distributed.

F tests for homogeneity of variance of ability, attitude and social class identification levels also appear in Appendix C. Three, four and one statistically significant F values were obtained in the ability, attitude and social class identification levels, respectively. The significant F values indicated that the variances were heterogeneous in these levels.

The mean gain in understanding of concepts as measured by the pre- and post-achievement tests for each of the high- and low-levels of ability, attitude and social class identification for each of the observational experience groups appear in Table 5. Only one mean gain, low-ability

TABLE 5.--Tests of Significance of the Mean Gain in Pre- and Post-test Scores in the Understanding of Concepts for High- and Low-Ability, Attitude, and Social Class Identification Levels with Direct or Vicarious Observational Experience in the First and Last Foundation Courses

Course	N	Mean Gain		S.E. Diff.	t
		High Level DOE	Low Level VOE		
Ability Levels					
First	26	4.96		.864	5.74**
Last	19	6.21		1.114	5.57**
First	21		2.71	1.491	1.82
Last	21		5.14	1.292	3.98**
First	20		5.15	.716	7.19**
Last	19		5.63	.977	5.76**
First	32		6.00	.994	6.04**
Last	22		9.14	1.132	8.07**
Attitude Levels					
First	25	5.84		1.247	4.68**
Last	26	8.08		1.042	7.75**
First	19		3.10	1.194	2.60**
Last	15		5.07	2.083	2.43*
First	21		5.90	1.272	4.64**
Last	14		3.50	.732	4.78**
First	24		4.62	1.005	4.60**
Last	22		8.82	1.287	6.85**
Social Class Identification Levels					
First	20	3.55		1.037	3.42*
Last	21	5.33		1.250	4.26**
First	22		4.64	1.106	4.20**
Last	20		5.85	1.512	3.87**
First	23		7.17	.971	7.38**
Last	28		7.39	.856	8.63**
First	20		5.95	1.262	4.71**
Last	18		8.94	1.411	6.34**

*Significant at the 0.05 level of significance.

**Significant at the 0.001 level of significance.

level with direct observational experience, was non-significant at the established 0.05 level of significance. The results indicated that all but one of the levels by observational experience and course made significant positive gains in understanding of concepts as measured by the Pre- and Post-tests.

Significance of the Mean Gains Between and Within
Levels of Ability, Attitude and Social Class
Identification

This portion dealt with the analysis of data regarding the primary purpose of the study. To accomplish the purpose thirty-six hypotheses were established and tested. Hypotheses 1-12 were related to high- and low-ability levels, hypotheses 13-24 to high- and low-attitude levels, and hypotheses 25-36 to high- and low-social class identification levels.

Ability Levels

The "t" values for mean gains of test scores between high- and low-ability levels and thereby hypotheses 1-12 are presented in Table 6. Only the obtained "t" values for hypotheses 4 and 8 were statistically significant. Therefore, the remainder of the null hypotheses from 1-12 were accepted.

Hypothesis 4 stated that there is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course of high- and low-ability levels who participated in

TABLE 6.--Analysis of Data for Ability Levels in the First and Last Foundation Courses
in the Professional Education Sequence

Course	Mean Gain				Mean Diff.	S.E. Diff.	t	
	High-Ability Level with DOE	High-Ability Level with VOE	Low-Ability Level with DOE	Low-Ability Level with VOE				
First	4.96		2.71		2.25	1.724	1.305	
Last	6.21		5.14		1.07	1.723	.62	
First		5.15		6.00	-0.85	1.225	-0.69	
Last		5.63		9.14	-3.51	1.520	-2.31*	
First	4.96	5.15			-0.19	1.169	-0.162	58
Last	6.21	5.63			.58	1.481	.39	
First			2.71	6.00	-3.29	1.721	-1.91	
Last			5.14	9.14	-4.00	1.713	-2.34*	
First	4.96			6.00	-1.04	1.350	-0.77	
Last	6.21			9.14	-2.93	1.599	-1.88	
First		5.15	2.71		-2.44	1.654	-1.48	
Last		5.63	5.14		-0.49	1.554	-0.30	

*Significant at the 0.05 level of significance.

selected vicarious observational experiences. The obtained "t" value was 2.31 and the required value for significance was 2.02. The null hypothesis of no difference was rejected and the difference in mean gain of understanding of concepts was significantly higher for the low-ability level.

Hypothesis 8 stated that there is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the low-ability level and participated in direct observational experiences and those who were in the low-ability level and participated in selected vicarious observational experiences. The obtained "t" value was 2.34 and the required value for significance was 2.02. The null hypothesis of no difference was rejected and the difference in mean gain of understanding of concepts was significantly higher for the vicarious observational experience group.

Attitude

The "t" values for mean gains of test scores between high- and low-attitude levels and thereby hypotheses 13-24 are presented in Table 7. Only the obtained "t" values for hypotheses 16 and 18 were statistically significant. Therefore, the remainder of the null hypotheses from 13-24 were accepted.

Hypothesis 16 stated that there is no statistically significant difference between mean gain in understanding

TABLE 7.--Analysis of Data for Attitude Levels in the First and Last Foundation Courses
in the Professional Education Sequence

Course	Mean Gain				Mean Diff.	S.E.Diff.	t	
	High-Attitude Level with DOE	High-Attitude Level with VOE	Low-Attitude Level with DOE	Low-Attitude Level-with VOE				
First	5.84		3.10		2.74	1.770	1.55	
Last	8.08		5.07		3.01	2.329	1.29	
First		5.90		4.62	1.28	1.603	.80	
Last		3.50		8.82	-5.32	1.481	-3.59*	
First	5.84	5.90			-0.06	1.851	-0.03	8
Last	8.08	3.50			4.58	1.273	3.95*	
First			3.10	4.62	-1.52	1.551	-0.98	
Last			5.07	8.82	-3.75	2.317	-1.62	
First	5.84			4.62	1.22	1.610	.76	
Last	8.08			8.82	-0.74	1.638	-0.45	
First		5.90	3.10		-2.80	1.755	-1.60	
Last		3.50	5.07		1.57	2.208	0.71	

*Significant at the 0.05 level of significance.

of concepts by students enrolled in the last foundation course of high- and low-attitude levels who participated in selected vicarious observational experiences. The obtained "t" value was 3.59 and the required value for significance was 2.03. The null hypothesis of no difference was rejected and the difference in mean gains of understanding of concepts was significantly higher for the low-attitude level.

