

AN ABSTRACT OF THE THESIS OF

ROBERT EINER SHAW for the DOCTOR OF EDUCATION
(Name) (Degree)

in EDUCATION presented on July 13, 1972
(Major) (Date)

Title: CHANGES IN SELF-CONCEPT PERTAINING TO SELECTED
TEACHING COMPETENCIES OF PROSPECTIVE TEACHERS

Abstract approved:

Redacted for privacy

Dr. Sylvia L. Lee

The study was devoted to identification and determination of magnitude of change of prospective teachers with regard to the prospective teachers' self perceived teaching ability. Teaching ability was defined as a combination of teaching competencies identified by other studies.

The general parameters of the study were to establish:

1. The direction, magnitude, and homogeneity of the attitudinal shift of the group identified as student teachers.
2. The direction, magnitude, and homogeneity of the attitudinal shift of the group identified as having had early field experience.
3. The direction, magnitude, and homogeneity of the attitudinal shift of the group who have had both early field experience and student teaching.

The study included 131 students at Oregon State University who were prospective teachers and were engaging in various types of field experience including student teaching.

The procedure selected was a pre-test post-test design which utilized the semantic differential as set forth by Osgood, Suci and Tannenbaum in The Measurement of Meaning. Teaching competencies which were used as the basis for the concepts on the semantic differential were based on the competency studies of Courtney and Haflin (1969), Gunderson (1971), Lindahl (1971), and Miller (1971). Twelve competencies were used as the basis for establishing the attitude of prospective teachers toward their own ability to perform selected teaching functions.

The data are based on a "D" score which takes into consideration the E, P, A (Evaluative, Potency, Activity) composition of attitude as structured by the semantic differential technique.

Findings indicate that change in attitude toward ability is related to field experience and also perhaps to subject matter major. An additional finding indicates that there might be grounds for the development of a profile, or sequential progression, of professional growth for prospective teachers.

Six conclusions are drawn, including:

Changes in self-concept by student teachers with no previous field experience are singularly outstanding;

Several field experiences prior to student teaching result in a smaller change during student teaching than if no field experience occurs before student teaching;

There is some indication that change of self-concept of prospective teachers is also correlated with the prospective teacher's subject matter area;

Significant and important (desirable and/or undesirable) changes in self-concept occur at all levels of field experience.

Six recommendations for further study are also offered.

Changes in Self-concept Pertaining to
Selected Teacher Competencies
of Prospective Teachers

by

Robert Einer Shaw

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Doctor of Education

June 1973

APPROVED:

Redacted for privacy

Professor of Education
in charge of major

Redacted for privacy

Chairman of Department of Education

Redacted for privacy

Dean of Graduate School

Date thesis is presented July 13, 1972

Typed by Mary Jo Stratton for Robert Einer Shaw

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
Background of the Problem	1
Statement of the Problem	3
Definition of Terms	4
Rationale	6
Importance of the Study	6
Importance of Attitude	9
II. REVIEW OF RELATED LITERATURE	13
Field Experience	13
Attitude and Attitude Measurement	15
Rationale for Using the Semantic	
Differential Technique	18
Similar and Related Studies	21
Summary	25
III. THE DESIGN OF THE STUDY	26
Research Design	26
Population	27
Development of the Instrument	28
Selection of Rating Scales	29
Treatment of the Data	31
Criterion of Significance	33
IV. THE DATA	35
Results of Change as Measured by "D"	35
General Comments About Tables	40
Specific Comments About Tables	46
V. SUMMARY, CONCLUSIONS AND IMPLICATIONS	64
The Problem	64
Procedures	64
Population Selection	64
Competency Selection	65
Instrument Selection	65
Questionnaire Administration	65

	<u>Page</u>
Data Compilation	66
Conclusions	67
Implications	68
Recommendations for Further Study	69
BIBLIOGRAPHY	71
APPENDICES	79

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Polarity and amount of group change according to field experience (grouped data).	36
2	Polarity and amount of group change according to subject matter area (grouped data).	37
3	Polarity and amount of group change according to class standing (grouped data).	37
4	Mean change (desirable or undesirable) in "D" for pre-test post-test ratings of ability for subgroups according to field experience (individual data).	41
5	Mean change (desirable or undesirable) in "D" for pre-test post-test ratings of ability for subgroups according to subject matter areas (individual data).	42
6	Mean change (desirable or undesirable) in "D" for pre-test post-test ratings of ability for subgroups according to class standing (individual data).	42
7	"D" for the change in group composite teaching abilities by grouping with respect to field experience.	44
8	"D" for the change in group composite teaching abilities by grouping with respect to subject matter areas.	44
9	"D" for the change in group composite teaching abilities by grouping with respect to class standing.	44

<u>Table</u>		<u>Page</u>
10	A cell-by-cell comparison of numbers of respondents with common classifications.	45
11	Summary of direction of change as reflected by individual composite "D" scores.	47
12	Summary of number of individuals and percentage of various groups with changes in composite "D" scores of ± 1.00 or more.	48
13	Percentage of selected groups showing degree of change, by ability.	52
14	Percentage of selected groups showing degree of change, by ability.	53
15	Percentage of selected groups showing degree of change, by ability.	54

CHANGES IN SELF-CONCEPT PERTAINING TO SELECTED TEACHER COMPETENCIES OF PROSPECTIVE TEACHERS

I. INTRODUCTION

Background of the Problem

Student teaching has long been recognized as an integral part of teacher preparation. In some respects it is student teaching which sets the prospective teacher apart from all other undergraduate students.

Of all the components of a teacher education program, the element considered most vital and essential is student teaching. Follow-up studies of beginning teachers reveal that student teaching was the most valuable course in their preparation programs. Superintendents and employing officials look to the student-teaching record as a major factor in the selection of new teachers. State Licensing Boards for teachers universally require student teaching as part of their certification standards. The American Association of Colleges for Teacher Education and the NEA's National Commission on Teacher Education and Professional Standards have made major efforts to improve programs of student teaching. Even such diverse critics of teacher education as James Conant and James Koerner agree that student teaching is a necessary element in a good teacher education program

(Pogue, 1969, p. 1).

Student teaching traditionally comes during the third or fourth year of the four year undergraduate program. Student teaching is also traditionally the first opportunity that the prospective teacher has to come in contact with "live students" in a "live" setting (Silberman, 1970).

In recent years there has been an increasing criticism of the student-teaching activity coming so late in the program (Boze and Day, 1968; Hermanowicz, 1968; Schalock and Hale, 1968; Sorenson and Haopert, 1968; Silberman, 1969).

The criticism usually follows a line of reasoning as follows: After investing three costly years of education and preparation the course of least resistance is to go for one more year and finish the program. Further, the unsatisfied prospective teacher has only to "endure" for one or two more quarters until he graduates. This general vein of reasoning continues leading the prospective teacher to conclude that he might as well teach, at least until something better comes along.

One conclusion, which is not too difficult to reach, if one continues in this vein of thought is as follows: If some appropriate contact between the prospective teacher and the school situation could be arranged for at an earlier time, the prospective teacher might be able to make a decision based on his experience in a teaching situation which would ultimately benefit both the individual concerned and society as a whole; that is, the prospective teacher could base his decision on experience.

It is in this general context that Oregon State University (and many other schools and universities as well) has initiated a program to provide some type of earlier field experience in conjunction with

the undergraduate teacher education program.

The rationale underlying the early field experience program is that if prospective teachers can be put in a "live" situation as soon as possible in their undergraduate program there will be a two-fold benefit. First, early field experience would provide a basis for the prospective teacher to make a more judicious decision about continuing or dropping out of the teacher education program. Secondly, this early field experience would provide background and experience in a teaching situation to make subsequent pedagogical courses more relevant.

In either case, the early field experience should provide the opportunity for the prospective teacher to develop attitudes which will exert a positive influence on his behavior. This attitude modification is the focal point of this study.

Statement of the Problem

The central problem of this study was related to development and change in certain attitudes held by prospective teachers about their own teaching competence.

The general problem stated in question form was as follows:

Do student teaching and other field experiences evoke a change in attitude? If so, what is the direction (positive or negative) of this change?

The secondary questions, stated below, were used to operationally define the scope of the problem.

1. What is the direction, magnitude, and homogeneity of the attitudinal shift of the group identified as student-teachers?
2. What is the direction, magnitude, and homogeneity of the attitudinal shift of the group identified as having had early field experience?
3. What is the direction, magnitude, and homogeneity of the attitudinal shift of the group of respondents who have had both early field experience and student teaching?

Definition of Terms

The following definitions are included and are to be used as operational definitions within this report.

Attitude is the location of a concept in semantic space by a respondent using the semantic differential technique.

Attitudinal shift is the change in location of a concept in semantic space between the pre-test and the post-test measures.

Concept is the statement to which the respondent is asked to react using the bi-polar scales of the semantic differential.

Direction of attitudinal shift is to be considered positive or negative, depending on the attitudinal shift of the respondent(s).

Early field experience is to be considered as an activity in

which prospective teachers are afforded an opportunity to participate in varying degrees of a teaching function prior to becoming a student-teacher.

Factor refers to the three major dimensions of attitude measured by the semantic differential technique. The three factors of attitude are Evaluation, Potency, and Activity.

Field experience is an activity in which prospective teachers are afforded an opportunity to participate, to varying degrees, in the teaching function. This refers to both early field experience and student teaching.

Magnitude of attitudinal shift "D" is measured by the square root of the sum of the squared differences of the pre-test post-test factors of the semantic differential.

Negative attitudinal shift is a post-test change of attitude which is closer to the negative side of the bi-polar adjectival scales of the semantic differential. In order to differentiate between the polarity of the adjectives and the direction of the attitudinal shift the term undesirable is also used.

Negative bi-polar adjectives are: weak, agitated, passive, shallow, awful, dull, short, dark, slow, small, bad, and cold.

Positive attitudinal shift is a post-test change of attitude which is closer to the positive side of the bi-polar adjectival scales of the semantic differential. In order to differentiate between the polarity

of the adjectives and the direction of attitudinal shift, the term desirable is also used.

Positive bi-polar adjectives are: strong, calm, active, deep, nice, sharp, long, bright, fast, large, good, and hot.

Scales are the bi-polar adjectival scales used in the semantic differential for the respondents to react to the concepts under consideration.

Semantic differential is the instrument used in this study to gather data.

Semantic differential technique is the method whereby attitudes are determined using the technique set forth by Osgood, Suci and Tannenbaum (1967).

Student teaching refers to those enrolled full time in college but who spend a full day in a school under the supervision of a regular teacher.

Rationale

Importance of the Study

A survey was made by Boze and Day (1968) to determine check points and screening procedures of teacher education programs in the United States. They state that

The sophomore year was favored as the beginning point in the student's screening process. Other check points included (1) prior to student teaching, (2) at time of field experience,

and (3) a continuous process. However, a definite void exists between the time a student enters college and the subsequent entrance into professional education courses . . .
(p. 13).

In concluding the study of present practices, Boze and Day (1968) made several recommendations, two of which were in direct support of this study. One of their recommendations was to "Implement on a trial basis a standardized test for measuring attitudes for prospective teachers" (p. 15). Another recommendation was that effort should be made to determine reasons why prospective teachers may have made a decision to change to another field of interest.

In the final report of "A Competency Based, Field Centered, Systems Approach to Elementary Teacher Education," Schalock and Hale (1968) have observed that the practicum is judged to be of sufficient importance to warrant its inclusion in their very extensive study. They see the practicum not as a set period of time but rather as a continual progression of levels of difficulty which require increased proficiency levels or competence as the prospective teacher moves to different stages.

Schalock and Hale (1968) see the product of the practicum as an instructional manager who is capable of adapting and developing a unique style of teaching. They conclude that to do this will mean that the prospective teacher must participate in designing his own continuous program for self-improvement.

In order for a prospective teacher to participate in the designing of his own program he will become involved in the process of self-evaluation. The processes in this study are related to this process of self-evaluation; that is, the prospective teacher was required to evaluate his own ability in order to respond to the instrument.

Further need for this study was found in the fact that Oregon State University has initiated a cooperative venture with the Corvallis School System. This venture will allow many undergraduate students to participate in some kind of early field experience in a generalized capacity. The program is so new that no formal guidelines have been developed. However, one purpose is to provide prospective teachers with early field experience which will better enable them to relate undergraduate courses to their future activities. A temporary mimeographed description used by the program coordinators says:

Field experience in Contemporary Education. Each student is assigned for three hours a week as a teaching aide, a student intern, or a similar role in a public school. A weekly seminar will accompany this field experience to help the student arrive at a meaningful interpretation of the experience. A student's decision to become a teacher must be made as early as possible in his academic career and must be made upon a realistic understanding of the general role of the teacher. He needs the opportunity to gain first hand experience with children at various age levels and needs to be able to express teaching-learning relationships in practical terms with a professor.

Interviews with persons responsible for organizing this early field experience provided still more support for the study. The coordinators of student teaching and field experience stated that it

would be helpful for them to know the attitudes held by prospective teachers. At the same time it was also stated that knowledge of direction and magnitude of attitudinal shift would be valuable. For example, it was hypothesized that, as a result of the "live" experience during the earlier part of the undergraduate program, prospective teachers will tend to change in their attitudes. This change should show up in the post-test situation.

Importance of Attitude

Any analysis of thinking, and therefore behavior, must accord an important role to attitudes. In the process of developing and modifying any program in the field of education, one is constantly faced with the problems of attitudes.

This point of view, that attitude is an extremely important consideration when dealing with behavior modification, is supported by Osgood, Suci and Tannenbaum (1967). They say

Most authorities are agreed that attitudes are learned and implicit--they are inferred states of the organism that are presumably acquired in much the same manner that other such internal learned activity is acquired. Further, they are predispositions to respond, but are distinguished from other such states of readiness that they predispose toward an evaluative response (p. 189).

In its First Annual Report, Stanford Center for Research and Development in Teaching (1967), the following statement was made.

Attitudes, values, and more complex combinations of attitudes and values such as one's conception of himself or his

philosophy of life, are usually recognized as orientations which significantly influence an individual's life. Historically, changes in these orientations have usually been regarded as one of the most important outcomes of an education. These outcomes influence how a person thinks and feels for many years after he has forgotten the details of specific disciplines (p. 56).

