A LONGITUDINAL STUDY OF GENERAL EDUCATION DEVELOPMENT OF TEACHER EDUCATION CANDIDATES IN THE COLLEGE OF EDUCATION AT OKLAHOMA STATE UNIVERSITY

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PREFACE

The concern for educated people to be more skilled in communications, to have a realistic insight of their own behavior, to interact with and understand the behavior of others, and to explore and appreciate the environment in which they live has helped to win a place for general education in the college curricula. This study is an attempt to objectively measure the change in the level of general education development over a two-year period of time and to evaluate its relationship to different variables. Teacher education candidates in the College of Education at Oklahoma State University were used in the research program.

The author would like to acknowledge his indebtedness to the advisory committee for its contribution in completion of the study. Acknowledgements go to the chairman, Dr. Harry K. Brobst, for his leadership and guidance throughout the study; to Dr. Edwin E. Vineyard for his constructive criticism of the organization and content of the manuscript; to Dr. Paschal Twyman for his sound advice concerning statistical designs for analyzing the data; to Dr. J. H. Zant for initiating the writer's aspirations in a doctoral program; and to Dr. Robert Scofield who served as a member and also

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CHAPTER I

INTRODUCTION

Although the purpose of this study is primarily to assess the general education development of teacher education candidates enrolled in the College of Education, some discussion regarding general education and its relationship to specialized and professional education is relevant. The relative values placed on specialized, professional, and general education during the last half century have helped determine the nature of teacher education programs. Even though each of the three areas is essential enough to justify additional course work, the total number of hours required for a degree has remained approximately the same through the years. Thus, achieving a proper balance between the three is a major problem in the education of teachers. Brief summaries of the minimum requirements in professional, specialized, and general education in the College of Education at Oklahoma State University are given here to describe the setting of the study. For a more detailed description of these three areas with a developmental history and philosophy of the teacher education program in the College of Education, see Appendix A.

Professional Education

Professional education in teacher education is that part of the curriculum designed to develop teacher education candidates into competent members of their profession.

Table I shows the minimum required professional courses for each teaching certificate as outlined by the 1963-65 Oklahoma State University catalogue. For simplification,

TABLE I

PROFESSIONAL EDUCATION COURSES REQUIRED OF TEACHER EDUCATION CANDIDATES IN THE COLLEGE OF EDUCATION AT OKLAHOMA STATE UNIVERSITY

Program	Survey of Education	Educ. Psych.	Hist. Philos.	Secondary Teaching Methods & Others	Total
Elementary Education	3	6	3	9	21
Secondary Education					
Art	3	6	3	12	24
Foreign Language	3	6	3	9	21
Health, P. E., and Recreation	3	6	3	9	21
Industrial Arts	3	6	3	12	24
Language Arts	3	6	3	9	21
Library Science	3	6	3	9	21
Mathematics	3	6	3	9	21
Music (all)	3	6	0	12	21
Science	3	6	3	9	21
Social Studies	3	6	3	9	21
Speech	3	6	3	9	21
Trade and Industry	3	6	3	12	24

programs are omitted that are not likely to be relative to the College of Education. All of the programs use a course entitled "School in American Society" to survey the field of education. All programs require six hours of Educational Psychology. This requirement is met by completing two courses entitled "Educational Psychology" and "Child and Adolescent Psychology." One exception to the latter course is in the elementary teacher program where "Child Development and Guidance" is substituted for "Child and Adolescent Psychology." All programs except three require "History and Philosophy of Education" (Philos. 423). No history or philosophy is required in the music program, and the industrial areas require history and philosophy courses related to their programs. Student teaching and methodology vary from nine hours to twelve hours for different programs. The industrial programs vary from the others by requiring three hours of administration in their professional work. All of the programs, except art and the two industrial areas, consistently require twenty-one hours of professional education.

Also, Oklahoma State University is concerned about professional work beyond the basic requirements in professional education for teacher education. In a report to the National Council for Accreditation of Teacher Education, it is stated:

> The professional education sequences in the teacher education curricula at Oklahoma State University have been developed to provide the knowledge and to develop the competencies which beginning teachers need to discharge their instructional responsibilities. However, it also recognizes that most teachers

> can be expected to return to campuses for further training both after and during their initial years of professional service and therefore this pre-service professional training is conceived to be only a base upon which the individual can build his instructional competence.[1]

Specialized Education

Specialized education is the part of the teacher education curriculum that concentrates the student's work in an area which will prepare him to teach later in his major assignment.

The number of hours required in the area of specialization varies in the College of Education from twenty-four hours in library science to forty-eight hours in science. The median is thirty-two hours in the program designed for health, physical education, and recreation.