Hypothesis 18 stated that there is no statistically significant difference between mean gain in understanding of concepts by students enrolled in the last foundation course who were in the high-attitude level and participated in direct observational experiences and those who were in the high-attitude level and participated in selected vicarious observational experiences. The obtained "t" value was 3.95 and the required value for significance was 2.02. The null hypothesis of no difference was rejected and the difference in mean gain of understanding of concepts was significantly higher for the direct observational experience group.

Social Class Identification

The "t" values for mean gains of test scores between high- and low-social class identification level and thereby hypotheses 25-36 appear in Table 8. Only the obtained "t" value for hypothesis 29 was statistically significant.

TABLE 8.--Analysis of Data for Social Class Identification Levels in the First and Last Foundation Courses in the Professional Education Sequence

Course	Mean Gain				Mean Diff.	S.E. Diff.	t
	High-SCI Level with DOE	High-SCI Level with VOE	Low-SCI Level with DOE	Low-SCI Level with VOE			
First	3.55		4.64		-1.09	1.525	-0.72
Last	5.33		5.85		-0.52	1.954	-0.27
First		7.17		5.95	1.22	1.571	.78
Last		7.39		8.94	-1.55	1.554	-1.00
First	3.55	7.17			-3.62	1.421	-2.55* ⁰
Last	5.33	7.39			-2.06	1.466	-1.40
First			4.64	5.95	-1.31	1.671	-0.78
Last			5.85	8.94	-3.09	2.082	-1.48
First	3.55			5.95	-2.40	1.633	-1.47
Last	5.33			8.94	-3.61	1.879	-1.92
First		7.17	4.64		-2.53	1.468	-1.72
Last		7.39	5.85		-1.54	1.738	-0.89

*Significant at the 0.05 level of significance.

Therefore, the remainder of the null hypotheses from 25-36 were accepted.

Hypothesis 29 stated that there is no statistically significant difference between the mean gain in understanding of concepts by students enrolled in the first foundation course who were in the high-social class identification level and participated in direct observational experiences and those who were in the high-social class identification level and participated in selected vicarious observational experiences. The obtained "t" value was 2.55 and the required value for significance was 2.02. The null hypothesis of no difference was rejected and the difference in mean gain of understanding of concepts was significantly higher for the vicarious observational experience group.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was designed to determine the differential effect of two types of observational experience on the understanding of concepts by students of high- and low-levels of ability, attitude and social class identification enrolled in the first and last foundation courses in the professional education sequence at the University of Oklahoma. The two types of observational experience were direct and vicarious observational experiences. Direct observational experiences consisted of observing, at the University Laboratory School, the concepts basic to each of the courses. Vicarious observational experiences consisted of viewing carefully selected film sequences, filmstrips, and slides illustrating concepts in each of these courses.

The data for this investigation was obtained from the records of Research Project #73403100 in the College of Education under a Title VII grant of the National Education Defense Act. The two procedures were parallel and this study constitutes an extension of the research project.

The sample for the study was composed of selected students who enrolled in four sections of each of the first and last foundation courses during the fall semester of the 1960-61 school year. Students were assigned randomly to the various sections of each course during the registration period. The randomness of sample was further assured by eliminating the instructors' name from the class schedule and by reserving an equal number of enrollment cards for each section of each course each day of enrollment. Each student had an equal chance of being included in any one of the sections. After the enrollment period students were not allowed to change sections.

Two sections in each of the first and last foundation courses were selected randomly as vicarious observation groups, and the remaining two sections served as the direct observation group. Two professors who normally teach one or more sections of the courses were selected to teach the sections included in this study. Each professor was assigned randomly to two sections of the same course.

A content analysis of the course content resulted in the formulation of unit objectives and concepts for each course. The concepts and illustrations of the concepts served as a basis for developing observational goals to direct both groups in their observational experiences. The concepts and illustrations also served as a basis for selecting and producing slide and film sequences.

The slide and film sequences were grouped to form observations of approximately 30 minutes in length. The vicarious observational group viewed these experiences while the direct observational group was observing educational situations at the University Laboratory School. Both groups were guided in their observation of educational situations by the same observational goals. The observations and goals were coordinated with the subject content so that both occurred at approximately the same time during the course.

The data for this problem were derived from scores obtained from various tests. An achievement test was constructed for each course and was based on the concepts formulated for each course in order to determine initial and final concept understanding of each student. Gains in the understanding of concepts were determined by the difference between the Pre- and Post- test scores. Factors of scholastic ability, attitude and social class identification were identified by the student's scores on the verbal portion of the Cooperative School and College Ability Tests, Form 1 C, the Minnesota Teacher Attitude Inventory, Form A, and the Sims Social Class Identification Occupational Rating Scale, respectively. The distributions of the test scores for each course were used as a basis for dividing the subjects into high- and low-ability, attitude and social class identification levels. The high-ability, attitude and social class identification levels were composed of students

whose scores on the appropriate test were 0.675 of one standard deviation above the mean of the test scores for the particular course. Likewise, the low-levels were composed of students whose scores were 0.675 of one standard deviation below the mean.

The findings of earlier research project indicated no statistically significant differences between instructor when comparing students' understanding of concepts in the first and last foundation courses which could be attributed to the instructor variable. Therefore, the two sections of the same observational experience in each course were combined and treated as a single observation group for purposes of this study.

The data were analyzed by the application of appropriate "t" tests. Prior to the computation of "t" values, the normality of each distribution was tested by chi square tests for goodness of fit. Likewise, the homogeneity of variance was tested by F tests.

Conclusions

Statistical analysis of the test scores suggested the following conclusions:

1. Each of the observational experience groups made significant gains in understanding of concepts in each of the courses as determined by "t" values of the difference between Pre- and Post-test scores.