The study of attitude change is relatively new even though the importance of attitude has long been recognized. In 1933 Thomas Briggs observed that conduct, education and attitude were all intertwined when he wrote:

. . .when we have acquired facts and principles on the authority of others in whom we have faith, how little we retain until the time of need! How constant the need of relearning and of new learning by those who demand an intellectual basis for action! How limited are the fields in which such people can and do act! But the emotionalized attitudes function constantly--for the intelligentsia in demanding and interpreting knowledge, for them and for all the rest of mankind in varying degrees leading more or less immediately to action. The very triumphs of civilization in extending its bounds have increased the inherent importance of recognizing, modifying, and directing the emotionalized attitude (Briggs, 1937, p. 400).

The importance of attitude change has taken on more and more importance in recent years. As testimony to this, UNESCO has produced a bibliography of selected research (Davis, 1964). The justification for the publication was to provide information for persons interested in promoting international well-being and cooperation which is sorely needed today.

Davis (1964) states that the term "attitude change" was encountered only infrequently until about 1950. It has occurred with

increasing frequency in professional literature until it is now considered a special area of research. He continues

The literature on attitudes is voluminous, the definitions nearly as numerous as authors who have written on the subject. The term 'attitude' would appear to be one of most widely (and differently) defined terms of the whole of social psychology; and yet, for some reason, social scientists appear to understand each other when using it. The variety of definitions and the quantity of writing about this term is probably indicative of the importance of attitudes to social psychological phenomena.

However, nearly all of them [definitions of attitudes] seem to have at least two factors in common: First, attitude is an inferred entity, something which is not measured directly but rather deduced from other observable data. . . . Second, attitudes imply some sort of tendency to act toward the object toward which they are held. Together with external factors in the person's environment, they co-determine the manner in which he perceives and reacts toward the world (p. 8-9).

The relationship between behavior and attitude seems to be one which might be hard to state in an ironclad, definitive statement.

However, it is safe to conclude that a relationship does exist. Many have become interested in this causal-correlational relationship between attitude and behavior.

Perhaps one of the reasons which Osgood, Suci and Tannenbaum (1967) became interested in attitudes and the semantic differential technique might be found in the following statement taken from their book:

One of the most common criticisms of attitude scales of all types is that they do not allow us to predict actual behavior in real-life situations. Like most such arguments, this one is overdrawn. Most proponents of attitude measurement have

agreed that attitude scores indicate only a disposition toward certain classes of behaviors, broadly defined, and that what overt response actually occurs in real-life situation depends also upon the context provided by that situation. . . . It can also be said that the attitudinal disposition itself accounts for only part of the intervening state which mediates between situations and behaviors, albeit perhaps the dominant part
(p. 198).

It may be summarized from the foregoing observations and statements that behavior is profoundly influenced by attitude!

II. REVIEW OF RELATED LITERATURE

A review of pertinent and related literature follows. It is organized around the topics of: field experience, attitude and attitude measurement, rationale, and similar and related studies.

Field Experience

Hayes (1967), Hermanowicz (1968), Schalock (1968), Auchara (1969), Dumas (1969), Strauch (1970) and others agree that some type of field experience is an absolute requirement in the preparation of teaching. As stated in Chapter I, the idea of providing some type of field experience for prospective teachers is gaining credence. The term "field experience" seems to have many different meanings.

Pogue (1969) sums it up in his study of the state of the art of student teaching by calling it "professional laboratory experiences." He says,

In this study, 'professional laboratory experiences' was used as an inclusive term to designate all the direct experience with children, youth, and adults that should be provided for students preparing to teach. Student teaching became only one aspect of this sequence. The terms prestudent-teaching experiences and poststudent-teaching experiences were introduced with obvious denotations (p. 2).

Amerschek and Chandler (1968) used the term "student teaching" to mean observation, participation, simulated teaching, internship, externship, and other field experiences which are a part of the teacher-education program. Aspy (1969) used the term "teacher trainee" to

refer to prospective teachers and McIntosh (1964) refers to the activity as practice teaching.

Davis (1966) has suggested that a developmental approach be used as the method whereby prospective teachers might gain field experience. He has proposed that a series of carefully planned levels of progressively more difficulty be arranged. The developmental levels which he suggests are (1) orientation, (2) observation, (3) practice teaching, and (4) instructional analysis.

In addition to the preceding terminology which is used to refer to various types of activities performed by prospective teachers, there is another term which is emergent. This term is "aide." "Aide," as used by Findley (1968) and Greenberg (1967), refers to the person in a paraprofessional situation who is gainfully employed to perform many of the non-teaching functions in support of the teaching-learning situation. This term is confounded frequently with the same term (aide) which is used to describe prospective teachers who are in the classroom before their "student teaching."

In view of the foregoing, "field experience" is the all-inclusive term which is used to refer to activities ranging from observation, to tutoring, to working with small groups, to teacher assistant, to student teacher, to intern, to resident teacher. "Early field experience" refers to those activities which come prior to actual enrollment in a formal class which is formally designated as

"student teaching."

Probably more significant than the label which is finally attached to the activity is the intent of the activity. It is this intent which provides the rationale for the field experience for prospective teachers. Aspy (1969) reports on the findings of several studies dealing with beginning teachers. The fears, concerns, etc. which show up consistently are: meeting individual needs, classroom control, motivation of pupils, evaluating pupil progress; organizing classwork. The field experience should provide the prospective teacher with the opportunity to gradually gain experience, confidence, and competence in these kinds of activities. Aspy (1969) says the

minimal goal for each graduate of the undergraduate training program must be the student's belief in his ability to cope with the classroom. Unless this is accomplished before the completion of teacher training, there is not much evidence to support the hope that the teacher will develop into the best teacher he can become. . . (p. 308).

Attitude and Attitude Measurement

Attitude formation relative to field experience is considered to be a step in the development of a prospective teacher.

Whether practice teaching turns out to be satisfying or disappointing depends, it appears, on neither the particular student traits nor the particular kind of setting but rather on the interaction between a student teacher and the personnel in the school where he does his student teaching.

Surveyor discomfort in student teaching probably does not inevitably lead to feelings of failure. Although we have no data on this specific point, it seems likely that the candidate

who experiences apprehension and overcomes it probably feels stronger as a result, while the one who fails to overcome his apprehensions suffers a loss of self-confidence (Sorenson and Haopert, 1968, p. 32).

Measurement of attitude is probably directly related to the definition of attitude. A definition of attitude must be operational in form. It is at this point that a review of attitudinal measurements is to be introduced.

Shaw and Wright (1967) have compiled an extensive volume concerning attitudinal scales and tests. Many tests (approximately 180) have been exemplified and evaluated specifically and individually. In a summary they make some general statements about those cited.

The authors state in their conclusions

There seem to have been few major advances or breakthroughs in techniques of scale construction since the Thurstone and Likert methods were developed. Guttman scales represent a different approach and have some advantages but also some serious disadvantages relative to the Thurstone and/or Likert techniques. Techniques such as those proposed by Lazarsfeld, Coombs, and others show promise but have not been fully developed. Also, little progress has been made toward the measurement of structural characteristics of attitudes and attitudinal systems, despite theoretical formulations directed toward this aspect of attitude (p. 559).

This idea, "that little progress has been made," might seem to have at least one exception tentatively identified by Heise (1969) in a fairly comprehensive review of the semantic differential technique.

He states:

Factor analyses of SD data consistently show that there are three major dimensions of rating response--Evaluation, Activity and Potency. Studies dealing with a great variety of

scales, stimuli, and subjects have demonstrated the prominence and significance of the EPA [Evaluative, Potency, Activity] structure in SD data (p. 412).

Sherif, Sherif and Nebergall (1965), in discussing the semantic differential, point out:

Another more recent technique that has been used in attitude assessment as well as in other research is the semantic differential developed by Osgood and his co-workers (Osgood et al., 1957). . . . The intensity indicator is based on the assumption that more extreme (polar) evaluations are more intensely held. This assumption is supported by considerable research evidence that, on the average, intensity varies with the extremity of a stand. . . (p. 22).

They also note that there are many scales for measurement of attitudes toward child rearing, ethnic groups, war, nationalistic attitudes, liberalism-conservatism, and tariffs. However, they say, there seem to be very few designed to measure attitudes toward abstract concepts such as life, freedom, education and time.

Shaw and Wright (1967) have observed in their evaluation of the Thurstone type scales that there seems to be some dating characteristics. They recommend that if an existing scale is to be used which is more than a few years old, or if the target population is apt to be significantly different from the population used for the original scaling, the scale should be revalidated.

They also mention that Guttman-type scales should not be used for populations different from the population used for their development.

Rationale for Using the Semantic Differential Technique

The attitude measuring or scaling technique which has been used for many years is the "Thurstone" type. This type of attitude scale commonly uses a statement to which a subject is asked to react. Frequently the subject is asked to "agree" or to "disagree." In many instances the subject is asked to rate the strength of agreement (or disagreement) on a five-point scale. In either case, the statement is generally in the form of a sentence.

The subject reads the sentence and then marks his reaction to the sentence. When a subject reads the sentence he is able to rate it along a continuum of favorability or acceptability (Messick and Ross, 1962).

This ability (to rate the sentence as favorable or unfavorable) is termed by Messick and Ross (after Edwards) as "social desirability." The social desirability factor (or undesirability) does tend to bias responses by the subject according to Messick and Ross.

The social desirability characteristic (sometimes called acquiescence, or denial) is a manifestation of response styles. This response style, or stylistic consistence, is considered to be worthy of study itself by Messick and Ross (1962) as a means of gaining understanding of instruments used for attitude measurement.

The importance of social desirability as a bias in

personality-test measuring instruments is attested to also by Crowne and Marlowe (1964).

A traditional staple of the early test constructors' stock-in-trade was the belief that the content of personality-test items is the major, if not the sole, determinant of response. Responses to test items were viewed as an effective substitute for the direct observation of actual behavior. Thus, it was assumed that the subject could report accurately how he typically behaved and, further, that he would willingly reveal his behavioral dispositions in his answers to test items
(p. 3-4).

Implied in this statement is the idea that perhaps the subject might not report his true feelings and therefore the result would be biased for some reason. This implication is made very positive by the statement which is made a few pages later in their book.

Crowne and Marlowe (1964) sum up the social desirability bias of testing by saying

. . .next. . .we turn to the problem of a social-desirability response set which vies with acquiescence as the major stylistic determinant on personality inventories. The disposition to respond in a socially desirable manner is the conceptual point of departure of this book (p. 10) (emphasis added).

In his consideration of methodological issues pertaining to social desirability and the semantic differential technique, Heise (1969) observed that it is possible for subjects to distort ratings of salient topics in the direction of social desirability. In the very next sentence, however, he said that before concluding this firmly, he would like to see replications of the very limited study

which has been done concerning social desirability bias due to the issue of saliency.

Ward, Higgs and Park (1970) in their study of issue saliency conclude that ". . .no evidence was found to support the hypothesis that saliency moderates the correlation between attitude measures" (p. 592). Further, the ". . .validity of the semantic differential scale is probably no more affected by changes in issue saliency than is the validity of other widely used measures of attitude" (p. 592).

Additional rationale supporting the use of the semantic differential technique for this study comes from another statement made by Ward, Higgs and Park (1970).

The attitude scales developed by L. L. Thurstone and his colleagues. . .have enjoyed long and widespread use as measures of attitude. A more convenient scaling instrument, one which has gained great popularity in recent years, is based on the evaluative factor of the semantic differential. . . (p. 587).

Rosenbaum and McGinnies (1969) see the semantic differential technique as a very desirable and useful technique of measuring attitude and, in fact, preferable to other methods of attitude measure.

It is obvious that the preferences of the subjects were consistent with their responses to the semantic differential, thus providing additional validation for the use of this technique in the measurement of attitudes. . . . It has the advantage of tapping attitudes in a less obvious fashion than the usual attitude scaling procedures and thus might be a more appropriate procedure in situations where subjects either resent attitude measurement or are inclined to falsify their responses because of the sensitivity of the issues under investigation (p. 234).

A very strong recommendation favoring the semantic differential technique comes from Heise (1969) after his extensive review of semantic differential methodology. He sums up his findings in this manner:

The 'successful' profile for the SD still seems warranted after more than ten years of additional studies and applications. The SD has become a standard and useful tool for social psychological research.

There is probably no social psychological principle that has received such resounding cross-group and cross-cultural verifications as the EPA structure of SD ratings. Furthermore, few traditions of research are associated with comparable productivity or with the richness of findings that has developed in SD applications (p. 421).

Evidence has been provided to warrant the following statements concerning the use of the semantic differential technique:

1. The semantic differential technique is a valid means of measuring attitude.
2. Measurement bias as the result of "social desirability" has (probably) less effect on the semantic differential technique than on other attitude measures.

Similar and Related Studies

Similar and related studies are reviewed in this section to establish precedence for using the semantic differential technique for the measure and determination of the individual subject's perceptions of himself. Also, other pertinent studies using the semantic

differential technique are reviewed.

Evans (1968) used the semantic differential to determine college professors' self-image. Through a factor analysis he was able to present a rank order of attitudes concerning concepts such as: Correspondence courses; Night students; Myself conducting a lecture course; Myself conducting a small class; Honors courses consisting only of textbooks and final examinations; Television supplemented by small discussion sections for large classes; Additional tuition increase. These are not all, but they are intended to serve as examples of the diversity of concept content and phraseology. Evans' study is cited as an example of one which uses what could be called a "self-perception" as the concept for rating on the semantic differential. This "self-perception" is one of many factors which go to make up a person's self-concept (Super et al., 1963).

Pallone, Rickark, Hurley and Tirman (1970) also reinforce the idea of using the semantic differential technique as a means of determining a person's attitude toward himself. In this study, the "semantic meaning of self" was measured through responses to a semantic differential schedule. The concept which was rated by subject was "myself" with various qualifications.

Dingman, Paulson, Eyman and Miller (1969) used the semantic differential technique as a means of monitoring a subject's self-concept while the subject was undergoing psychotherapy. Although

generalization from a single instance is a dubious procedure, it is still worth noting.

In still another instance, Cohen and Miller (1969) examined the self-images of 40 college students with a semantic differential which was designed to measure "ego-identity."

The instrument used was a semantic differential test designed to tap three phases of self-concept: (1) perceived self-image, (2) perception of parental views of self, and (3) perception of peer views of self (p. 776).

Jorgensen and Howell (1969) used a modification of the semantic differential technique to study the relationship between subject's "self" with their "ideal self."

The semantic differential technique has been used for studying attitude change by Butts and Reun (1967). In their study, using subjects with science education backgrounds they were able to conclude that a teacher's change in attitude was somewhat related to several factors. One of the factors, which was the topic of the study, was the involvement of the teacher in a curricular innovation which focused on the process of science. The study dealt primarily with attitudinal change of subjects participating in a special program.