The objectives for the curricula in specialization are indicated as follows:

> All teacher education curricula at Oklahoma State University are planned to insure that the prospective teacher will have sufficient depth of experience in one or more disciplines so that he may acquire a degree of mastery in at least one field of concentration. It is intended that the learner acquire an understanding of the method of inquiry through which knowledge in the particular area of specialization is discovered, tested, revised, and extended.[2]

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[1] Report of Teacher Education at Oklahoma State University to the National Council for Accreditation of Teacher Education, Oklahoma State University (Stillwater, Oklahoma, 1962), pp. 96-98.

[2] Ibid., p. 6.

General Education

General education is that part of the curriculum designed to integrate the student's total educational program into meaningful experiences that will help to develop the individual, as a whole, into a humane, emotionally stable, socially mature, and realistic person who can operate effectively within his environment.

The present study is an evaluation of the general education program in the College of Education during the first two years of college work. A total of fifty hours in general education must be completed to meet the minimum requirements of the certification program in teacher education. It is estimated that approximately seventy to eighty per cent of the general education requirements are completed by the end of the sophomore year.

The four areas in general education studied are writing, mathematics, social studies, and science; and Table II has been constructed to show the minimum requirements in these four areas of general education for each teaching certificate offered in the College of Education. The four areas of general education used in the study are the only ones included in the table. Required English composition courses are the only courses considered for the area of writing.

The general education requirements in the four areas studied are the same for all elementary teacher education candidates. These requirements consist of five hours of

English composition, six of mathematics, twelve of social studies, and twelve of science.

TABLE II

GENERAL EDUCATION REQUIREMENTS IN ENGLISH COMPOSITION, MATHEMATICS, SOCIAL STUDIES, AND SCIENCE FOR TEACHER EDUCATION CANDIDATES IN THE COLLEGE OF EDUCATION AT OKLAHOMA STATE UNIVERSITY

Program	English Composition	Mathematics	Social Studies	Science
Elementary Education	5	6	12	12
Secondary Education				
Art	5	0	10	8
Foreign Language	6	0-6*	6	4
Health, P. E., and Recreation	5	0-3*	8	11
Industrial Arts	5	5	11	16
Language Arts	5	0-3*	6	8
Library Science	7	0-8*	8	8
Mathematics	5	3	6	8
Music (all)	5	0-6*	6	8
Science	7	5-6	8	10
Social Studies	7	0-8*	11	4
Speech	5	3	6	8
Trade and Industry	5	5	12	8

*May choose from different areas including mathematics.

The requirements for secondary teacher education candidates in general education for the four areas studied are similar in basic structure but vary between programs of study. Of the twelve programs, eight require five hours of English composition and the remaining four require seven hours. One of the programs requires no mathematics, six allow students

to choose from different areas which include mathematics, and the remaining five require three to six hours. Social studies and science are required for all programs. The hours in social studies range from six to twelve and four to sixteen in science.

Statement of the Problem

The present research is a study of the general educational development of teacher education candidates during the freshmen and sophomore years in the College of Education at Oklahoma State University. The basic subjects of writing, mathematics, social studies, and natural science are considered. The study utilizes test results given to beginning freshmen for the school year 1960-61 with retests near the end of the school year 1961-62.

The problem is that of measuring the change in level of student achievement over a two-year period in general education, then analyzing the variables or combination of variables which are related to any significant changes which are found. One of the specific questions the problem raises is whether a significant change in general education takes place during the two-year period of time as measured by achievement tests. If there is a change, another question is whether there is a significant difference between change of students enrolled in elementary teacher education and those enrolled in secondary teacher education. If there is a change, how are aptitudes for college work and reading skills related to

achievement in general education? Do the four areas of general education tend to change the same amount or do some areas change more than others? How is the change, as measured by achievement tests, related to other predictors or measures of college success such as high school grade point average and college grade point average? Also, in this study how are high school grade point average, college grade point average, ACT composite score, and SRA total reading score related?

The independent variables are the field of education (either secondary or elementary), level of academic aptitude, level of reading skills, grade point average, and area of general education. The dependent variables are scores made on achievement tests in four different areas of general education: writing, mathematics, social studies, and science.

The instruments used to measure different variables for the study are as follows:

I. Plan of Study - the course of study that a student is pursuing; either elementary education or secondary education.

II. American College Testing Program (ACT) - a test designed to measure the academic aptitude of students in different areas of general education.

III. Science Research Associates Reading Record (SRA Reading Record) - a test designed to measure the level of achievement in reading skills.

IV. Sequential Test of Educational Progress (STEP) - a test designed to measure the level of achievement in general education.

V. Grade Point Average (GPA) - an index of success in college or high school in terms of a student's grades.

The population for this study consists of students who enroll in the teacher education program of the College of Education, attend their freshmen and sophomore years at Oklahoma State University, and make an application for admission to the upper-division teacher education program. Those who were pre-tested in the fall semester of 1960 with the STEP battery, remained in the College of Education, were post-tested near the end of their sophomore year, and made application for the upper-division teacher education program are the sample for the study.