2. Additional professional education courses appeared to contribute to the improvement of the student's attitude toward teaching as disclosed by performance on the MTAI.

3. Students who were enrolled in the first foundation course and who participated in vicarious observational experiences demonstrated a significantly greater understanding of concepts than did those students who were enrolled in the same course but who participated in direct observational experiences.

4. Each of the ability, attitude and social class identification levels made significant gains in understanding of concepts as determined by "t" values of the difference between Pre- and Post-test scores.

5. Students of the low-ability level who were enrolled in the last foundation course and participated in vicarious observational experiences demonstrated a significantly greater understanding of concepts than did students of the high-ability level in the same course with the same experience.

6. Students of the low-ability level who were enrolled in the last foundation course and who participated in vicarious observational experiences demonstrated a significantly greater understanding of concepts than did students of the low-ability level who were enrolled in the same course but who participated in direct observational

experiences.

7. Students of the low-attitude level who were enrolled in the last foundation course and who participated in selected vicarious observational experiences demonstrated a significantly greater understanding of concepts than did students of the high-attitude level who were enrolled in the same course and who participated in the same observational experience.

8. Students of the high-attitude level who were enrolled in the last foundation course and who participated in direct observational experiences demonstrated a significantly greater understanding of concepts than did students of the high-attitude level who were enrolled in the same course but who participated in vicarious observational experiences.

9. Students of the high-social class identification level who were enrolled in the first foundation course and participated in vicarious observational experiences demonstrated a significantly greater understanding of concepts than did students of the high-social class identification level who were enrolled in the same class but who participated in direct observational experiences.

Recommendations

From the results of the study the following recommendations are presented:

1. That both appropriate direct observational experiences and carefully selected vicarious observational experiences be included in foundation courses in professional education since statistically significant gains in the understanding of concepts were found for students with different levels of ability, attitude and social class identification and either type of observational experience.

2. That a follow-up study be conducted of students who were involved in the study and are presently teaching to determine if the factors of high- and low-ability, attitude and social class identification and direct or vicarious observational experience effect teaching performance.

3. That an investigation be conducted comparing differences in student achievement after participating in carefully selected vicarious observational experiences or a wider range of the most desirable kinds of direct observational experiences.

4. That further investigation be made in which carefully selected vicarious observational experiences and evaluative instruments of the observational experiences would be used to determine the degree of student "readiness" for direct observational experiences.

5. That the same study be conducted with direct and vicarious experience and two additional procedural groups, one having no observational experience and one characterized

by both vicarious and direct observational experiences.

6. That appropriate investigations be made in developing instruments to be used in determining the "readiness" of students for student teaching.

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TABLE 9.--Direct Observational Experience--Education 52, The School in American Culture, First Foundation Course
(N = 82)

SCAT-V		SCAT-Q	MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores
299	49	39	- 1	31	27	46	47
298	49	54	-10	28	24	44	47
308	56	43	-24	26	23	34	41
313	59	49	43	42	25	47	49
315	60	56	26	38	21	59	56
315	60	44	58	48	24	52	55
301	51	55	47	44	18	37	51
302	52	57	64	51	21	47	50
287	42	64	- 4	30	20	41	42
313	59	47	14	35	18	39	45
315	60	57	14	35	28	50	60
292	45	42	51	45	29	45	51
292	45	39	55	47	24	40	34
299	49	51	15	35	19	46	51
288	42	38	4	32	20	41	41
305	54	52	5	33	17	36	32
300	51	63	13	35	19	51	52
273	35	39	-24	26	23	32	34
306	55	58	8	33	20	39	49
292	45	55	73	54	15	45	50
316	62	51	22	37	22	50	68
293	45	56	16	36	28	45	45
321	65	49	42	42	25	54	53
296	48	49	27	39	24	48	55
296	48	68	2	32	18	47	49

TABLE 9.--Continued

SCAT-V		SCAT-Q		MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test	
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores	
295	46	51	64	51	18	44	54	
321	65	56	55	47	33	47	50	
305	54	51	45	43	28	43	51	
307	55	51	21	37	24	46	53	
304	54	45	45	43	14	54	54	
287	42	45	36	41	32	41	44	
313	59	73	-42	24	21	43	49	
316	62	51	-23	26	22	50	54	
305	54	57	31	40	15	44	50	
296	48	49	19	37	34	46	43	
291	44	63	11	34	23	37	32	
283	39	51	-10	28	18	44	41	
315	60	73	5	33	26	55	60	
308	56	56	47	44	26	43	56	
323	66	49	9	34	19	59	62	
298	49	49	10	34	19	41	42	
307	55	46	28	39	16	47	49	
325	68	55	39	41	20	50	60	
299	49	38	28	39	30	31	37	
299	49	40	-11	27	23	46	51	
298	49	58	31	40	15	39	40	
313	59	47	8	33	24	38	49	
294	46	49	1	32	22	38	31	
318	63	43	63	50	21	49	49	
292	45	44	14	35	25	32	37	

TABLE 9.--Continued

SCAT-V ^A		SCAT-Q	MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores
296	48	51	41	42	24	41	47
293	45	38	-10	28	22	44	39
287	42	38	33	40	19	25	41
301	51	49	8	33	26	42	42
301	51	47	30	40	25	43	52
318	63	40	83	58	20	45	53
305	54	60	34	40	24	45	57
310	58	36	-46	23	19	53	56
299	49	44	58	48	25	28	39
299	49	55	- 1	31	25	48	56
286	42	56	2	32	12	39	45
316	62	51	40	41	27	55	59
323	66	57	11	34	20	43	50
313	59	49	44	43	25	42	46
319	63	51	12	35	28	48	55
308	56	39	27	39	20	54	50
307	55	46	36	41	19	45	60
305	54	41	-11	27	27	41	40
327	68	64	44	43	28	52	62
287	42	58	18	36	26	37	38
323	66	46	54	46	21	47	49
304	54	46	28	39	13	36	34
307	55	51	10	34	20	51	49
300	51	46	81	58	31	34	30
325	68	38	35	40	23	49	50