Butts and Reun (1967) concluded that a change in attitude of the teacher seemed to be also related to previous course work. Another of the conclusions which was reached in this study was that attitudinal change does not seem to be related to years of teaching experience.

Apel (1967) used the semantic differential technique in a study to

predict attitudes toward institutional change, and Kane (1968) used it to measure prospective elementary school teachers' attitudes.

The findings of the competency studies of Courtney and Haflin (1969), Gunderson (1971), Lindahl (1971) and Miller (1971) indicate that there is considerable agreement of priority in the mean ranking of teaching competencies. Some of the more important ones are summarized below: (A general topic, rather than exact wording is used.)

Competency <u>topics</u> which deal with the teacher's ability to:	Mean ranking [*]			
	<u>CH</u>	<u>G</u>	<u>L</u>	<u>M</u>
Motivate students	1&6	1&6	2	1
Ask questions to aid learning	3&4		9	3
Select instructional materials	9	3	4	4
Select classroom equipment		4	3	7
Maintain class attention, be stimulating		8.5	5	2&8
Teach at students' level		8.5	7	9
Base classroom instruction on individualized learning				10
Provide basic skill practice	7	2	1	5
Conduct individual demonstrations		7		
Relate the course of study to mea- surable performance objectives				
Develop performance tests			8	
Utilize individualized instructional materials				

* CH = Courtney and Haflin ranking
 G = Gunderson ranking
 L = Lindahl ranking
 M = Miller ranking

Summary

After a review of some of the more pertinent literature, the following conclusions are:

1. Field experience is an important part of teacher education.
2. Self-concept and attitude may be measured using the semantic differential technique.
3. Attitude change may be measured by using the semantic differential technique.
4. The present study has had precedence established, by other similar and related studies, with regard to both content and methodology.

III. THE DESIGN OF THE STUDY

The sections included in this chapter include: Research design, population selection, preparation of instrument, description of analysis procedure.

Research Design

Research questions stated under the heading of "The Problem" were based on the assumption that the attitudes of the subjects being investigated would change.

Since the primary purpose of this study was to measure a change in the self-concept of prospective teachers, a pre-test post-test design was used.

The pre-test was given at a period in time to coincide with the beginning of a regular University term. The post-test was administered about a week and a half before the end of the same term. This means that the field experience took place over a seven to eight week period for those involved.

Initially the pre-test instrument was mailed to 139 prospective teachers who were enrolled in student teaching. It was also administered to 115 additional prospective teachers who were enrolled in an early field experience program.

Pre-test data were obtained for 89 of those enrolled in student

teaching. A follow-up mailing to the rest was not used because of the time factor; i. e., by the time a follow-up could be sent and responded to, the respondent would be too far into the "treatment" (field experience) to obtain a valid measure of change.

Post-test data which were paired to pre-test data were obtained for 64 of the student teachers and for 67 of those enrolled in an early field experience activity.

Sample

Those selected for inclusion in the study were prospective teachers who were either enrolled in secondary student teaching or enrolled in an experimental program of field experience. The experimental courses were officially referred to as Ed 111x or Ed 211x, however, the important feature of these classes which warranted their inclusion in the study was that students (prospective teachers) were involved in a teaching capacity in a "live" situation.

In order to answer the secondary questions posed in Chapter I, four major sub-groups with reference to field experience were identified in the total group: (1) Prospective teachers classed as lower division students with no previous field experience; (2) Prospective teachers classed as lower division students with previous field experience; (3) Student teachers with no previous field experience; and (4) Student Teachers with previous field experience.

Development of the Instrument

The technique used in this study was the semantic differential technique. Rationale for the selection of this method was presented in Chapter II.

Concept selection for inclusion in the semantic differential was based on a review of the competency research done by Courtney and Haflin (1969), Gunderson (1971), Lindahl (1971), and Miller (1971). These competency studies were concerned with the identification of competencies which are necessary for an instructor to be able to function effectively. Although they do not have exactly the same findings, it takes only a brief perusal to see many similarities in the final ranking of important teacher competencies. The highest ranking competencies from these studies provided the basis for the concepts used in the semantic differential (Courtney and Haflin, 1969; Gunderson, 1971; Lindahl, 1971; Miller, 1971).

The reason for selection of the particular competencies used in the semantic differential was based on the assumption that since research has identified important competencies for teaching, prospective teachers should hold some attitudes or beliefs about their own ability to perform with respect to the selected competency.

In determining the phraseology of the concepts used in semantic differential, Osgood, Suci and Tannenbaum (1967) recommend that

"good judgement" be used. They recommend: (1) to select concepts for meanings which might be expected to have considerable individual differences; (2) to try to select those concepts having a unitary meaning for the individual; and (3) to use those concepts which are expected to be familiar to all of the subjects.

Using the research relating to competency studies coupled with the guidelines of Osgood, Suci and Tannenbaum (1967), the investigator feels that the two procedures complement one another.

Selection of Rating Scales

The semantic differential technique uses a series of bi-polar adjectives as a means of determining the location of a given concept in semantic space. The selection of these bi-polar adjectives (scales) should be related to the purpose of the investigator (Osgood, Suci and Tannenbaum, 1967).

Osgood, Suci and Tannenbaum (1967) recommend using those evaluative scales which have high loadings on the evaluative factor across concepts and negligible loadings on other factors. This is reiterated when they later wrote:

If we are careful to select as our evaluative scales those which maintain high and pure loading on the evaluative factor regardless of the concept class being judged, it is probable that such high correlations with standard attitude-measuring instruments would be obtained regularly (p. 195).

The potency scales should also have high potency loading and negligible evaluative and activity loadings. Similarly, the activity scales should have high activity loading and negligible evaluative and potency loadings.

Garrison (1968), as a participant in a special project completed by the Northwest Regional Educational Laboratory, was able to identify a group of adjectives which were applied by students to themselves in a field experience situation. His conclusion was:

These lists may be helpful to the college student in establishing a list of criteria by which to monitor his own behavior or to define certain behaviors which he needs to learn (p. 176).

The words identified by Garrison which apply to self-concept were strong, smart, anxious, secure, sexy, popular, weak, confused, calm, scared, accepted, respected, friendly, gullible, nervous, cautious, appealing, lonely, angry, innocent, confident, worried, lovable, evasive (p. 183-184).

The above list was generated by students in the study who were spending one-half day per week in an elementary school. Garrison's list, in conjunction with the lists contained in The Measurement of Meaning, by Osgood, Suci and Tannenbaum (1967, p. 37), comprised the master list from which the bi-polar adjectives were selected for use in this study.

The adjective pairs selected were :

Evaluative: good-bad, nice-awful, bright-dark, calm-agitated;
 Potency: strong-weak, large-small, deep-shallow, long-short;
 Activity: active-passive, fast-slow, sharp-dull, hot-cold.

A random order of concept presentation was used. The presentation order of the scales was ordered alternately, i. e., the "positive" and "negative" bi-polar adjectives within the scales alternated from left to right. The questionnaire included directions which follow closely those recommended by Osgood, Suci and Tannenbaum (1967).

Treatment of the Data

The researcher used an operational definition of attitude shift in terms of quantifiable data similar to the technique recommended by Osgood, Suci and Tannenbaum (1967). This technique makes it possible to determine, mathematically, the direction and the magnitude of the attitudinal shift for each subject. This technique utilizes the generalized distance formula of solid geometry to locate the concept identified by the semantic differential in semantic space.

A fundamental assumption involving the semantic differential technique, is that location of a concept in semantic space constitutes an operational definition of attitude and a change in location is equivalent to a change in attitude. Utilization of the generalized distance formula of solid geometry for this purpose is the recommended procedure set forth by Osgood, Suci and Tannenbaum (1967, p. 90-96).

In addition, data were analyzed to determine correlational (not causal) relationships extant with respect to biographical data gathered from the subjects.

This study used the following procedure for determining change in attitude.

1. Responses to the paired pre-test and the post-test bi-polar adjectives were scored on a seven-point basis (one being the "desirable" polar extreme and seven being the "undesirable" polar extreme).
2. Scores were computed for each respondent for each of the three factors (evaluative, potency, and activity) of attitude. This was done for each concept in the pre-test and for each concept in the post-test.
3. To determine, operationally, the change of attitude of each subject the square root of the sum of the squared differences between the scores for each of the three factors (evaluative, potency, and activity) of attitude was computed for each subject with respect to each concept included in the semantic differential. This was done by computing the score for each of the three factors (evaluative, potency, and activity) measured by the semantic differential. These data are presented in Appendix D and are rank ordered by magnitude of \bar{D} (mean D) for the individual.

The bi-polar adjectives were scaled from 1 to 7, "1" being the most desirably¹ oriented in all three factors (i. e., calm, strong,

¹It will be recalled (p. 5) that in the definitions, "desirable" or "undesirable," is used to avoid confusion with polarization.

active, deep, nice, sharp, long, bright, fast, large, good, and hot).

The mean evaluative factor was computed from: calm-agitated, nice-awful, bright-dark, good-bad. The mean potency factor was computed from: strong-weak, deep-shallow, long-short, large-small. The mean activity factor was computed from: active-passive, sharp-dull, fast-slow, hot-cold.

The means of the three factors (evaluative, potency, activity) of the pre-test were subtracted from the respective means of the post-test. The difference (ΔE , ΔP , and ΔA) provided the data for treatment with the "D" statistic.

"D" then is the measurement of the change in attitude of each respondent.

Criterion of Significance

"...the usual univariate tests of significance (e.g., the t-test) are not applicable" (Osgood, Suci and Tannenbaum, 1957, p. 100).

To determine the degree of attitude change for the individual, "D" was used. To determine a level of significance, a criterion which is appropriate for the semantic differential technique was applied. Osgood, Suci and Tannenbaum (1957), in their concluding chapter, state

The evidence shows that for individual subjects a shift of more than two scale units probably represents a significant change or difference in meaning, a shift of more than 1.00

to 1.50 scale units in factor score. . . is probably significant. For group data, changes or differences in measured meaning as small as one-half of a scale unit are significant at the 5 percent level. These levels of reliability should be satisfactory for most applications of the instrument (p. 328).

A change in any one factor score (E, P, A) of 1.00 will generate a change in "D" of 1.00 also (provided the other two factor scores remain constant). Similarly, any change in any one factor (E, P, A) of 1.50 will reflect a change in "D" of 1.50. However, a change of .50 in one factor in one direction and a change of .50 in a different factor in the opposite direction would reflect a change in "D" of approximately .707.

In spite of the fact that an insignificant change in all three factors might influence "D" to the extent that it would generate a change greater than 1.00, an examination of the data revealed that this happened 81 times in 1,572 "D" scores (5 percent of the time) and then in no case did "D" exceed 1.299.

Therefore, a change in "D" of 1.00 was used as a significant change in the individual. In dealing with grouped data, either in considering a composite score for individuals across abilities, or individuals grouped by various sub-groupings, a change in "D" of .50 was considered as significant (Osgood, Suci and Tannenbaum, 1957, loc. cit.).

IV. THE DATA

The data were analyzed by "D" with reference to individuals, the total group, and various subgroups. Data were also analyzed by concepts.

Results of Change as Measured by "D"

The procedure for determining "D" or the distance (the amount of change) which a given individual or group has changed in his attitude is outlined by Osgood, Suci and Tannenbaum (1957, p. 90-91). This procedure is shown in detail in Appendices A and B.

For convenience, the following numbering system was used to identify the various teaching abilities which are referred to in Tables 1, 2, and 3.

A₁: "My ability to motivate students in the classroom, shop or laboratory. "

A₂: "My ability to ask questions during classroom presentations or demonstrations to aid student learning. "

A₃: "My ability to select textbooks and instructional materials for the classroom, shop, or laboratory. "

A₄: "My ability to select appropriate equipment and supplies for instructional purposes. "

A₅: "My ability to maintain student attention during classroom presentations or demonstrations. "

Table 1. Polarity and amount of group change according to field experience (grouped data) (cell entries are "D").

Subgroup	N	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Composite
FE	32	- .428	- .357	+ .368	- .296	- .303	- .584*	- .404	- .394	- .195	- .527*	- .336	- .332	- .377
MFE	15	- .262	- .331	.222	- .247	- .942*	- .329	- .764*	- .420	- .323	- .545*	+ .588*	- .666*	- .470
ST	29	- .808*	- .523*	- .808*	-1.401*	-1.153*	- .627*	- .823*	- .901*	- .627*	-1.252*	-1.163*	- .761*	- .904*
ST+FE	21	- .423	- .362	- .395	- .149	- .274	- .374	- .735*	- .554*	- .326	- .394	- .337	+ .220	- .379

FE - First Field Experience

MFE - Multiple Field Experiences

ST - Student Teaching

ST+FE - Student Teaching plus Field Experience

minus (-) means that the polarization of attitude was desirable

plus (+) means that the polarization of attitude was undesirable

* significant (.05) change

Table 2. Polarity and amount of group change according to subject matter areas (grouped data) (cell entries are "D").

Subgroup	N	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Composite
Sci	17	- .334	- .428	+ .428	- .289	- .526*	.483	- .325	- .476	- .340	- .978*	- .775*	- .308	- .456
Edu	52	- .630*	- .700*	- .630*	- .759*	- .713*	- .798*	- .731*	- .876*	- .497	- .733*	- .579*	- .729*	- .698*
PA	14	- .992*	- .777*	- .451	- .791*	- .819*	- .586*	- .804*	- .624*	- .320	- .366	- .183	- .855*	- .631*
Hum	40	- .347	+ .084	- .265	- .250	- .374	- .384	- .254	- .313	+ .034	- .458	- .437	+ .078	- .273
PE	8	+ .335	- .387	- .473	-1.046*	-1.383*	- .628	- .691*	.740*	- .829*	-1.331*	-1.332*	- .313	- .791*

- indicates a desirable change
+ indicates an undesirable change

* significant (.05)

Sci - Science
Edu - Education
PA - Practical Arts
Hum - Humanities
PE - Physical Education

Table 3. Polarity and amount of group change according to class standing (grouped data) (cell entries are "D").