TABLE 9.--Continued

SCAT-V		SCAT-Q McCall's T-Scores	MTAI		SCI Raw Scores	Pre- test Scores	Post- test Scores
Converted Scores	McCall's T-Scores		Raw Scores	McCall's T-Scores			
293	45	58	11	34	18	41	47
294	46	37	16	36	26	40	44
319	63	49	23	38	24	40	43
302	52	51	29	39	24	34	38
313	59	48	- 8	29	19	41	44
295	46	51	-28	25	24	24	42
268	34	34	32	40	28	27	25

TABLE 10.--Vicarious Observational Experience--Education 52, The School in American Culture, First Foundation Course
(N = 82)

SCAT-V Converted Scores	SCAT-V McCall's T-Scores	SCAT-Q McCall's T-Scores	MTAI		SCI Raw Scores	Pre- test Scores	Post- test Scores
			Raw Scores	McCall's T-Scores			
298	49	46	59	48	46	42	57
292	45	40	0	31	30	43	45
330	71	68	-15	27	26	54	60
283	39	46	-30	25	20	35	36
286	42	42	44	43	22	44	58
305	54	46	36	41	23	44	52
309	55	46	22	37	24	46	53
301	51	46	16	36	25	51	62
300	51	43	7	33	20	48	56
316	62	57	9	34	24	48	55
302	52	46	17	36	23	48	42
292	45	27	-12	27	22	34	38
293	45	52	45	43	26	37	43
308	56	55	2	32	27	45	55
307	55	41	40	41	23	49	44
283	39	47	23	38	18	38	47
302	52	45	-18	26	21	44	49
291	44	54	-11	27	26	31	38
313	59	52	12	35	24	35	62
304	54	57	3	32	15	50	52
287	42	46	-16	36	17	29	31
307	55	68	-15	27	22	46	50
307	55	46	43	42	24	27	45
336	78	56	49	44	20	57	62
299	49	47	22	37	19	33	45

TABLE 10.--Continued

SCAT-V		SCAT-Q		MTAI		SOI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test	
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores	
304	54	55	17	39	24	46	51	
294	46	43	42	42	24	43	51	
294	46	60	6	33	26	39	43	
300	51	49	33	40	27	34	48	
293	45	47	48	44	15	41	49	
293	45	49	7	33	33	34	37	
304	54	57	60	49	15	47	48	
313	59	45	58	48	26	46	50	
290	44	54	31	40	23	37	40	
325	68	55	28	39	25	52	64	
301	51	43	13	35	26	37	53	
321	65	80	- 5	30	14	54	57	
312	59	57	-27	25	22	45	53	
290	44	51	34	40	16	47	45	
279	38	45	0	31	18	33	27	
298	49	44	6	33	11	48	53	
315	60	51	6	33	20	52	56	
327	68	54	46	43	24	58	62	
296	48	49	40	41	24	45	43	
290	44	38	-21	26	25	37	31	
296	48	43	32	40	28	42	50	
318	63	73	-37	24	19	54	56	
292	45	49	14	35	20	43	54	
293	45	43	5	33	21	40	46	
300	51	42	11	34	22	34	41	

TABLE 10.--Continued

SCAT-V		SCAT-Q		MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test	
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores	
296	48	49	41	42	26	51	59	
287	42	64	-11	27	14	32	40	
287	42	48	-13	27	26	39	43	
307	55	63	15	35	19	43	54	
306	55	60	6	33	23	37	54	
323	66	49	56	47	21	53	55	
287	42	38	-31	25	18	35	41	
302	52	54	34	40	29	42	46	
279	38	49	5	33	12	13	32	
323	66	60	27	39	18	52	61	
284	41	57	- 7	29	28	28	46	
284	41	39	19	37	6	35	46	
298	49	46	6	33	25	34	43	
311	58	35	26	38	30	45	50	
312	58	49	14	35	26	48	55	
294	46	45	74	55	26	39	48	
293	45	52	43	42	33	35	44	
296	48	43	10	34	25	38	46	
307	55	56	10	34	26	48	49	
299	49	47	27	39	23	40	50	
288	42	56	- 4	30	18	38	42	
318	63	64	0	31	23	52	61	
279	38	37	42	42	25	33	35	
318	63	60	1	32	20	46	50	
286	42	45	29	39	30	35	39	

TABLE 10.--Continued

SCAT-V		SCAT-Q	MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores
298	49	48	-33	25	31	40	43
288	42	20	-13	27	23	28	31
312	59	46	52	46	20	55	52
286	42	52	-46	23	22	32	42
316	62	80	49	44	18	46	50
319	63	47	33	40	23	45	49
294	46	47	39	41	18	34	45

TABLE 11.--Direct Observational Experience--Education 222, Evaluation and Guidance,
Last Foundation Course
(N = 78)

SCAT-V		SCAT-Q	MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores
295	46	56	37	41	32	38	36
325	68	57	30	40	24	47	49
293	45	46	58	48	30	30	46
323	66	80	85	59	21	54	60
312	59	73	49	44	24	46	57
300	51	57	- 4	30	27	42	45
325	68	54	71	54	13	50	59
305	54	55	65	51	28	45	54
318	63	78	27	39	32	49	54
310	58	43	16	36	19	49	49
305	54	47	42	42	26	43	46
305	54	54	51	45	32	45	56
286	42	52	49	44	19	41	46
301	51	52	21	37	25	36	46
298	49	44	0	31	18	36	33
306	55	46	56	47	26	34	53
310	58	47	60	49	27	40	47
298	49	68	- 3	30	21	46	39
302	52	46	40	41	23	34	46
291	44	49	81	58	17	47	52

TABLE 11.--Continued

SCAT-V		SCAT-Q		MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test	
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores	
293	45	56	-22	26	19	40	39	
302	52	45	46	43	25	45	50	
305	54	56	73	54	26	44	52	
306	55	47	20	37	18	42	39	
279	38	48	27	39	21	39	37	
302	52	49	3	32	21	39	48	
325	68	54	53	46	20	51	50	
306	55	38	24	38	26	44	53	
311	58	55	46	43	22	43	48	
293	45	55	65	51	20	42	49	
294	46	52	- 7	29	28	36	39	
312	59	49	87	60	19	53	52	
316	62	55	86	60	25	49	49	
296	48	38	34	40	30	32	43	
306	55	40	- 6	29	20	36	46	
302	52	56	60	49	26	37	55	
316	62	55	8	33	19	40	60	
302	52	63	58	48	24	34	48	
301	51	47	49	44	28	42	47	
291	44	46	48	44	21	34	40	

TABLE 11.--Continued

SCAT-V Converted Scores	SCAT-V McCall's T-Scores	SCAT-Q McCall's T-Scores	MTAI		SCI Raw Scores	Pre- test Scores	Post- test Scores
			Raw Scores	McCall's T-Scores			
296	48	56	-10	28	22	31	49
293	45	40	33	40	21	33	38
319	63	46	30	40	27	46	45
284	41	35	-16	26	27	42	35
292	45	46	43	42	32	34	40
310	58	73	56	47	15	41	57
327	68	63	57	48	21	41	48
300	51	49	56	47	22	41	58
287	42	49	30	40	21	33	40
293	45	58	67	52	15	43	46
306	55	49	82	58	22	53	62
307	55	46	43	42	11	43	59
310	58	36	60	49	20	42	45
291	44	55	46	43	22	41	43
336	78	60	49	44	25	54	54
311	58	56	71	54	30	41	49
273	45	39	- 3	30	22	34	40
304	54	47	-25	26	9	37	43
316	62	73	47	44	17	47	60
302	52	48	60	49	22	45	51

TABLE 11.--Continued

SCAT-V		SCAT-Q	MTAI		SCI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores
299	49	46	85	59	23	43	62
313	59	55	65	51	18	54	60
305	54	46	41	42	29	51	50
318	63	52	49	44	21	48	56
302	52	49	57	48	21	48	62
301	51	45	30	40	28	37	54
313	59	45	65	51	23	48	57
307	55	54	28	39	28	50	54
294	46	44	- 2	31	22	41	53
307	55	51	43	42	29	48	53
308	56	57	63	50	29	46	52
302	52	57	48	44	24	37	32
293	45	34	- 6	29	12	35	42
330	71	46	52	46	34	52	58
316	62	49	71	54	23	42	47
316	62	49	47	44	21	40	54
288	42	46	84	59	27	43	44
301	51	64	84	59	21	40	56

TABLE 12.--Vicarious Observational Experience--Education 222, Educational Evaluation and Guidance, Last Foundation Course
(N = 78)

SCAT-V		SCAT-Q	MTAI		SOI	Pre-	Post-
Converted	McCall's	McCall's	Raw	McCall's	Raw	test	test
Scores	T-Scores	T-Scores	Scores	T-Scores	Scores	Scores	Scores
279	38	31	-24	26	19	27	31
284	41	42	0	31	23	28	40
321	65	68	70	53	25	53	57
291	44	39	1	32	26	30	45
307	55	55	- 3	30	30	45	50
315	60	54	13	35	22	44	40
327	68	58	99	69	29	56	59
300	51	49	44	43	25	42	43
282	45	58	11	34	26	33	43
301	51	44	- 8	29	24	37	48
304	54	49	31	40	30	40	45
294	46	52	14	35	20	41	46
290	44	60	13	35	6	36	52
318	63	46	21	37	33	47	50
308	56	56	52	46	25	42	48
308	56	60	4	32	30	47	50
298	49	51	47	44	22	34	40
291	44	51	20	37	25	37	43
302	52	38	- 9	28	28	46	49
305	54	49	27	39	28	31	45

TABLE 12.--Continued

SCAT-V		SCAT-Q McCall's T-Scores	MTAI		SOI Raw Scores	Pre- test Scores	Post- test Scores
Converted Scores	McCall's T-Scores		Raw Scores	McCall's T-Scores			
293	45	60	24	38	30	38	47
304	54	35	28	39	14	47	58
298	49	48	31	40	23	30	43
295	46	51	32	40	24	29	41
305	54	52	50	45	30	35	48
304	54	45	71	54	17	45	44
310	58	49	71	54	24	40	42
306	55	49	52	46	34	41	49
296	48	54	34	40	24	40	48
308	56	49	1	32	22	39	44
301	51	38	22	37	24	39	44
311	58	51	54	46	28	36	46
321	65	73	17	36	16	43	53
315	60	46	35	40	31	41	51
310	58	63	1	32	18	45	54
304	54	45	23	38	24	36	46
296	48	60	61	49	24	47	56
313	59	45	57	48	29	46	48
296	48	51	50	45	24	37	45
294	46	46	33	40	18	36	45

TABLE 12.--Continued

SCAT-V		SCAT-Q McCall's T-Scores	MTAI		SCI Raw Scores	Pre- test Scores	Post- test Scores
Converted Scores	McCall's T-Scores		Raw Scores	McCall's T-Scores			
315	60	54	1	32	30	49	61
327	68	54	68	53	19	53	56
292	45	46	48	44	21	43	44
313	59	49	78	56	28	43	46
295	46	54	6	33	27	34	41
300	51	39	49	44	30	40	44
306	55	44	19	37	31	29	45
310	58	54	50	45	28	32	52
311	58	49	64	51	24	52	54
308	56	46	54	46	23	45	54
313	59	49	56	47	23	43	52
283	39	48	-23	26	11	28	53
327	68	64	25	38	24	47	56
327	68	47	48	44	28	50	58
321	65	51	5	33	32	50	61
340	80	57	63	50	22	59	60
306	55	57	81	58	24	54	57
308	56	46	38	41	19	44	50
293	45	56	-7	29	20	34	41
305	54	51	20	37	25	47	44