Subgroup	N	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Composite
Fr	23	- .544*	- .483	+ .201	- .422	- .585*	- .597*	- .629*	- .631*	- .467	- .607*	- .196	- .608*	- .497
So	41	- .548*	- .731*	- .812*	- .941*	- .657*	- .735*	- .750*	- .940*	- .486	- .924*	- .781*	- .835*	- .762*
Jr	10	- .513*	- .443	- .184	- .130	-1.694*	- .446	+ .168	- .501*	- .501*	- .823*	- .489	- .462	- .526*
Sr	43	- .511*	- .263	- .285	- .471	- .589*	- .438	- .609*	- .428	- .210	0.618*	- .698*	- .181	- .442
Total group	131	- .481	- .419	- .395	- .495	- .632*	- .553*	- .525*	- .603*	- .288	- .664*	- .538*	- .403	- .499**

- indicates a desirable change
+ indicates an undesirable change

* significant (.05)

**significant if rounded to .5

Fr - Freshman
So - Sophomore
Jr - Junior
Sr - Senior

- A₆: "My ability to teach at the student's level and rate of learning. "
- A₇: "My ability to develop classroom instruction based upon the individual needs of the learner. "
- A₈: "My ability to provide appropriate practice for development of basic skills. "
- A₉: "My ability to conduct a shop or laboratory demonstration for an individual student. "
- A₁₀: "My ability to relate the course of study to measurable performance objectives. "
- A₁₁: "My ability to develop performance tests to measure achievement. "
- A₁₂: "My ability to utilize individualized instruction materials and techniques. "

Data are also presented in Tables 1, 2, and 3 which subdivide the total group according to different criteria.

Of the 131 respondents who completed both the pre-test and the post-test, there were 22 different subject matter specialties indicated, and all levels from freshman through graduate student. These were subdivided into 13 subgroups as follows:

Subgroup 1 (Field Experience - FE) includes those respondents with one field experience which is equal to or less than ten hours per week for one term. (This is intended to identify the group engaging in

early field experience and who have had no prior field experience.)

Subgroup 2 (Multiple Field Experiences - MFE) includes those respondents with two or three field experiences with an average of less than six hours per week per term. (This was intended to identify those with multiple early field experiences.)

Subgroup 3 (Student Teachers - ST) includes those respondents with one field experience which is equal to or greater than 11 hours per week for one term. (This is intended to identify student teachers with no prior field experience.)

Subgroup 4 (Student Teaching plus Field Experience - ST+FE) includes those respondents with two terms of field experience which average 11-1/2 hours per week OR respondents with three terms of field experience which averaged ten hours per week. (This was intended to identify those who have done student teaching and have also had prior field experience.)

Subgroup 5 (Science - Sci) includes respondents who indicated that their subject matter major was science oriented. This included responses such as biology, science, chemistry, math, and physics.

Subgroup 6 (Education - Edu) includes respondents who indicated that their subject matter area was education oriented. This included responses such as education, elementary education, and unspecified. Unspecified or undecided responses were included here because it was assumed that anyone enrolled in field experience would fit in this

group better than any other group.

Subgroup 7 (Practical Arts - PA) includes respondents who indicated that their subject matter area was oriented toward the practical arts were included in this subgroup. This listing included responses such as business, electronics, industrial arts, agriculture, and home economics.

Subgroup 8 (Humanities and Social Sciences - Hum) includes respondents who indicated subject matter majors such as humanities, art, political science, English, French, journalism, and speech.

Subgroup 9 (Physical Education and Recreation - PE) includes respondents who indicated subject matter major of physical education and recreation.

Subgroups 10, 11, 12 and 13 were a "class standing" grouping and were identified respectively as freshman (Fr), sophomore (So), junior (JR), and senior (Sr).

General Comments About Tables

Tables 1, 2, and 3 show grouped data for "D" which was obtained by taking the square root of the sum of the squared differences of the means of all responses for each factor (E, P, A) with respect to each concept for each designated group (Appendix A).

Tables 4, 5, and 6 show mean individual "D" which was obtained

Table 4. Mean change (desirable or undesirable) in "D" for pre-test post-test ratings of ability for subgroups according to field experience (individual data).

Subgroup	N	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Composite
FE	32	1.31	1.34	1.40	1.34	1.34	1.30	1.37	1.46	1.35	1.32	1.21	1.36	1.33
MFE	15	1.18	1.48	1.29	1.08	1.41	1.00	1.51	.96*	1.55	1.07	1.17	.95*	1.22
ST	29	1.55	1.61	1.75	1.99	1.99	1.88	1.41	1.65	1.70	1.95	1.94	1.45	1.74
ST+FE	21	1.10	1.40	1.19	1.17	1.55	1.19	1.46	1.54	1.36	1.50	1.45	1.71	1.38

* All scores significant (.05) except these.

FE - First Field Experience

MFE - Multiple Field Experiences

ST - Student Teaching

ST+FE Student Teaching plus Field Experience

Table 5. Mean change (desirable or undesirable) in "D" for pre-test post-test ratings of ability for subgroups according to subject matter areas (individual data).

Subgroup	N	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Composite
Sci	17	1.49	1.56	1.42	1.64	1.86	1.62	1.38	1.68	1.27	1.70	1.54	1.47	1.55
Edu	52	1.38	1.62	1.67	1.62	1.66	1.56	1.57	1.66	1.36	1.44	1.37	1.37	1.52
PA	14	1.49	1.04	1.23	1.21	1.27	1.53	1.60	1.26	1.18	1.40	1.41	1.35	1.33
Hum	40	1.02	1.18	1.25	1.07	1.33	1.20	1.10	1.26	1.63	1.23	1.45	1.50	1.27
PE	8	1.34	1.87	1.62	1.86	1.79	1.59	1.62	1.29	2.12	2.37	2.08	1.34	1.74

* All scores significant (.05).

Sci - Science

PA - Practical Arts

PE - Physical Education

Edu - Education

Hum - Humanities

Table 6. Mean change (desirable or undesirable) in "D" for pre-test post-test ratings of ability for subgroups according to class standing (individual data).

Subgroup	N	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Composite
Fr	23	1.11	1.32	1.28	1.18	1.19	1.39	1.14	1.58	1.56	1.15	1.23	1.34	1.27
So	41	1.27	1.53	1.74	1.73	1.64	1.35	1.63	1.57	1.61	1.60	1.51	1.44	1.55
Jr	10	1.61	1.51	1.22	1.32	1.85	1.18	1.14	1.16	1.17	1.10	1.66	.95*	1.32
Sr	43	1.37	1.43	1.31	1.29	1.62	1.57	1.39	1.45	1.45	1.67	1.68	1.50	1.48
Total	131	1.32	1.45	1.41	1.42	1.58	1.41	1.41	1.42	1.48	1.50	1.51	1.36	1.44

* All scores significant (.05) except these.

Fr - Freshman

Jr - Junior

So - Sophomore

Sr - Senior

by computing "D for each ability for each person in the group and then determining the mean (Appendix B).

Tables 7, 8, and 9 show the "D" which is a composite of all abilities for specified groups compared with the other similar groups. Table 7 contains field experience groupings. Table 8 has the subject matter groupings and Table 9 contains the groupings which were based on grade level. To interpret these data refer to Table 7 as an example. Look under the column heading of "FE" where it intersects with row heading "ST" and find the number .7202. This indicates that the difference in the change which took place in the self-perceived teaching abilities of those in field experience compared with student teachers is relatively large.

Next, locate the number .0333 which is under the column heading of "MFE" and in the row heading of "ST+FE." This indicates that the difference in the change which took place in the self-perceived teaching abilities of those with multiple field experience compared with those with student teaching plus multiple field experience is relatively small.

A complete table which provides comparison of each group with every other group is included in Appendix E.

Table 10 shows a comparison of the numbers of respondents with common classifications in various groups. Table 10 was compiled for the convenience of the reader to indicate some degree of the

Table 7. "D" for the change in group composite teaching abilities by grouping with respect to field experience.

	FE	ST	MFE
ST	.7202		
MFE	.1618	.5844	
ST+FE	.1363	.6033	.0333

Table 8. "D" for the change in group composite teaching abilities by grouping with respect to subject matter areas.

	Sci	Edu	PA	Hum
Edu	.3145			
PA	.2057	.1090		
Hum	.1992	.4961	.3916	
PE	.3127	.1349	.1519	.4951

Table 9. "D" for the change in group composite teaching abilities by grouping with respect to class standing.

	Fr	So	Jr
So	.4137		
Jr	.1723	.2916	
Sr	.1402	.3569	.0703

Table 10. A cell-by-cell comparison of numbers of respondents with common classifications.

Group	FE	MFE	ST	ST+ FE	Sci	Edu	PA	Hum	PE	Fr	So	Jr	Sr
FE	32				3	15	2	11	1	17	7	4	3
MFE		15			1	5	1	7	1	2	7	4	2
ST			29		5	10	5	6	3		10		17
ST+FE				21	6	3	3	8	1		5	1	12
Sci	3	1	5	6	17						3	2	7
Edu	15	5	10	3		52				16	30		1
PA	2	1	5	3			14					2	12
Hum	11	7	6	8				40		6	8	5	17
PE	1	1	3	1					8	1		1	6
Fr	17	2				16		6	1	23			
So	7	7	10	5	3	30		8			41		
Jr	4	4		1	2		2	5	1			10	
Sr	3	2	17	12	7	1	12	17	6				43

(Not all subgroups will sum to the total of a given group because of incomplete information on some questionnaires.)

overlap of groups.

The data presented in Table 11 show the number and the percentage of the various groupings which reflected any difference in the "D" score during the course of the study.

Table 12 presents similar data, however, the criterion for "change" is based on a change in "D" of ± 1.00 .

Specific Comments about Tables

It should be noted that in examining Tables 1, 2, and 3 that the greatest composite change exhibited by any group is to be found in the student teacher group. Further it is interesting to observe that the data in Tables 1, 2, and 3 are based on factor scores for individual respondents which would tend to cancel each other; that is, subjects responding with different polarity changes will tend to cancel each other and lower the mean. This fact means that the changes which took place in a desirable direction (-) were sufficiently large not only to cancel out the undesirable changes but to still influence the group score to a noteworthy extent.

This study was primarily concerned with the change of attitude concerning self-possessed teaching competencies of prospective teachers with reference to various amounts of field experience and

Table 11. Summary of direction of change as reflected by individual composite "D" scores.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	21	65.6	11	34.4
MFE	15	13	86.7	2	13.3
ST	29	22	75.9	7	24.1
ST+FE	21	14	66.7	7	33.3
Sci	17	12	70.6	5	29.4
Edu	52	41	78.8	11	21.2
PA	14	10	71.4	4	28.6
Hum	40	28	70.0	12	30.0
PE	8	5	62.5	3	37.5
Fr	23	17	73.9	6	26.1
So	41	34	82.9	7	17.1
Jr	10	9	90.0	1	10.0
Sr	43	28	65.1	15	34.9
Total	131	96	73.3	35	26.7

Table 12. Summary of number of individuals and percentage of various groups with changes in composite "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	13	40.6	10	31.0
MFE	15	9	60.0	1	6.6
ST	29	19	65.5	5	17.2
ST+FE	21	14	66.6	4	19.0
Sci	17	10	58.8	3	17.6
Edu	52	30	57.6	7	13.5
PA	14	9	64.3	3	21.4
Hum	40	21	52.5	8	20.0
PE	8	5	62.5	2	25.0
Fr	23	10	43.5	5	21.7
So	41	26	63.4	4	9.8
Jr	10	8	80.0	0	0.0
Sr	43	24	55.8	12	27.9
Total	131	75	57.2	23	17.6

these data are presented in Table 1. Other groupings were done to provide a visual comparison of the data also. These other groupings are found in Tables 2 and 3.

Tables 1, 2, and 3 also provide a minus (-) or a plus (+) which precede the "D" score. This minus or plus is the indication of direction of change which the group as a whole took with respect to attitudes toward the various teaching abilities.

The greatest amount of change in any group was shown to be the student-teacher group. This was followed by the physical-education-and-recreation group and this, in turn, was followed rather closely by a sophomore grouping.

Further investigation of the composition of the population revealed the data presented in Table 10.

Tables 1, 2, and 3 treat the data in terms of the total group and changes which are manifested by the total group. Contrasted and compared with that are the data presented in Tables 4, 5, and 6.

Tables 4, 5, and 6 display the mean changes of individuals in various groups without regard to the direction or polarity of the change.

While tables 1, 2, and 3 treat the data in a manner which causes the cancelation of a minus score by a plus score of an equal magnitude, Tables 4, 5, and 6 reflect the magnitude of change without regard for the polarity of the change.

Tables 4, 5, and 6 indicate that the mean individual change with

respect to all abilities and in any grouping is well beyond the 5 percent level (by the criterion of Osgood, Suci and Tannenbaum, 1957, p. 328) with only three exceptions.

Again, as with Tables 1, 2, and 3, "student teachers," "physical education and recreation," and "sophomores" show the greatest amount of change.

Tables 7, 8, and 9 provide a way of looking at the relative amount of change of one group with every other group. These tables do not provide any indication of the polarity of the change. There is no test of significance for these data (loc. cit.). Tables 7, 8, and 9 provide a summary of the differences between groups with respect to the magnitude of change. Appendix E contains a more elaborate table, which provides similar comparison data for every group with every other group, regardless of the kind of grouping.

To provide a quick overview of the number, percentage, and direction of change, composite "D" scores were used in the presentation of the data contained in Table 11. Caution should be used in drawing any conclusions based on Table 11 alone since the data here are based on any change no matter how large or small.

Table 12 is based on the same information but uses a "D" score change of 1.00 or greater to warrant inclusion of the data. Based on the composite score the data again indicates that a majority of the persons enrolled in the field experience do undergo a significant

change in their attitude toward their own ability. Further, the data in Table 12 indicate that 57 percent undergo a desirable change while only about 18 percent undergo an undesirable change.

An elaboration of the data presented in Table 12 is provided in Appendices F through Q. The data in Appendices F through Q are computed from individuals "D" score change (in a specified concept) of 1.00 or more.

Tables 13, 14, and 15 show the percentage of various groups which exhibited various degrees of change ranging from significant and desirable, to not significant, and to significant and undesirable.

When the data are ordered according to amounts of field experience, as in Table 13, several observations about each group might be made.

Prospective teachers with one field experience had 44 percent of the group make a significant and desirable change in their attitude toward their ability to teach at the students' level and rate of learning (A_6). The smallest percentage of the group making a significant, desirable change was 19 percent with respect to conducting demonstrations for an individual student (A_9).

In the same group, 44 percent made a significant, undesirable change with respect to their ability to select appropriate equipment (A_4).

Those respondents with a large time block of field experience

Table 13. Percentage of selected groups showing degree of change, by ability.

Group and N	Direction of change	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Mean percentage
Field experience (32)	Desirable	38	37	22	31	34	44	31	31	19	41	31	25	32
	Not significant	31	35	37	25	50	34	47	38	44	40	50	50	40
	Undesirable	31	28	41	44	16	22	22	31	37	19	19	25	28
Multiple field experience (15)	Desirable	27	20	33	33	40	20	40	40	27	33	7	40	30
	Not significant	43	47	40	34	40	53	40	46	33	53	53	60	45
	Undesirable	30	33	27	33	20	27	20	14	40	14	40	0	25
Student teaching (29)	Desirable	55	52	48	52	45	45	52	34	41	55	52	34	47
	Not significant	21	31	28	27	31	27	38	42	35	21	38	56	33
	Undesirable	24	17	24	21	24	28	10	24	24	24	10	10	20
Student teaching plus field experience (21)	Desirable	24	24	29	29	43	43	38	33	33	33	33	33	33
	Not significant	57	43	38	38	28	43	43	34	34	34	38	24	38
	Undesirable	19	33	33	33	29	14	19	33	33	33	29	43	29
Total (131)	Desirable	37	39	34	37	41	40	39	37	29	40	35	33	37
	Not significant	40	37	37	33	38	37	40	40	41	39	45	46	39
	Undesirable	23	24	29	30	21	23	21	23	30	21	20	21	24

Table 14. Percentage of selected groups showing degree of change, by ability.

Group and N	Direction of change	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Mean percentage
Science (17)	Desirable	35	29	23	41	41	41	29	41	35	53	35	41	37
	Not significant	42	36	36	18	30	36	42	12	42	27	47	30	33
	Undesirable	23	35	41	41	29	23	29	47	22	18	18	29	30
Education (52)	Desirable	44	52	42	42	42	46	44	40	27	36	35	35	40
	Not significant	37	29	35	33	41	33	37	39	54	45	52	52	41
	Undesirable	19	19	23	25	17	21	19	21	19	19	13	13	19
Practical arts (14)	Desirable	50	50	29	43	64	36	70	50	36	43	29	36	45
	Not significant	21	43	35	43	29	43	16	43	43	28	67	57	39
	Undesirable	29	7	36	14	7	21	14	7	21	29	4	7	16
Humanities and Social sciences (40)	Desirable	28	20	38	25	33	33	33	25	25	30	38	25	29
	Not significant	52	52	37	47	42	44	49	55	30	52	37	47	45
	Undesirable	20	28	25	35	25	23	18	20	45	18	25	28	26
Physical education and recreation (8)	Desirable	25	38	49	38	38	50	38	38	38	50	38	38	40
	Not significant	25	24	29	24	37	12	25	37	24	12	37	37	27
	Undesirable	50	38	22	38	25	38	38	25	38	38	25	25	33

Table 15. Percentage of selected groups showing degree of change, by ability.

Group and N	Direction of change	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	Mean percentage
Freshmen (23)	Desirable	35	30	13	26	39	40	39	35	17	35	26	26	30
	Not significant	39	44	48	35	52	34	48	26	48	61	48	52	45
	Undesirable	26	26	39	39	9	26	13	39	35	4	26	22	25
Sophomores (41)	Desirable	39	49	49	51	37	41	49	41	37	44	39	39	43
	Not significant	42	34	29	24	41	38	34	44	36	34	44	51	38
	Undesirable	19	17	22	25	22	21	17	15	27	22	17	10	19
Juniors (10)	Desirable	50	40	30	50	70	20	10	40	30	50	20	30	37
	Not significant	30	20	40	20	20	60	60	40	40	50	50	50	40
	Undesirable	20	40	30	30	10	20	30	20	30	0	30	20	23
Seniors (43)	Desirable	40	35	33	28	44	39	42	37	35	42	44	33	38
	Not significant	30	42	37	42	35	35	37	40	35	25	35	41	36
	Undesirable	30	23	30	30	21	26	21	23	30	33	21	26	26

and no previous field experience (Student teachers) provided data which indicate that this group changed significantly, and desirably, more than any other grouping as evidenced by mean ability change. Further, an "ability-by-group" examination reveals that student teachers changed significantly, and desirably, more than almost any other grouping, a slight exception being in ability to provide appropriate practice (A_8) and ability to utilize individualized materials (A_{12}).

Those with multiple early field experiences of relatively small amounts (excluding student teaching) exhibited the lowest mean percentage of significantly desirable change for all of the "field experience" groupings. The largest percentage of this group showed significant, desirable changes in four abilities. Ability to maintain student attention (A_5), ability to develop instruction based on learner needs (A_7), ability to provide practice for basic skills (A_8), and ability to utilize individualized materials and techniques (A_{12}) were the four abilities which all showed a significant and desirable change for 40 percent of the group. In contrast with these data it should be also noted that 40 percent of this same grouping made a significant, undesirable change concerning their ability to conduct a demonstration for an individual student (A_9), and their ability to develop performance tests to measure achievement (A_{11}).

Those respondents with both early field experience and student

teaching had 43 percent of the group make a significant and desirable change with respect to their ability to maintain student attention during class (A_5). The same percentage made the same change concerning their ability to teach at the students' level and rate (A_6).

It should be noted that in the total group, percentages of desirable changes ranged from a low of 29 percent to a high of 40 percent. The mean percentage change for significant, desirable changes for the group was 37 percent. The preceding observation indicates that the group, as a total group, has a desirable-change-profile which would be fairly flat. Similarly, the maximum percentage of the group making a significant, undesirable change ranged from a low of 20 percent to a high of 30 percent. The mean percentage change for significant, undesirable changes for the group was 24 percent. Again, the undesirable-change-profile would be quite flat.

When the data were grouped by subject matter major (Table 14) they reveal that the highest percentage of science-oriented prospective teachers making a significant change was with respect to measurable performance objectives (A_{10}).

Education majors had the greatest percentage exhibiting a significant change dealing with their ability to ask questions (A_2).

Subject matter majors indicating an area of concentration in the practical arts had the greatest percentage of that group exhibiting a

significant and desirable change in the area of textbook and materials selection (A_3). The same results were also obtained for their ability to develop performance tests to measure achievement (A_{11}).

Physical education and recreation majors provided data which indicate that their greatest percentage of significant and desirable change was with reference to their ability to teach at the student's level and rate of learning (A_6), and also to relate the course to measurable performance objectives (A_{10}).

When data were ordered by grade level (Table 15), it was revealed that freshmen made the most significant, desirable changes concerning their ability to teach at the student's level and rate of learning (A_6). Close to this change was their ability to maintain student attention (A_5) and their ability to individualize instruction (A_7).

Sophomores exhibited their greatest percentage of significant, desirable change with respect to selection of equipment and supplies for instruction (A_4).

Juniors exhibited their greatest percentage of significant, desirable change concerning their ability to maintain student attention during class (A_5).

Seniors exhibited their greatest percentage of significant, desirable change in two ability areas; ability to maintain student attention during class (A_5), and ability to develop performance tests (A_{11}).

Speculation and Discussion

The balance of this chapter is devoted to a discussion of the data with speculation and possible implications. Based on the evidence available, the following opinions are offered.

Group Data Presented in Tables 1, 2, and 3

The data presented in Table 1 show that the greatest change that took place in any grouping by field experience (in any group for that matter) was in the student teacher group. A composite (of all abilities) "D" of .904 was the greatest amount of change of any group. This finding would support the contention held that student teaching with no prior field experience has a strong effect on the prospective teacher's opinion of his own ability.

The data also indicate the group which had field experience prior to student teaching showed the least change. This finding would support the contention of the protagonists of early field experience. Further, the only significant change made by the group having both field experience and student teaching came in the area of individualized instruction (A7) and in the area of providing appropriate practice (A8).

The progressive development of prospective teachers' ability based on each person's own feelings about himself (Table 1) contains the beginning for the creation of a profile of professional development.

For example: In the first field experience, the greatest changes dealt with the prospective teacher's ability to teach at the student's level (A6) and the ability to relate the course of study to performance objective (A10). During subsequent field experience activities (MFE) the greatest change is related to maintaining attention during classroom presentations or demonstrations (A5), followed closely by change in ability to develop classroom instruction based on the individual needs of the learner (A7). Both of these suggest a possibility of change during the first field experience, but did not reach significance.

One finding shown in Table 1 is indication of an undesirable change with reference to ability to develop performance tests to measure achievement. This pertains only to those teachers with multiple field experiences and may be an indication of a growing awareness of a personal need or perhaps a sense of inadequacy or frustration on the part of the prospective teacher. It might also represent a lack of adequate, or relevant, classroom preparation.

Future research concerning the data related to field experience which are in Table 1 may support or refute this conjecture. The future study may be done either with another group or in a longitudinal study of this same group.

Data in Tables 1, 2, and 3 (field experience, subject matter major, and class standing) are based on the total group; Tables 4, 5,

and 6 (field experience, subject matter major, and class standing) are based on individual data. This means that Tables 4, 5, and 6 reflect mean changes without regard to the direction (desirability) of the change. These data (Tables 4, 5, and 6) provide evidence relevant to the change of strength of feelings which the individual prospective teacher has undergone. When the data are analyzed in this manner, the student teacher group shows the greatest amount of change.

Consideration of these two arrays of data supports the contention that the change occurring in student teaching is the most pronounced of all groupings considered.

Evidence presented in this chapter supports the decision made by the School of Education, Oregon State University, to engage in constant efforts to improve the quality of its teacher education program by providing more and/or better field experience. Prospective teachers who are engaging in various early field experience activities are undergoing a continuous change in their attitude toward their ability to perform certain teaching functions.

If one accepts the proposition that distributed learning is more lasting than massed learning, then it might be argued that the field experience program will produce changes in prospective teacher behavior that will be longer lasting than student teaching by itself.

One of the most curious findings deals with the change in

attitude of the group identified as subgroup 8 (Humanities and Social Sciences) (see data in Tables 2 and 5). The findings presented in Table 2 (subject matter grouping) indicate that, as a group, the change in attitude was not significant with reference to either the specific abilities or to the composite of all abilities. These data were compiled in a manner which would have the "desirable" and the "undesirable" changes cancel one another. Further examination of the data in Table 5 reveals that the mean change in attitude of the individual, without respect to the direction of the change, was significant though the change was not generally as great as for most other groups.

Speculation as to the cause of this fact is pure conjecture. However, it may be related to the decision of some people in this group not to pursue a teaching career. A follow-up study in two or three years should be able to ascertain the validity of such conjecture.

Differences in Change of Attitude

Table 7 indicates that Student Teaching and Field Experience produce markedly different changes than the changes occurring as a result of Multiple Field Experiences and Student Teaching plus Field Experience. This difference may be related to the quantity of exposure to the classroom situation; i. e., Student Teaching and Field Experience are both "one-time" activities. An interesting

consideration in this matter, however, is that if one considers the total number of contact hours which the prospective teacher has with the classroom, Student Teachers may have more hours than some of those with Multiple Field Experience.

Data tabulated in Table 8 indicate that there is quite a difference in the change of attitude between the Humanities and Social Sciences and Education, and there is also a similar situation between Humanities and Social Sciences and Physical Education. These data would imply that Education and Physical Education prospective teachers undergo similar changes in attitude.

Significant Changes in Attitude

A summary of individual changes in Table 12 is, in the eyes of the investigator, one of the most important arrays of data. Forty percent of those in the first field experience underwent a significant "desirable" change in attitude. Thirty-one percent underwent an "undesirable" change, constituting a group size very worthy of consideration. If one compares these data with those available for the Multiple Field Experience group, it will be noted that the figures are 60 and 7 percent, respectively. This would imply either 1) there is a tremendous change in the attitude as a result of Multiple Field Experiences, or 2) a natural selection process has occurred that eliminates those not inclined to make a career of teaching.

In the future, a longitudinal study must be made which will identify those continuing in teacher education and those selecting some other career. This could be done as a part of a follow-up study of this same group. Based on informal interviews with limited numbers and "non-random" selection of students, the investigator would postulate that number 2 (the natural selection process) has been operative and that the early field experience activity is performing the function for which it was intended, i. e., providing experiences for prospective teachers to confirm, or alter, the teaching profession as a career choice.

V. SUMMARY, CONCLUSIONS AND IMPLICATIONS

The Problem

The primary purpose of this study was to determine whether, and in what manner, attitudes held by prospective teachers concerning selected self-possessed teaching competencies changed during various kinds of field experience. Respondents in the study were prospective teachers enrolled in various types of field experience at Oregon State University.

The procedural steps necessary for providing an answer to the primary question were related to population selection, competency selection, instrument selection, questionnaire administration, data compilation, and data interpretation.

Procedures

Sample

Respondents were prospective teachers who were enrolled in various types of field experience programs at Oregon State University and included students at all levels from freshmen to graduate students. Twenty-two different subject matter major classifications were indicated by the 131 respondents who completed both the pre-test and the post-test questionnaire.

Competency Selection

A review of literature ascertained teaching competencies which would be pertinent and relevant to teaching behavior and performance. Twelve teaching competencies were selected which were used as the basis for the prospective teacher to evaluate their own ability. These 12 teaching competencies were used as the "concept" for the prospective teacher to react to on a semantic differential.

Instrument Selection

A review of the literature of various attitudinal measuring tests resulted in the decision to use the semantic differential technique as originally proffered by Osgood, Suci and Tannenbaum (1967). This work provided the basis for the selection of the bi-polar adjectives ultimately used in the semantic differential.

Questionnaire Administration

The pre-test questionnaire was administered to a total of 194 prospective teachers who were enrolled in field experience. Eight weeks later a post-test questionnaire was administered to the same group. Questionnaires from the post-test resulted in matched pre-test post-test scores for 131 prospective teachers. The individual differences between the pre-test results and the post-test results were used as the basis for determining the change in the self-perceived

teaching ability of the prospective teachers.

Data Compilation

Individual "D" scores for each ability were computed based on the difference between the pre-test and the post-test results on the semantic differential. "D" was computed using the generalized distance formula for solid geometry as promulgated by Osgood, Suci and Tannenbaum (1967). This resulted in 12 "D" scores for each individual. Based on test-retest reliability a change of 1.00 in the "D" score was accepted as a significant change in any given respondent. The direction, or polarity, of the change was determined by the directional change in the E, P, A factors measured by the semantic differential.

For group data, the mean score for each factor (E, P, A) was computed for each group with respect to each ability and the generalized distance formula was then applied to determine the change in a particular group.

In addition to individual and group change for each ability, a composite "D" was computed which was based on all the abilities lumped together.

For the determination of the change of self-perceived ability individual "D" scores were used with the results of these data being organized into various tables which indicated the percentage of

various groupings which had made significant and desirable, or significant and undesirable changes in the prospective teachers' self-perceived teaching ability.