TABLE 12.--Continued

SCAT-V		SCAT-Q McCall's T-Scores	MTAI		SCI Raw Scores	Pre- test Scores	Post- test Scores
Converted Scores	McCall's T-Scores		Raw Scores	McCall's T-Scores			
301	51	60	37	41	24	39	51
340	80	38	54	46	27	56	64
300	51	44	47	44	14	40	54
301	51	57	7	33	28	36	44
302	52	51	49	44	27	38	43
295	46	39	28	39	28	36	40
307	55	47	48	44	26	33	41
313	59	37	76	55	28	37	41
302	52	42	31	40	23	44	50
284	41	44	-10	28	20	34	38
321	65	45	54	46	26	60	62
311	58	56	39	41	33	48	52
293	45	63	29	39	20	46	52
315	60	60	77	56	26	40	49
307	55	48	59	48	29	35	40
293	45	40	53	46	19	36	44
301	51	57	31	40	18	40	49
287	42	55	-31	25	18	35	51

TABLE 13.--Chi Square Tests of Goodness of Fit for Scholastic Ability, Attitude, Social Class Identification, Pre-test and Post-test Scores of Direct and Vicarious Observational Experience Groups in the First Foundation Course

Direct Observational Experience Group (N = 82)									
SCAT-Verbal		MTAI		SCI		Pre-test		Post-test	
Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies
325-329	3	80-89	2	33-35	2	55-59	4	65-69	1
320-324	5	70-79	1	30-32	3	50-54	12	60-64	6
315-319	11	60-69	3	27-29	10	45-49	22	55-59	9
310-314	7	50-59	6	24-26	23	40-44	23	50-54	20
305-309	13	40-49	10	21-23	14	35-39	11	45-49	17
300-304	9	30-39	10	18-20	22	30-34	6	40-44	15
295-299	15	20-29	10	15-17	5	25-29	3	35-39	6
290-294	10	10-19	15	12-14	3	20-24	1	30-34	7
285-289	6	0-9	10					25-29	1
280-284	1	(-1)-(-10)	7						
275-279	0	(-11)-(-20)	2						
270-274	1	(-21)-(-30)	4						
265-269	1	(-31)-(-40)	0						
		(-41)-(-50)	2						
$\chi^2 = 7.022$		$\chi^2 = 4.147$		$\chi^2 = 7.084$		$\chi^2 = 3.334$		$\chi^2 = 10.164$	
df = 10-3=7		df = 12-3=9		df = 7-3=4		df = 7-3=4		df = 7-3=4	
P = .35		P = .90		P = .14		P = .50		P = .027	
$\bar{X} = 303.54$		$\bar{X} = 21.9$		$\bar{X} = 22.59$		$\bar{X} = 43.37$		$\bar{X} = 47.40$	
S.D. = 12.053		S.D. = 26.491		S.D. = 4.515		S.D. = 7.227		S.D. = 7.607	

TABLE 13.--Continued

Vicarious Observational Experience Group (N = 82)									
SCAT Verbal		MTAI		SCI		Pre-test		Post-test	
Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies
335-339	1	70-79	1	36-38	2	55-59	4	60-64	8
330-334	1	60-69	1	33-35	2	50-54	11	55-59	11
325-329	2	50-59	4	30-32	4	45-49	20	50-54	19
320-324	3	40-49	13	27-29	5	40-44	14	45-49	18
315-319	7	30-39	8	24-26	25	35-39	16	40-44	15
310-314	6	20-29	8	21-23	18	30-34	12	35-39	6
305-309	9	10-19	12	18-20	17	25-29	4	30-34	4
300-304	11	0-9	16	15-17	5	20-24	0	25-29	1
295-299	10	(-1)-(-10)	3	12-14	3	15-19	0		
290-294	16	(-11)-(-20)	10	9-11	1	10-14	1		
285-289	9	(-21)-(-30)	2	6-8	1				
280-284	4	(-31)-(-40)	3						
275-279	3	(-41)-(-50)							
$\chi^2 = 8.007$		$\chi^2 = 17.520$		$\chi^2 = 10.662$		$\chi^2 = 3.407$		$\chi^2 = 3.409$	
df = 11-3=8		df = 10-3=7		df = 8-3=5		df = 7-3=4		df = 7-3=4	
P = .44		P = .015		P = .06		P = .49		P = .49	
$\bar{X} = 300.8$		$\bar{X} = 15.60$		$\bar{X} = 23.12$		$\bar{X} = 41.91$		$\bar{X} = 48.12$	
S.D. = 12.821		S.D. = 25.654		S.D. = 5.090		S.D. = 8.242		S.D. = 8.209	

TABLE 14.--Chi Square Tests of Goodness of Fit for Scholastic Ability, Attitude, Social Class Identification, Pre-test and Post-test Scores of Direct and Vicarious Observational Experience Groups in the Last Foundation Course

Direct Observational Experience Group (N = 78)									
SCAT Verbal		MTAI		SCI		Pre-test		Post-test	
Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies
335-339	1	80-89	8	33-35	1	54-56	3	60-62	7
330-334	1	70-79	4	30-32	7	51-53	5	57-59	7
325-329	4	60-69	10	27-29	13	48-50	9	54-56	10
320-324	1	50-59	10	24-26	13	45-47	11	51-53	9
315-319	8	40-49	18	21-23	24	42-44	15	48-50	13
310-314	10	30-39	7	18-20	12	39-41	14	45-47	13
305-309	14	20-29	6	15-17	4	36-38	9	42-44	5
300-304	15	10-19	1	12-14	2	33-35	9	39-41	8
295-299	6	0-9	3	9-11	2	30-32	3	36-38	3
290-294	12	$\begin{pmatrix} -10 \\ -20 \\ -30 \end{pmatrix} - \begin{pmatrix} -1 \\ -11 \\ -21 \end{pmatrix}$	8					33-35	2
285-289	3		1					30-32	1
280-284	1		2						
275-279	1								
270-274	1								
$\chi^2 = 5.665$		$\chi^2 = 29.094$		$\chi^2 = 4.952$		$\chi^2 = 2.601$		$\chi^2 = 8.225$	
df = 9-3=6		df = 11-3=8		df = 7-3=4		df = 8-3=5		df = 10-3=7	
P = .47		P = .001-		P = .29		P = .76		P = .31	
$\bar{X} = 304.31$		$\bar{X} = 41.83$		$\bar{X} = 23.05$		$\bar{X} = 42.29$		$\bar{X} = 49.04$	
S.D. = 11.702		S.D. = 28.208		S.D. = 5.036		S.D. = 6.072		S.D. = 7.428	