Conclusions

Several conclusions may be drawn from the findings of this study of attitude change and field experience:

1. Prospective teachers can be directed to attend to their ability to perform the teaching competencies which were identified in the review section of this study.
2. Most of the group of undergraduate prospective teachers enrolled at Oregon State University made a significant and desirable change in their attitude toward their ability as a teacher during their field experience.
3. Changes in self-perceived ability by student teachers with no previous field experience are singularly outstanding.
4. Several field experiences prior to student teaching result in a smaller change during student teaching than if no field experience occurs before student teaching.
5. There is some indication that change of self-perceived ability of prospective teachers is also correlated with the prospective teacher's subject matter area.
6. Significant and important (desirable and/or undesirable)

changes in self-concept occur at all levels of field experience.

Implications

An interpretation of the data collected and analyzed as a result of this study has implications for future modification of teacher education programs. Further, on the basis of the data gathered for this study, there are philosophical questions which must be considered.

1. Teacher educators should continue to explore and evaluate the role of field experience as a part of the prospective teachers' pre-service professional preparation.
2. Consideration of a planned program of field experiences at all levels of undergraduate teacher education is in order.
3. The sudden and marked change of the group identified as student teachers raises the philosophical question, "Is it better for prospective teachers to undergo a sudden change at the senior level, or is it better for prospective teachers to undergo a gradual change"? This question should, of course, give consideration to the question of "massed vs. distributed" learning.

Recommendations for Further Study

Six suggestions for further study are:

1. This study dealt only with change in attitude. It would be in order for a companion study to be made using the same data to determine the absolute position of the respondents either before or after their field experience.
2. A follow-up study should be done in three to five years which would determine whether the prospective teachers with an "undesirable" change decided not to become teachers, and if those with a "desirable" change did, in fact, become teachers.
3. This study might be replicated on a yearly basis which would follow the respondents who were freshmen and sophomores through the balance of their undergraduate career to determine whether there is any sort of profile which develops as a result of field experience.
4. The same instrument should be used with a group of teachers in the field who can be identified as successful teachers in an attempt to establish an "ideal" profile. This might then be used as a step in determining a "desirable change profile" for prospective teachers.
5. Personal interviews of those respondents with the highest desirable "D" scores should be conducted to provide

data for establishing early field experience guidelines for pertinent activities for prospective teachers and cooperating teachers.

6. A longitudinal study should be made to determine the dynamic relationship which exists between field experience and self-concept, and to try to ascertain whether there is any relationship which exists between quantity and quality of field experience.

BIBLIOGRAPHY

- Amerschek, K. and B. Chandler. 1968. Innovative ideas in student teaching. College Park, Maryland University, College of Education. 48 p. (Microfiche)
- Apel, J. D. 1967. Prediction of adult educators' attitudes toward institutional changes. Chicago University, Illinois. U.S. Department of Health, Education and Welfare, final report. April. 19 numb. leaves. (Microfiche)
- Aspy, D. N. 1969. Maslow and teachers in training. *Journal of Teacher Education* 20:303-309.
- Baird, J. U., W. D. Belt and L. Holder. 1968. The individualized secondary teacher education program at Brigham Young University. II. M-step monograph.. Salt Lake City, Utah State Board of Education. 38 p. (Microfiche)
- Bashaw, W. L. et al. 1969. Attitudes toward services of state departments of education. *Journal of Experimental Education* 37:8-12.
- Beard, H. G. 1966. A study of the meaning of selected program planning concepts in vocational education. Ph.D. thesis. Ithaca, New York, Cornell University. 108 numb. leaves.
- Boze, N. S. and W. E. Day. 1968. Screening points in secondary teacher education programs. Lubbock, Texas Technological College, School of Education. 17 p. (Microfiche)
- Bradley, R. C. 1968. Improving student teaching experience. *Contemporary Education* 40:39-47.
- Brantner, S. T. 1964. Trade and technical teachers' opinions on in-service education. University Park, Pennsylvania State University. 92 p. (Microfiche)
- Briggs, T. H. 1937. Secondary education. New York, MacMillan. 577 p.
- Brinton, J. E. 1961. Deriving an attitude scale from semantic differential data. *Public Opinion Quarterly* 25:289-295.

- Brown, H. D. 1965. An investigation of attitudes and opinions held by teachers of vocational agriculture and their administrators regarding selected areas of the vocational agriculture program. Ph. D. thesis. Oklahoma State University. (Abstracted in Dissertation Abstracts 27:63-A)
- Bruning, J. L. and B. L. Kintz. 1968. Computational handbook of statistics. Glenview, Illinois, Scott, Foresman. 269 p.
- Butts, D. P. and C. E. Reun. 1967. A study of teacher attitude change. Austin, Texas University, Science Education Center. 13 p. (Microfiche)
- Carroll, J. B. 1964. Language and thought. Englewood Cliffs, New Jersey, Prentice-Hall. 118 p.
- Chou, Y. 1969. Statistical analysis with business and economic applications. New York, Holt, Rinehart and Winston. 794 p.
- Clevenger, T., Jr., G. A. Lazier and M. L. Clark. 1968. The influence of certain factors on response to the semantic differential. Public Opinion Quarterly 32:675-679.
- Cohen, H. A. and R. Miller. 1969. Mobility as a factor in adolescent identity problems. Psychological Reports 25:775-778.
- Cooper, J. M. 1967. A performance curriculum for teacher education. The Second Annual Florence B. Stratemeyer Lecture, U.D. Department of Health, Education and Welfare, Office of Education. 21 p. (Microfiche)
- Corrigan, D. (ed.). 1967. The study of teaching. Association for Student Teaching. 96 p. (Microfiche)
- Courtney, E. W. and H. H. Haflin. 1969. Competence of vocational teachers: a factor analysis of the training needs of teachers of occupational education. Corvallis, Oregon State University. 48 p. (Microfiche)
- Crowne, D. P. and D. Marlowe. 1964. The approval motive: studies in evaluative dependence. New York, Wiley. 233 p.
- Dahle, T. L. 1968. Faculty attitudes toward the Division of Continuing Education at the University of Oregon. Paper presented

- at the National Seminar on Adult Education Research, University of Oregon, Eugene. 11 p. (Microfiche)
- Davis, E. E. 1964. Attitude change, a review of bibliography of selected research. New York, UNESCO Publications Center (NAIP). 63 p. (UNESCO reports and papers in the social sciences no. 19)
- Davis, T. S. 1966. A developmental approach to student teacher programs. *The Clearing House* 41:153-155.
- Denmark, F. L. 1969. The effect of ethnic and social class variables on semantic differential performance. Paper presented at the Eastern Psychological Association meeting, Philadelphia, Pennsylvania. 12 p.
- Dewey, J. 1966. Democracy and education. New York, The Free Press. 378 p.
- Dingman, H. F. et al. 1969. The semantic differential as a tool for measuring progress in therapy. *Psychological Reports* 25:271-279.
- Divita, C., Jr. 1968. Attitudes toward vocational education in the secondary schools of West Virginia. Part I. School administrators and boards of education members. Huntington, West Virginia Research Coordinating Unit. 195 p. (Microfiche)
- DiVesta, F. and W. Dick. 1966. The test-retest reliability of children's ratings on the semantic differential. *Educational and Psychological Measurement* 26:605-616.
- Dumas, W. 1969. Factors associated with self-concept change in student teachers. *The Journal of Educational Research* 62:275-278.
- Evans, R. I. 1968. Resistance to innovation in higher education. San Francisco, Jossey-Bass. 198 p.
- Festinger, L. and H. H. Kelly. 1951. Changing attitudes through social contact: An experimental study of a housing project. Ann Arbor, University of Michigan. 83 p.
- Findley, D. 1968. Teacher aides: A status report. Terre Haute, Indiana State University, Educational Development Council. 40 p. (Microfiche)

- Garrison, J. 1968. Appendix U. Self concept in teaching; an exploration. In: A competency based, field centered, systems approach to elementary teacher education. Portland, Oregon, Northwest Regional Educational Laboratory. Final report. p. 175-187. (Microfiche)
- Greenberg, B. 1967. Review of literature relating to the use of nonprofessionals in education (from 1942 to 1967). New York, New Careers Development Center. 18 p. (Microfiche)
- Grigg, A. E. 1959. Validity study of the semantic differential technique. *Journal of Clinical Psychology* 15:179-181.
- Gunderson, O. D. 1971. The factor analysis of professional education competencies and community college vocational instructors of trade and industrial education. Ed.D. thesis. Corvallis, Oregon State University. 96 numb. leaves.
- Hajek, J. and Z. Sidak. 1967. Theory of rank tests. New York, Academic. 297 p.
- Hayes, R. B. 1967. Viewing imperatives for student teaching in 1967. *Teachers College Journal* 39:30-35.
- Heise, D. R. 1969. Some methodological issues in semantic differential research. *Psychological Bulletin* 72:406-422.
- Hermanowicz, H. J. 1968. Teacher education: An exploration of efforts and proposals for its improvement. Report prepared for Committee Q, Illinois Board of Higher Education. 24 p. (Microfiche)
- Howe, E. S. 1962. Probabilistic adverbial qualifications of adjectives. *Journal of Verbal Learning and Verbal Behavior* 1:225-242.
- Husek, T. R. and M. C. Wittrock. 1962. The dimensions of attitude toward teachers as measured by the semantic differential. *Journal of Educational Psychology* 53:209.
- Jenkins, J. J., W. A. Russell and G. J. Suci. 1958. An atlas of semantic profiles for 360 words. *American Journal of Psychology* 71:688-699.

- Johnson, R. L. and D. D. Wall. 1969. Cluster analysis of semantic differential data. *Educational and Psychological Measurement* 29:769-780.
- Johnston, D. P. 1969. The relationship of self-supervision to change in selective attitudes and behaviors of secondary school teachers. *Educational Leadership* 27:57-63.
- Jorgensen, E. C. and R. J. Howell. 1969. Changes in self-ideal-self-correlations from ages 8 through 18. *Journal of Social Psychology* 79:63-67.
- Kane, R. B. 1968. Use of the semantic differential technique to measure prospective elementary school teacher attitude toward mathematics and other subjects. Lafayette, Indiana, Purdue Research Foundation. U.S. Department of Health, Education and Welfare. 66 p. Final report. (Microfiche)
- Kerlinger, F. N. 1964. *Foundations of behavioral research*. New York, Holt, Rinehart and Winston. 739 p.
- Klapper, J. T. 1959. The semantic differential: Its use and abuse. *Public Opinion Quarterly* 23:435-438.
- Kreuz, M. L. 1969. Innovative move to meet local problems. *American Vocational Journal* 44:62-65.
- Lindahl, D. G. 1971. Commonalities in the professional education competencies of selected community college vocational instructors. Ed.D. thesis. Corvallis, Oregon State University. 95 numb. leaves.
- McIntosh, J. R. 1964. The effectiveness of N-term block practice teaching--a comparative study. *Canadian Education and Research Digest* 4:34-42. (Microfiche)
- Messick, S. and J. Ross (eds.). 1962. *Measurement in personality and cognition*. New York, Wiley. 334 p.
- Miller, J. D. 1971. A factor analysis of professional education competencies and selected community college instructors. Ed.D. thesis. Corvallis, Oregon State University. 98 numb. leaves.

- Miller, T. R. 1966. Teacher perception of principals' views on vocational education. Raleigh, North Carolina University. 20 p. (Microfiche)
- Nixon, R. M. 1969. When I look at education today. *Today's Education* 58:21-23.
- Nussell, E. J. and M. J. Johnson. 1969. Who obstructs innovation? A study of teacher perception of possible obstacles to innovation. *Journal of Secondary Education* 44:3-11.
- Osgood, C. E. and G. J. Suci. 1952. A measure of relation determined by both mean difference and profile information. *Psychological Bulletin* 49:251-262.
- Osgood, C. E., G. J. Suci and P. H. Tannenbaum. 1967. The measurement of meaning. Urbana, University of Illinois Press. 346 p.
- Pallone, N. J. et al. 1970. Work values and self-meaning. *Journal of Counseling Psychology* 17:376-377.
- Pogue, G. 1969. Student teaching: The state of the art. Indiana, Ball State University. 11 p. (Microfiche)
- Remmers, H. H. 1934. Studies in attitudes--a contribution to social-psychological research. Purdue University, Studies in higher education. 112 p. (Bulletin no. 26)
- Rosenbaum, L. L. and E. McGinnies. 1969. A semantic differential analysis of concepts associated with the 1964 presidential election. *The Journal of Social Psychology* 78:227-235.
- Schalock, H. D. and J. R. Hale (eds.). 1968. A competency based, field centered, systems approach to elementary teacher education. I. Overview and specifications. Portland, Oregon, Northwest Regional Educational Laboratory. 151 p. (Final report) (Microfiche)
- Shaw, M. E. and J. M. Wright. 1967. Scales for the measurement of attitudes. New York, McGraw-Hill. 604 p.
- Sherif, C. W., M. Sherif and R. E. Nebergall. 1965. Attitude and attitude change. Philadelphia, W. B. Saunders. 264 p.

- Siegel, S. 1956. Nonparametric statistics: for the behavioral sciences. New York, McGraw-Hill. 312 p.
- Silberman, C. E. 1970. Crisis in the classroom. New York, Random House. 552 p.
- Skinner, B. F. 1957. Verbal behavior. New York, Appleton-Century-Crofts. 478 p.
- Smith, M. B., J. S. Bruner and R. W. White. 1958. Opinions and personality. New York, Wiley. 294 p.
- Snider, J. G. and C. E. Osgood (eds.). 1969. Semantic differential technique. Chicago, Aldine. 681 p.
- Sorenson, G. and R. Haopert. 1968. Stress in student teaching. California Journal of Educational Research 19:28-33.
- Staats, A. W. and C. K. Staats. 1964. Complex human behavior. San Francisco, Holt, Rinehart and Winston. 546 p.
- Stanford Center for Research and Development in Teaching. 1967. Palo Alto, California, Stanford University. 123 p. (Annual report)
- Strauch, J. D., P. N. Chester and C. N. Rucker. 1970. Teacher aide attitudes toward the mentally retarded. The Training School Bulletin 67:15-19.
- Suchara, H. T. et al. 1969. Cooperative teacher education: School-college relations in developing school personnel. Washington, D. C., National Education Association. 26 p.
- Super, D. E. et al. 1963. Career development: Self-concept theory. New York, Columbia University Teachers College. 95 p.
- Van Dalen, D. B. 1966. Understanding educational research. San Francisco, McGraw-Hill. 525 p.
- Van Mondfrans, A. T. et al. 1969. Attitudes in achievement in an educational psychology course after micro-teaching. Los Angeles, Proceedings of the American Research Association. 14 p. (Microfiche)

- Ward, C. D., W. J. Higgs and G. D. Park. 1970. Issue saliency and correspondence between measures of attitude. *Psychological Reports* 26:587-593.
- Ware, E. E., R. C. Radtke and E. Berner. 1970. The effect of context on semantic differential ratings. *Canadian Journal of Behavioural Science* 2:246-252.
- Weiss, R. F. and F. G. Miller. 1971. The drive theory of social facilitation. *Psychological Review* 78:44-57.
- Weisskopf, J., E. J. Zimmerman and M. McDaniel. 1970. Similarity between subject and stimulus as an influence on projection. *Journal of Projective Techniques and Personality Assessment* 34:328-331.
- Whorf, B. L. 1959. *Language, thought and reality*. New York, Wiley. 278 p.
- Wilcoxon, F. 1947. Probability tables for individual comparisons by ranking methods. *Biometrics* 3:119-122.

APPENDICES

APPENDIX A

Equation to Determine "D" for Group Scores

$$D_g = \sqrt{(\bar{E}_{1g} - \bar{E}_{2g})^2 + (\bar{P}_{1g} - \bar{P}_{2g})^2 + (\bar{A}_{1g} - \bar{A}_{2g})^2}$$

\bar{E}_{1g} = pre-test mean for all members of a designated group for Evaluative responses

\bar{E}_{2g} = post-test mean for all members of a designated comparison group for Evaluative responses

\bar{P}_{1g} = pre-test mean for all members of a designated group for Potency responses

\bar{P}_{2g} = post-test mean for all members of a designated comparison group for Potency responses

\bar{A}_{1g} = pre-test mean for all members of a designated group for Activity responses

\bar{A}_{2g} = post-test mean for all members of a designated comparison group for Activity responses

APPENDIX B

Equation to Determine "D" for Individual Scores

$$D_i = \sqrt{(\bar{E}_1 - \bar{E}_2)^2 + (\bar{P}_1 - \bar{P}_2)^2 + (\bar{A}_1 - \bar{A}_2)^2}$$

- \bar{E}_1 = pre-test mean score for Evaluation responses by individual
 \bar{E}_2 = post-test mean score for Evaluation responses by individual
 \bar{P}_1 = pre-test mean score for Potency responses by individual
 \bar{P}_2 = post-test mean score for Potency responses by individual
 \bar{A}_1 = pre-test mean score for Activity responses by individual
 \bar{A}_2 = post-test mean score for Activity responses by individual

APPENDIX C

Equation to Determine "D" for Distance Between Groups

$$D_g = \sqrt{(\bar{E}_{1g} - \bar{E}_{2g})^2 + (\bar{P}_{1g} - \bar{P}_{2g})^2 + (\bar{A}_{1g} - \bar{A}_{2g})^2}$$

\bar{E}_{1g} = mean of all evaluative responses for a given group (summed over all abilities)

\bar{E}_{2g} = mean of all evaluative responses for a given comparison group (summed over all abilities)

\bar{P}_{1g} = mean of all potency responses for a given group (summed over all abilities)

\bar{P}_{2g} = mean of all potency responses for a given comparison group (summed over all abilities)

\bar{A}_{1g} = mean of all activity responses for a given group (summed over all abilities)

\bar{A}_{2g} = mean of all activity responses for a given comparison group (summed over all abilities)

APPENDIX D

"D" scores for each individual for each ability (rank ordered by mean "D" score.

A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	A ₁₁	A ₁₂	\bar{D}
-3.288	-3.700	-7.395	-8.235	-8.235	4.330	5.196	-7.508	-6.270	5.196	-7.802	6.928	-6.174
-1.969	-2.424	-3.953	-3.767	-3.437	-4.308	-3.509	-4.366	-3.482	-2.487	-3.945	-3.536	-3.432
1.061	.707	3.857	-4.924	4.763	-2.016	-3.021	-3.363	-3.482	-2.318	-4.479	-2.236	-3.019
-1.146	-2.839	2.512	-2.622	-2.358	-0.935	.559	-4.198	-3.363	-3.649	-3.500	-3.544	-2.602
-2.487	-2.669	-1.173	-2.318	-4.345	-2.622	1.118	-3.279	3.482	-2.318	-4.008	-1.346	-2.597
-2.761	.707	.354	-2.969	-4.330	-3.373	-2.739	1.299	-1.146	-3.482	-3.211	-2.092	-2.372
.433	-3.052	1.275	-1.061	-2.194	-1.871	-3.717	-2.512	-3.112	-2.372	1.969	-3.649	-2.268
-1.275	-2.761	-4.387	-1.436	-1.750	-2.062	-2.622	-1.173	-1.061	-4.387	-3.260	.433	-2.217
-1.541	-2.622	-3.758	3.464	1.031	-1.677	-0.935	-0.935	.354	-2.937	-3.052	-2.750	-2.088
-1.479	-1.275	-1.768	-1.871	.707	-3.211	-1.031	-3.631	1.090	-4.430	-2.250	-2.250	-2.083
-2.305	1.750	-3.491	-1.639	-2.424	1.785	-3.905	-2.610	1.061	-2.208	.901	.612	-2.058
-1.458	-1.969	-4.008	-3.082	-1.369	-1.871	-1.500	1.768	-4.500	1.061	0	-1.677	-2.022
.901	-1.920	-0.500	1.436	.559	-2.358	-1.225	1.601	3.897	-2.318	-2.716	-4.650	-2.007
-2.031	-2.462	-3.269	-3.553	-0.935	-2.194	-2.062	-2.031	-0.612	.791	.500	-3.588	-2.002
-0.829	-3.758	-0.829	-1.639	1.436	1.837	-2.872	-1.620	-1.887	1.369	3.172	-2.750	-2.000
-2.194	-3.000	0	3.464	-2.194	-2.250	-1.146	-0.559	3.464	-4.265	-0.901	-0.559	-2.000
2.610	-2.372	-1.031	-1.479	2.598	1.458	1.601	-1.479	-3.062	-1.871	2.795	-1.369	-1.977
-1.677	-3.631	1.820	1.414	-3.132	-2.092	-1.750	-1.031	1.969	-2.278	-0.612	-2.077	-1.957
1.820	.866	0	0	-1.346	2.969	-0.612	-3.437	-3.509	2.291	-3.674	-2.658	-1.932
-3.437	-3.260	1.031	-1.346	.750	2.979	-0.500	1.414	-1.346	-1.969	-3.482	1.500	-1.918
1.000	1.458	-1.820	1.118	-1.299	-2.622	-3.491	-1.299	2.411	3.410	-1.275	1.768	-1.914
.750	-1.847	.750	2.016	-1.953	-3.052	-2.658	-3.326	1.732	-1.458	0	-2.622	-1.850
-0.901	-2.062	-3.260	-1.458	-2.016	-1.031	-2.795	-2.500	-2.016	-1.601	-0.559	-1.904	-1.842
-1.581	-2.031	-3.092	-2.031	-2.165	-2.151	.750	-2.462	-1.458	-2.750	-0.559	.612	-1.804
-1.250	1.000	-2.658	-2.693	-2.250	-0.612	-2.092	-1.837	-2.658	-2.092	-1.031	-1.479	-1.804
-1.275	-1.118	-1.768	-2.278	-1.369	-2.250	-1.768	-1.696	-1.639	-2.622	-3.021	-0.829	-1.803
-0.935	-2.062	-2.610	.750	-3.202	2.165	-3.649	-1.750	-0.935	1.299	1.061	1.090	-1.792
-1.696	-2.586	-3.062	-2.462	-2.016	-1.250	-1.601	-1.803	1.061	-0.791	-2.165	-0.612	-1.759
-1.031	1.785	1.173	-1.031	-1.620	-1.275	-1.369	-1.920	-2.236	2.487	-3.092	-1.750	-1.731
-2.358	-1.750	-1.458	-1.369	-2.031	.750	-1.601	-0.750	.354	-2.372	-3.579	-2.194	-1.714
-2.937	-2.031	-1.061	-2.179	2.165	-2.512	-1.346	-1.250	-1.146	-1.479	-1.146	-1.146	-1.700
-1.887	-1.369	-1.768	.791	-2.761	-1.146	2.151	-2.062	-1.677	1.969	-1.904	-0.750	-1.686
-0.901	-1.953	-1.061	-1.031	-2.062	1.785	-1.250	-1.601	-1.969	-2.915	-1.346	-2.062	-1.661
-1.953	-1.031	1.173	-1.458	-2.264	-1.458	-1.601	-1.750	-1.061	-1.871	.791	-3.482	-1.658
-2.750	-2.512	-1.969	-0.829	-1.500	-1.479	.707	-1.369	-1.541	2.194	-1.275	1.732	-1.655
-0.901	-0.500	-2.669	-1.061	.750	-0.750	-1.639	-2.979	-4.387	-0.612	-1.768	1.436	-1.621
.750	-0.750	2.291	-2.250	-1.436	-2.969	1.031	-2.622	1.346	.559	.354	-2.969	-1.611
1.677	2.669	2.424	-0.901	-2.250	1.061	2.318	1.173	.750	-1.031	1.436	-1.601	-1.608
.707	1.436	-0.559	-1.479	-2.318	-2.894	-0.250	-2.894	-1.581	-0.901	-3.824	-0.250	-1.591

-1.173	.791	.354	-0.791	.901	-1.601	-2.622	-4.962	-1.601	1.090	-2.424	.707	-1.585
.750	1.785	-2.462	-1.871	1.785	-1.500	-3.260	1.173	0	-1.837	-0.750	1.768	-1.578
1.436	.829	-0.791	-1.620	-1.953	-1.369	-3.437	.791	.433	-1.696	1.369	-3.052	-1.565
2.165	-0.829	-1.639	-2.318	-1.479	0	-3.945	.791	.935	2.487	1.541	.612	-1.562
.750	.354	-2.016	1.061	-2.208	.750	-2.525	-0.250	-3.092	-2.622	-0.901	-2.194	-1.560
-1.601	-2.179	-1.346	-1.887	-1.436	-2.345	-1.768	-1.031	-1.346	1.173	.750	-1.601	-1.539
.707	.500	1.785	2.562	-1.541	-2.358	-1.369	-3.683	-0.829	-0.559	-1.581	-0.935	-1.534
-2.151	-1.887	-1.768	-0.935	-2.031	.750	-2.250	-1.837	.829	-0.935	-2.062	-0.935	-1.531
-2.622	-1.887	-1.436	-1.601	-1.541	-1.750	-1.768	-1.541	.433	-1.346	-0.750	-1.541	-1.518
-1.031	.612	.559	-0.829	-1.639	-2.622	-1.837	1.521	1.146	-1.275	-1.346	-3.717	-1.511
.750	2.598	-1.061	1.173	2.136	-1.369	-1.750	-0.791	-1.118	-0.250	1.500	-3.614	-1.509
-2.278	1.090	-1.768	-1.369	-2.305	-0.829	2.750	.750	-1.299	-1.521	.750	1.275	-1.499
-1.146	-2.761	-1.250	-1.768	.250	-1.173	1.601	2.031	.901	1.458	-1.920	-1.677	-1.495
-1.601	-1.541	1.061	.559	2.411	-1.275	.354	2.305	-1.601	1.061	2.372	1.369	-1.459
-0.791	-0.250	2.165	-1.696	-1.061	-0.901	.750	-3.783	-1.541	.354	-2.693	-1.031	-1.418
1.275	-2.250	-1.436	-2.179	-0.559	-0.612	.935	-0.612	-0.612	-2.179	-3.363	-0.559	-1.381
-2.372	-1.920	.354	-1.118	-2.795	-1.369	-1.299	.433	1.090	-0.901	-2.031	-0.829	-1.376
1.768	-1.346	-0.559	1.090	-1.601	-2.562	-1.061	-1.346	-0.559	-1.250	-2.151	.750	-1.337
.559	-0.901	-0.500	.354	3.260	.559	1.369	-1.275	-2.761	-2.121	-1.225	.829	-1.309
-1.146	.354	1.785	1.601	-2.610	.866	-0.791	-1.118	1.541	-0.559	2.194	.354	-1.243
1.090	.354	-1.369	-2.092	-2.194	-0.250	1.173	.354	.935	-1.601	-2.194	-1.250	-1.238
-1.601	-1.346	-0.612	-2.031	-1.031	-2.194	.750	-1.541	.433	-1.601	-0.612	-0.750	-1.209
.750	.707	-0.829	-0.935	.935	-2.610	1.620	.901	2.750	-0.829	-0.935	.612	-1.201
-0.250	.559	-1.871	-1.541	1.871	0	.935	-0.901	1.118	-2.077	-1.500	-1.458	-1.173
-1.785	-0.612	-0.612	1.346	-1.887	-0.250	.612	-3.588	1.090	.707	-0.901	-0.559	-1.163
1.146	.707	-1.275	-0.612	.354	-1.458	-0.612	-0.791	.829	1.436	-2.622	-2.092	-1.161
-1.275	-0.901	-0.935	-1.031	-2.062	-1.346	-1.479	1.031	.935	.433	1.369	.829	-1.136
.433	.559	-1.458	-0.829	.750	-1.346	-1.436	1.090	1.299	-2.345	-0.829	.901	-1.106
.866	-1.225	.433	-1.837	-0.612	-1.479	-1.146	2.475	-1.031	-1.031	.354	-0.559	-1.087
.707	1.953	-0.612	1.031	.612	-1.541	1.090	-0.559	1.887	-1.346	.250	-1.118	-1.059
.750	-0.935	1.436	-0.500	.559	.935	1.275	-0.559	.559	-1.225	.354	3.588	-1.056
-1.146	-0.612	-1.458	-1.479	1.090	-0.559	-0.500	-1.346	.354	-1.275	.750	-2.031	-1.050
-2.358	-2.031	1.173	1.458	-2.345	.354	.354	.250	1.090	.354	-0.250	.354	-1.031
-1.953	2.121	-1.250	1.275	-0.901	.433	.433	-0.559	.750	-0.791	-1.000	-0.791	-1.021
-1.146	-1.601	-0.250	.750	-0.935	1.061	-1.369	.750	-1.061	-1.173	.866	-1.225	-1.015
1.299	-1.887	.433	-0.791	.707	-0.829	-1.346	-1.146	-0.935	-0.559	-1.061	-1.061	-1.005
-2.915	-1.601	-0.750	.250	.866	.750	1.299	-0.791	.829	-0.829	0	.901	-0.982
-0.559	1.250	.612	-2.031	.866	-1.458	1.061	-1.225	.935	.354	-0.791	.354	-0.958
1.031	.612	1.541	.935	.433	-1.346	-0.500	1.146	-1.458	-1.031	0	1.090	-0.927
.433	-1.061	.707	-0.829	.559	-1.953	-0.559	1.837	-0.791	-0.559	.250	1.250	-0.899
.612	-0.901	1.346	-1.299	1.090	.433	-1.785	-1.118	-0.559	-0.500	.250	-0.829	-0.894
.707	.612	.866	.354	-0.791	.354	-1.118	1.346	-2.562	.559	-0.500	.707	-0.873
.433	.559	-1.581	1.250	-0.559	.829	-0.500	-1.696	.354	-1.275	.612	-0.829	-0.873
1.031	-0.500	-1.275	-1.346	1.000	.750	-0.791	.354	.935	-0.559	.433	1.146	-0.843