TABLE 14.--Continued

Vicarious Observational Experience Group (N = 78)									
SCAT Verbal		MTAI		SCI		Pre-test		Post-test	
Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies	Scores	Observ- ed Fre- quencies
340-344	2	90-99	1	33-35	3	60-62	1	63-65	1
335-339	0	80-89	1	30-32	10	57-59	1	60-62	4
330-334	0	70-79	6	27-29	15	54-56	3	57-59	5
325-329	4	60-69	4	24-26	22	51-53	3	54-56	7
320-324	4	50-59	13	21-23	10	48-50	4	51-53	10
315-319	5	40-49	8	18-20	12	45-47	13	48-50	14
310-314	10	30-39	11	15-17	2	42-44	9	45-47	11
305-309	14	20-29	11	12-14	2	39-41	13	42-44	14
300-304	15	10-19	6	9-11	1	36-38	13	39-41	10
295-299	8	0-9	9	6-8	1	33-35	9	36-38	1
290-294	10	(-10)-(-1)	5			30-32	4	33-35	0
285-289	1	(-20)-(-11)	0			27-29	5	30-32	1
280-284	4	(-30)-(-21)	2						
275-279	1	(-40)-(-31)	1						
$\chi^2 = 7.931$		$\chi^2 = 7.853$		$\chi^2 = 8.636$		$\chi^2 = 5.525$		$\chi^2 = 7.658$	
df = 10-3=7		df = 11-3=8		df = 8-3=5		df = 10-3=7		df = 9-3=6	
P = .34		P = .45		P = .13		P = .60		P = .27	
$\bar{X} = 304.85$		$\bar{X} = 33.22$		$\bar{X} = 24.32$		$\bar{X} = 40.96$		$\bar{X} = 48.33$	
S.D. = 12.301		S.D. = 27.236		S.D. = 5.168		S.D. = 7.558		S.D. = 6.529	

TABLE 15.--Application of F Tests for Homogeneity of Variance for Scholastic Ability, Attitude, Social Class Identification, Pre-test and Post-test Scores of Direct and Vicarious Observational Experience Groups in the First Foundation Course

Test	Variances		F
	DOE Group (N = 82)	VOE Group (N = 82)	
SCAT Verbal	145.273	164.376	1.131
MTAI	701.773	658.128	1.066
SCI	20.385	25.908	1.271
Pre-test	52.234	67.930	1.300
Post-test	57.873	67.392	1.164

TABLE 16.--Application of F Tests for Homogeneity of Variance for Scholastic Ability, Attitude, Social Class Identification, Pre-test and Post-test Scores of Direct and Vicarious Observational Experience Groups in the Last Foundation Course

Test	Variances		F
	DOE Group (N = 78)	VOE Group (N = 78)	
SCAT Verbal	136.937	151.315	1.105
MTAI	795.691	741.800	1.073
SCI	25.361	26.708	1.053
Pre-test	36.871	57.117	1.549*
Post-test	55.170	42.623	1.294

*Significant at the 0.05 level of significance.

TABLE 17.--Application of F Tests for Homogeneity of Variance for SCAT Verbal, MTAI, and SCI for the First and Last Foundation Courses

Test	Variances		F
	First	Last	
SCAT Verbal	154.825	144.120	1.074
MTAI	680.018	768.744	1.130
SCI	23.211	26.031	1.121

TABLE 18.--Application of F Tests for Homogeneity of Variance for Gain in Understanding of Concepts for Direct and Vicarious Observational Experience Groups in the First and Last Foundation Courses

Course	Variance for Observational Experience Groups		F
	DOE	VOE	
First (N=82)	28.864	27.855	1.036
Last (N=78)	40.635	24.652	1.648*

*Significant at the 0.05 level of significance.

TABLE 19.--Chi Square Tests of Goodness of Fit for Gains in Understanding of Concepts of Direct and Vicarious Observational Experience Groups in the First and Last Foundation Courses

GAINS	Observed Frequencies			
	DOE		VOE	
	First Course (N=82)	Last Course (N=78)	First Course (N=82)	Last Course (N=78)
24-26				1
21-23				0
18-20	2	5	3	1
15-17	2	6	3	4
12-14	3	6	4	8
9-11	8	11	14	17
6-8	16	17	19	16
3-5	20	15	23	21
0-2	17	6	9	7
(-3)-(-1)	7	9	3	2
(-6)-(-4)	6	1	4	1
(-9)-(-7)	1	2		
<hr/>				
χ^2	= 4.533	χ^2 = 8.765	χ^2 = 8.564	χ^2 = 3.277
df	= 9-3=6	df = 9-3=6	df = 8-3=5	df = 7-3=4
P	= .61	P = .19	P = .13	P = .51
\bar{X}	= 4.11	\bar{X} = 6.74	\bar{X} = 6.18	\bar{X} = 7.37
S.D.	= 5.372	S.D. = 6.374	S.D. = 5.278	S.D. = 4.965

TABLE 20.--Chi Square Tests of Goodness of Fit for Gains in Understanding of Concepts of High- and Low-Ability Levels with Direct or Vicarious Observational Experience in the First and Last Foundation Courses in the Professional Education Sequence

GAINS	Observed Frequencies							
	High-Ability Level				Low-Ability Level			
	DOE		VOE		DOE		VOE	
	First Course	Last Course	First Course	Last Course	First Course	Last Course	First Course	Last Course
24-26								1
21-23								0
18-20	1	1			1	1	2	0
15-17	0	0			1	1	0	3
12-14	0	2	1	1	0	1	1	2
9-11	4	3	2	6	1	1	7	4
6-8	5	5	5	2	3	6	7	7
3-5	10	2	9	6	5	5	8	4
0-2	4	3	2	3	5	2	4	1
(-3)-(-1)	2	3	1	0	1	3	1	
(-6)-(-4)				1	3	0	2	
(-9)-(-7)					0	1		
(-12)-(-10)					1			
χ^2	1.833	4.935	1.022	3.789	2.699	3.518	1.972	2.419
df	2	2	1	1	3	3	3	2
P	.41	.09	.32	.052	.45	.32	.58	.30
\bar{X}	4.96	6.21	5.15	5.63	2.71	5.14	6.00	9.14
S.D.	4.404	4.854	3.200	4.258	6.835	5.918	5.622	5.312