1.061	.433	-0.612	.750	1.031	2.031	.500	-0.559	1.173	0	1.346	-0.559	-0.838
-1.118	-0.559	-0.500	1.031	-0.250	1.173	.707	-0.829	1.887	.354	.500	.829	-0.811
-0.612	.612	1.436	1.299	.829	0	.750	-0.829	-0.901	-0.901	.612	-0.612	-0.783
-1.146	-1.953	1.346	1.146	.433	-0.500	0	.433	-0.829	.250	.829	.250	-0.760
.612	.866	-1.346	-0.612	.829	-0.935	-0.559	-0.612	.707	.354	0	-0.500	-0.661
-1.031	.901	-0.791	.707	.250	.354	-0.559	.250	-0.559	-1.458	.354	.250	-0.622
1.090	.750	0	.354	.901	.250	.750	-0.250	1.677	-0.791	0	.354	-0.597
.354	-0.935	-0.829	-0.250	-1.031	-1.601	.433	0	.433	-0.500	.354	.354	-0.589
-0.500	-1.061	.433	.612	.250	-0.500	.935	.559	.829	-0.559	0	-0.791	-0.586
-0.612	-0.750	-0.559	0	-0.791	-0.612	.612	-0.559	1.031	0	.433	.250	-0.517
-0.559	-1.031	-0.750	.750	-0.250	-0.250	.354	0	.901	.707	.354	.250	-0.513
.559	1.173	.250	.433	.433	.354	.354	-0.250	.354	0	.354	0	-0.376
-0.250	-0.250	.433	.354	.354	-0.250	.354	.354	.354	.354	.354	.354	-0.334
.433	-0.250	-0.250	.354	-0.250	.250	.559	.500	.500	.354	.250	.354	.359
.707	-0.500	.750	.500	.901	.612	-0.559	.559	.354	.500	.433	.354	.561
.559	.250	1.346	.250	1.031	.791	.935	.901	.250	.354	.935	.612	.685
.750	-0.559	.612	.559	.559	1.061	.559	.559	-0.559	.750	-1.275	1.090	.741
.354	.354	.433	.559	.250	.250	.559	.612	3.437	.935	1.436	0	.765
.791	1.299	.791	1.479	-0.250	.750	.354	1.061	-0.612	-0.791	.750	1.061	.832
.500	1.250	.791	.250	.750	1.275	1.601	.354	.433	.707	-0.935	1.601	.870
-0.829	.829	-2.622	-0.829	.829	.791	.612	.354	.935	.935	.750	.559	.906
.559	1.275	.935	1.677	1.541	.901	.901	1.090	0	-0.935	-0.250	1.061	.927
.935	1.000	.559	.750	-1.250	1.173	.500	.354	.707	.935	1.601	1.768	.961
.829	1.601	1.225	-0.935	1.146	1.118	.901	-0.250	.707	1.275	.901	.750	.970
1.061	1.031	1.436	.433	1.146	1.250	.354	.791	1.369	.707	1.146	1.031	.979
-0.901	1.146	.707	-0.559	1.479	.791	1.118	1.658	.935	-1.250	.559	.935	1.003
1.061	.829	1.479	.250	.354	1.275	-0.559	.612	1.768	1.458	-0.612	-2.562	1.068
-0.935	.829	1.953	1.031	-1.173	-1.031	-1.275	1.146	.791	.791	1.696	.433	1.090
1.346	1.677	1.090	1.250	.866	1.299	-0.612	1.146	1.620	1.146	-0.559	.500	1.093
.707	-1.768	.612	2.250	-1.601	-0.935	-1.458	.612	1.837	.901	0	.612	1.108
-0.612	.935	1.275	1.061	1.000	-1.620	.829	.612	1.953	-0.559	-1.601	1.639	1.141
1.225	1.118	-1.173	1.639	-0.791	.935	.750	.612	.559	-1.920	2.016	-1.541	1.190
1.436	1.969	2.016	1.275	1.414	1.500	.354	-0.935	.354	-0.829	-1.768	.559	1.201
-1.458	1.118	.612	1.225	.750	1.031	1.061	1.369	1.225	-0.829	2.031	1.768	1.206
-1.146	-1.677	1.768	1.677	.750	-0.935	.612	1.601	1.639	-2.031	1.061	.612	1.292
1.275	-1.173	1.732	2.208	2.358	1.090	.707	.901	-1.173	-0.829	1.601	-0.829	1.323
.559	2.462	-0.559	1.436	-1.061	.901	1.768	1.436	2.979	2.795	1.061	1.953	1.581
2.358	.791	1.920	1.118	-0.612	.866	-1.969	2.318	1.768	1.225	-2.622	-1.620	1.599
1.061	1.090	2.512	-1.479	.750	1.299	1.479	.354	1.677	1.677	-2.318	3.857	1.629
1.146	-0.829	1.658	1.118	.354	3.172	-2.318	.612	-1.250	2.795	4.228	-0.612	1.674
-1.500	1.969	1.541	1.118	-2.278	1.031	1.146	2.031	2.016	1.601	1.920	2.077	1.685
1.173	.791	1.601	.901	2.550	1.969	1.275	2.016	1.436	1.061	-4.047	1.696	1.709
-2.305	-1.061	1.479	.935	1.750	2.761	1.969	-1.639	3.010	-1.871	1.601	.901	1.774
3.112	2.031	1.146	2.462	2.077	1.146	1.369	1.225	.829	2.318	1.887	2.318	1.827
1.299	1.837	-0.935	1.620	-2.077	-1.887	1.871	3.142	2.773	-1.768	1.275	5.196	2.140
2.046	3.518	-2.236	1.275	4.596	4.677	-1.118	2.358	1.299	1.369	-0.750	.433	2.140
4.220	3.354	3.649	1.601	.866	-2.449	1.871	2.372	-0.935	3.775	.250	.829	2.181
.559	.354	2.449	3.482	6.270	1.146	4.880	-3.491	2.318	-1.677	-1.479	.866	2.414

APPENDIX E

The change resulting from the application of the "D" statistic to the composite scores of all abilities and comparing each group with every other group.

Group	Sci	Educ	PA	Hum	PE	Fr	Group So	Jr	Sr	FE	ST	MFE	ST+FE
Educ	.3145												
PA	.2057	.1090											
Hum	.1992	.4961	.3916										
PE	.3127	.1349	.1519	.4951									
Fr	.1417	.3438	.2506	.2129	.3087								
So	.3817	.0721	.1766	.5666	.1645	.4137							
Jr	.1141	.2214	.1212	.2762	.2525	.1723	.2916						
Sr	.0538	.2874	.1818	.2105	.3012	.1402	.3569	.0703					
FE	.2216	.4810	.3843	.1026	.4698	.1669	.5531	.2731	.2195				
ST	.5268	.2500	.3360	.7200	.3088	.5806	.1834	.4510	.5107	.7202			
MFE	.0794	.3620	.2572	.1362	.3723	.1464	.4318	.1418	.0754	.1618	.5844		
ST+FE	.0888	.3775	.2725	.1199	.3771	.1250	.4479	.1602	.0937	.1363	.6033	.0333	
Total	.1155	.2045	.0995	.2927	.2206	.1654	.2747	.0371	.0850	.2866	.4341	.1598	.1734

APPENDIX F

Summary of number of individuals and percentage of various groups with changes in ability 1 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	12	38	10	31
MFE	15	4	27	3	30
ST	29	16	55	7	24
ST+FE	21	5	24	4	19
Sci	17	6	35	4	23
Edu	52	23	44	10	19
PA	14	7	50	4	29
Hum	40	11	28	8	20
PE	8	2	25	4	50
Fr	23	8	35	6	26
So	41	16	39	8	19
Jr	10	5	50	2	20
Sr	43	17	40	13	30
Total	131	48	37	20	23

APPENDIX G

Summary of number of individuals and percentage of various groups with changes in ability 2 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	12	37	9	28
MFE	15	3	20	5	33
ST	29	15	52	5	17
ST+FE	21	5	24	7	33
Sci	17	5	29	6	35
Edu	52	27	52	10	19
PA	14	7	50	1	7
Hum	40	8	20	11	28
PE	8	3	38	3	38
Fr	23	7	30	6	26
So	41	20	49	7	17
Jr	10	4	40	4	40
Sr	43	15	35	10	23
Total	131	51	39	31	24

APPENDIX H

Summary of number of individuals and percentage of various groups with changes in ability 3 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	7	22	13	41
MFE	15	5	33	4	27
ST	29	14	48	7	24
ST+FE	21	6	29	7	33
Sci	17	4	23	7	41
Edu	52	22	42	12	23
PA	14	4	29	5	36
Hum	40	12	30	12	30
PE	8	3	38	2	25
Fr	23	3	13	9	39
So	41	20	49	9	22
Jr	10	3	30	3	30
Sr	43	14	33	13	30
Total	131	44	34	38	29

APPENDIX I

Summary of number of individuals and percentage of various groups
with changes in ability 4 "D" scores of ± 1.00 or more

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	10	31	14	44
MFE	15	5	33	5	33
ST	29	15	52	6	21
ST+FE	21	6	29	7	33
Sci	17	7	41	7	41
Edu	52	22	42	13	25
PA	14	6	43	2	14
Hum	40	10	25	14	35
PE	8	3	38	3	38
Fr	23	6	26	9	39
So	41	21	51	10	25
Jr	10	5	50	3	30
Sr	43	12	28	13	30
Total	131	48	37	39	30

APPENDIX J

Summary of number of individuals and percentage of various groups with changes in ability 5 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	11	34	5	16
MFE	15	6	40	3	20
ST	29	13	45	7	24
ST+FE	21	9	43	6	29
Sci	17	7	41	5	29
Edu	52	22	42	9	17
PA	14	9	64	1	7
Hum	40	13	33	10	25
PE	8	3	38	2	25
Fr	23	9	39	2	9
So	41	15	37	9	22
Jr	10	7	70	1	10
Sr	43	19	44	9	21
Total	131	54	41	27	21

APPENDIX K

Summary of number of individuals and percentage of various groups with changes in ability 6 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	14	44	7	22
MFE	15	3	20	4	27
ST	29	13	45	8	28
ST+FE	21	9	43	3	14
Sci	17	7	41	4	23
Edu	52	24	46	11	21
PA	14	5	36	3	21
Hum	40	13	33	9	23
PE	8	4	50	3	38
Fr	23	10	40	6	26
So	41	17	41	9	22
Jr	10	2	20	2	20
Sr	43	17	39	11	26
Total	131	53	40	30	23

APPENDIX L

Summary of number of individuals and percentage of various groups with changes in ability 7 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	10	31	7	22
MFE	15	6	40	3	20
ST	29	15	52	3	10
ST+FE	21	8	38	4	19
Sci	17	5	29	5	29
Edu	52	23	44	10	19
PA	14	5	70	2	14
Hum	40	13	33	7	18
PE	8	3	38	3	38
Fr	23	9	39	3	13
So	41	20	49	7	17
Jr	10	1	10	3	30
Sr	43	18	42	9	21
Total	131	51	39	27	21

APPENDIX M

Summary of number of individuals and percentage of various groups with changes in ability 8 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	10	31	10	31
MFE	15	6	40	2	14
ST	29	10	34	7	24
ST+FE	21	7	33	7	33
Sci	17	7	41	8	47
Edu	52	21	40	11	21
PA	14	7	50	1	7
Hum	40	10	25	8	20
PE	8	3	38	2	25
Fr	23	8	35	9	39
So	41	17	41	6	15
Jr	10	4	40	2	20
Sr	43	16	37	10	23
Total	131	49	37	30	23

APPENDIX N

Summary of number of individuals and percentage of various groups with changes in ability 9 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	6	19	12	37
MFE	15	4	27	6	40
ST	29	12	41	9	24
ST+FE	21	7	33	7	33
Sci	17	6	35	4	23
Edu	52	14	27	10	19
PA	14	5	36	3	21
Hum	40	10	25	18	45
PE	8	3	38	3	38
Fr	23	4	17	8	35
So	41	15	37	11	27
Jr	10	3	30	3	30
Sr	43	15	35	13	30
Total	131	38	29	40	30

APPENDIX O

Summary of number of individuals and percentage of various groups with changes in ability 10 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	13	41	6	19
MFE	15	5	33	2	14
ST	29	16	55	7	24
ST+FE	21	7	33	7	33
Sci	17	9	53	3	18
Edu	52	19	36	10	19
PA	14	6	43	4	29
Hum	40	12	30	7	18
PE	8	4	50	3	38
Fr	23	8	35	1	4
So	41	18	44	9	22
Jr	10	5	50	0	0
Sr	43	18	42	14	33
Total	131	52	40	27	21

APPENDIX P

Summary of number of individuals and percentage of various groups with changes in ability 11 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	10	31	6	19
MFE	15	1	7	6	40
ST	29	15	52	3	10
ST+FE	21	7	33	6	29
Sci	17	6	35	3	18
Edu	52	18	35	8	13
PA	14	4	29	3	4
Hum	40	15	38	10	25
PE	8	3	38	2	25
Fr	23	6	26	6	26
So	41	16	39	7	17
Jr	10	2	20	3	30
Sr	43	19	44	9	21
Total	131	46	35	26	20

APPENDIX Q

Summary of number of individuals and percentage of various groups with changes in ability 12 "D" scores of ± 1.00 or more.

Group	N	Desirable change		Undesirable change	
		N	%	N	%
FE	32	8	25	8	25
MFE	15	6	40	0	0
ST	29	10	34	3	10
ST+FE	21	7	33	7	43
Sci	17	7	41	5	29
Edu	52	18	35	7	13
PA	14	5	36	1	7
Hum	40	10	25	11	28
PE	8	3	38	2	25
Fr	23	6	26	5	22
So	41	16	39	4	10
Jr	10	3	30	2	20
Sr	43	14	33	11	26
Total	131	43	33	27	21