TABLE 21.--Chi Square Tests of Goodness of Fit for Gains in Understanding of Concepts of High- and Low-Attitude Levels with Direct or Vicarious Observational Experience in the First and Last Foundation Courses in the Professional Education Sequence

GAINS	Observed Frequencies							
	High-Attitude Level				Low-Attitude Level			
	DOE		VOE		DOE		VOE	
	First Course	Last Course	First Course	Last Course	First Course	Last Course	First Course	Last Course
24-26								1
21-23	1							0
18-20	0	2	1		1	2	1	0
15-17	1	2	1		0	0	0	3
12-14	2	2	1		0	1	0	2
9-11	4	4	3	2	0	2	3	5
6-8	3	9	5	0	4	3	5	3
3-5	7	4	4	7	6	2	9	7
0-2	4	2	3	4	5	1	4	0
(-3)-(-1)	1	1	2	1	1	2	0	0
(-6)-(-4)	2		1		1	0	2	1
(-9)-(-7)					1	2		
χ^2	2.075	4.322	0.469	1.639	3.770	0.815	2.349	7.003
df	4	3	3	1	2	2	2	3
P	.72	.23	.92	.20	.16	.67	.31	.08
\bar{X}	5.84	8.08	5.90	3.50	3.10	5.07	4.62	8.82
S.D.	6.236	5.314	5.830	2.739	5.206	8.066	4.924	6.037

TABLE 22.--Chi Square Tests of Goodness of Fit for Gains in Understanding of Concepts of High- and Low-Social Class Identification Levels with Direct or Vicarious Observational Experience in the First and Last Foundation Courses in the Professional Education Sequence

GAINS	Observed Frequencies							
	High-Social Class Identification				Low-Social Class Identification			
	DOE		VOE		DOE		VOE	
	First Course	Last Course	First Course	Last Course	First Course	Last Course	First Course	Last Course
24-26								1
21-23								0
18-20			1	1		1	1	0
15-17		2	2	1	2	2	0	2
12-14	1	0	1	3	1	1	1	1
9-11	2	3	3	4	1	2	5	5
6-8	4	5	6	5	4	4	3	4
3-5	5	6	8	13	6	4	4	4
0-2	4	1	2	1	6	1	4	0
(-3)-(-1)	3	3			1	5	1	1
(-6)-(-4)	1	0			1		1	
(-9)-(-7)		1						
χ^2	0.208	2.829	3.159	14.727	1.833	1.000	2.044	3.483
df	2	3	2	1	2	2	3	3
P	.91	.43	.21	.001	.43	.61	.57	.33
\bar{X}	3.55	5.33	7.17	7.39	4.64	5.85	5.95	8.94
S.D.	4.639	5.730	4.658	4.532	5.187	6.763	5.643	5.985

TABLE 23.--Application of F Tests for Homogeneity of Variance for Ability Levels in the First and Last Foundation Courses

Course	Variances for Ability Levels and Number of Students in each Level								F
	High-Ability Level with DOE	No.	High-Ability Level with VOE	No.	Low-Ability Level with DOE	No.	Low-Ability Level with VOE	No.	
First	19.398	26			46.714	21			2.408*
Last	23.564	19			35.029	21			1.487
First			10.239	20			31.613	32	3.088*
Last			18.134	19			28.219	22	1.556
First	19.398	26	10.239	20					1.894
Last	23.564	19	18.134	19					1.299
First					46.714	21	31.613	32	1.478
Last					35.029	21	28.219	22	1.241
First	19.398	26					31.613	32	1.620
Last	23.564	19					28.219	22	1.198
First			10.239	20	46.714	21			4.562*
Last			18.134	19	35.029	21			1.932

*Significant at the 0.05 level of significance.

TABLE 24.--Application of F Tests for Homogeneity of Variance for Attitude Levels in the First and Last Foundation Courses

Course	Variances for Attitude Levels and Number of Students in each Level								F
	High-Attitude Level with DOE	No.	High-Attitude Level with VOE	No.	Low-Attitude Level with DOE	No.	Low-Attitude Level with VOE	No.	
First	38.890	25			27.099	19			1.435
Last	28.234	26			65.067	15			2.305*
First			33.990	21			24.244	24	1.402
Last			7.500	14			36.442	22	4.859*
First	38.890	25	33.990	21					1.144
Last	28.234	26	7.500	14					3.764*
First					27.099	19	24.244	24	1.118
Last					65.067	15	36.442	22	1.785
First	38.890	25					24.244	24	1.604
Last	28.234	26					36.442	22	1.291
First			33.990	21	27.099	19			1.254
Last			7.500	14	65.067	15			8.676*

*Significant at the 0.05 level of significance.

TABLE 25.--Application of F Tests for Homogeneity of Variance for Social Class Identification Levels in the First and Last Foundation Courses

Course	Variances for Social Class Identification Levels and Number of Students in each Level								F
	High-SCI Level with DOE	No.	High-SCI Level with VOE	No.	Low-SCI Level with DOE	No.	Low-SCI Level with VOE	No.	
First	21.524	20			26.909	22			1.250
Last	32.833	21			45.744	20			1.393
First			21.692	23			31.839	20	1.468
Last			20.544	28			35.820	18	1.744
First	21.524	20	21.696	23					1.008
Last	32.833	21	20.544	28					1.598
First					26.909	22	31.839	20	1.183
Last					45.744	20	35.820	18	1.293
First	21.524	20					31.839	20	1.479
Last	32.833	21					35.820	18	1.091
First			21.696	23	26.909	22			1.240
Last			32.833	28	45.744	20			2.227*

*Significant at the 0.05 level of significance.