A control group would have been desirable in order to make a comparison of the sample to a similar group with no treatment. However, for this particular study it would have been very difficult to provide a matched group. Since it would have been composed of persons receiving no instruction in general education, those in educational institutions would have been excluded. Also, problems in pre-testing, post-testing, and controlling other variables made a control group not feasible.

The statistical analysis employs analysis of variance. When groups are tested for change or compared with other groups, means are tested for significant differences. The Pearson product-moment correlation coefficient is used to test the relationship between variables in the study.

The definitions of the terms used for this study are as follows:

I. Field of Education - the course of study that a student plans to pursue in the College of Education elementary or secondary education programs.

II. Ability Level - the level of ability in general education as measured by the ACT test composite.

III. Reading Level - the level of reading of each student as measured by the SRA Reading Record total score.

IV. Area of General Education - the areas of writing, mathematics, social studies, and science in which each student will be pre-tested and post-tested by the STEP battery of tests.

V. Growth in General Education - the difference in the STEP standard scores over a two-year period of college work (freshman and sophomore).

VI. Grade Point Average - the ratio between the amount of work completed and the grade points received.

Hypotheses of the Study

Following are the hypotheses that are tested in this study concerning growth of teacher education candidates in four areas of general education -- writing, mathematics, social studies, and science -- during their freshmen and sophomore years of college work. They are stated in the null or no difference form:

I. When teacher education candidates in the College of Education are measured for change in their level of general education development over the first two years of college work:

   A. Elementary teacher education candidates do not change significantly in the areas of:

      1. Writing.

      2. Mathematics.

      3. Social Studies.

      4. Science.

B. Secondary teacher education candidates do not change significantly in the areas of:

   1. Writing.

   2. Mathematics.

   3. Social Studies.

   4. Science.

C. The total of elementary and secondary teacher education candidates does not change significantly in the areas of:

   1. Writing.

   2. Mathematics.

   3. Social Studies.

   4. Science.

D. The change made by elementary teacher education candidates will not differ significantly from the change made by secondary teacher education candidates in the areas of:

   1. Writing.

   2. Mathematics.

   3. Social Studies.

   4. Science.

E. The change in the area of writing will not be significantly different than that in the area of mathematics.

F. The change in the level of writing will not be significantly different than that in the area of social studies.

G. The change in the level of writing will not be significantly different than that in the area of science.

H. The change in the level of mathematics will not be significantly different than that in the area of social studies.

I. The change in the level of mathematics will not be significantly different than that in the area of science.

J. The change in the level of social studies will not be significantly different than that in the area of science.

K. The change made by teacher education candidates with high academic aptitude will not be significantly different from those with low academic aptitude in the areas of:

1. Writing.

2. Mathematics.

3. Social Studies.

4. Science.

L. The change made by teacher education candidates with a high level in reading skills will not be significantly different from those with a low level in reading skills in the areas of:

1. Writing.

2. Mathematics.

3. Social Studies.

4. Science.

M. The change made by teacher education candidates with high academic aptitude and high reading level will not be significantly different from those with high academic aptitude and low reading level in the areas of:

1. Writing.

2. Mathematics.

3. Social Studies.

4. Science.

N. The change made by teacher education candidates with high academic aptitude and high reading level will not be significantly different from those with low academic aptitude and high reading level in the areas of:

1. Writing.

2. Mathematics.

3. Social Studies.

4. Science.

O. The change made by teacher education candidates with high academic aptitude and high reading level will not be significantly different from those with low academic aptitude and low reading level in the areas of:

1. Writing.

2. Mathematics.

3. Social Studies.

4. Science.

P. The change made by teacher education candidates with high academic aptitude and low reading level will not be significantly different from those with low academic aptitude and high reading level in the areas of:

1. Writing.

2. Mathematics

3. Social Studies.

4. Science.

Q. The change made by teacher education candidates with high academic aptitude and low reading level will not be significantly different from those with low academic aptitude and low reading level in the areas of:

1. Writing.

2. Mathematics.

3. Social Studies.

4. Science.

R. The change made by teacher education candidates with low academic aptitude and high reading level will not be significantly different from

those with low academic aptitude and low reading level in the areas of:

1. Writing.

2. Mathematics.

3. Social Studies.

4. Science.

II. When the growth in the four areas of general education for teacher education candidates are intercorrelated:

A. There will be no significant relationship between writing and mathematics.

B. There will be no significant relationship between writing and social studies.

C. There will be no significant relationship between writing and science.

D. There will be no significant relationship between mathematics and social studies.

E. There will be no significant relationship between mathematics and science.

F. There will be no significant relationship between social studies and science.

III. There will be no correlation between total high school grade point average and change in the level of general education development in the areas of:

A. Writing.

B. Mathematics.

C. Social Studies.

D. Science.

IV. There will be no correlation between total college grade point average and change in the level of general education development in the areas of:

A. Writing.

B. Mathematics.

C. Social Studies.

D. Science.

V. When high school grade point average, college grade point average, ACT composite score, and SRA Reading Record total score are intercorrelated:

A. There will be no relationship between high school grade point average and college grade point average.

B. There will be no relationship between high school grade point average and ACT composite score.

C. There will be no relationship between high school grade point average and SRA Reading Record total score.

D. There will be no relationship between college grade point average and ACT composite score.

E. There will be no relationship between college grade point average and SRA Reading Record total score.

F. There will be no relationship between ACT composite score and SRA Reading Record total score.

The above hypotheses were grouped into five categories with subgroups under each of these to provide an organized method for testing these hypotheses and summarizing the results.

Purpose of the Study

The study is designed, first, to assess the change in the level of general education development in the areas of writing, mathematics, social studies, and science for teacher education candidates in the College of Education at Oklahoma State University; second, to make an analysis of these changes in relationship to different variables. The assessment is made over a two-year period of time by using a pre-test and a post-test in the four areas of general education.

General education has evolved for most teacher education programs into the fifty-hour requirement with the philosophy that the lower division program is primarily devoted to this purpose. Students entering upper division work should have made a growth in general knowledge which can be measured in terms of an achievement test. The use of achievement tests in this study is an attempt to measure this growth more objectively rather than evaluating it by number of course credit hours and letter grades.

Using grades to assess the achievement level in course content is thought by many to be inadequate. Webster, Freeman, and Heist think that the majority of teachers today regard grade point average as an inadequate measure of educational growth.[3]

Jespon made a study of 800 graduates from Fresno State College in California and found no relationship between success in college grades and vocational success.[4]

Although assessments of the general education program are made in this study in respect to change in level of achievement, it is not an attempt to settle the controversy about the relative importance of specialized and general education.

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[3]Harold Webster, Mervin Freeman, and Paul Heist, "Personality Changes in College Students," The American College, ed. Nevitt Sanford (New York, 1962), p. 816.

[4]V. L. Jespon, "Scholastic Proficiency and Vocational Success," Educational and Psychological Measurements, XI (Winter, 1951), pp. 616-628.

However, it is hoped that a better insight into the general education program and the degree to which it fulfills its purpose and its goals may result from the study.

Need for the Study

There is a need for systematic evaluations of college curricula. If there is a method for measuring the results of a plan of study, both quantitatively and qualitatively, then a more realistic evaluation can be made about the aim or goal it was to accomplish. Sanford says that an effort should be made to involve faculty in research focused upon various kinds of evaluation of students so that the limitations of particular methods, for example the use of course grades, will be appreciated more.[5]

The need to measure objectively the change in the level of general education of teacher education candidates in the College of Education and to evaluate its relationship to different variables led to the study.

The requirement of fifty hours in general education at Oklahoma State University is based on the philosophy that a certain level of knowledge in this area is essential for the training of effective and successful teachers. The statement of objectives is as follows:

> The General Education program is designed to contribute to the broad cultural development of the individual. The University subscribes to the

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[5]Webster, Freeman, and Heist, p. 842

> belief that each student should be helped to understand his capacities, his limitations, and his relationship to other individuals.
>
> This University believes that general education should help the individual to recognize his responsibilities as a citizen and to contribute to his development of a willingness to assume civic responsibilities above and beyond the demands of the vocation in which he is engaged. By precept and example, the teacher as a good citizen should promote moral and ethical behavior and have a dedicated concern for the well-being of individuals and groups in all areas of our society.
>
> Through the program of general education the student is expected to explore his physical environment, to understand and to appreciate the great achievements of his cultural heritage, to develop his ability to communicate and to learn to understand the ideas of others.[6]

Assuming that achivement in the areas of writing, mathematics, social studies, and natural science helps to promote these ends, then it is important to answer questions such as: Has growth taken place in each area of general education? In which areas of general education has the most growth taken place? What factors are significantly related to growth in each area of general education? Do different factors interact in their relation to changes in general education?

The importance of guidance and counseling at the college level is realized more and more each year. Valuable time and money can be saved by students if they, as well as administrators, understand their potential and know something about

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[6] Report of Teacher Education at Oklahoma State University to the National Council for Accreditation of Teacher Education, p. 5.

their probability of success in a particular field. Through counseling and guidance, freshmen with low probability of success in teacher education can be screened (a method becoming popular in teacher education programs), either by self-screening method or by an administrative-screening method. This study attempts to give the counselor more information to use for counseling freshmen entering the College of Education at Oklahoma State University.

Assumptions of the Study

To justify some of the statistical treatments in the study, some assumptions about the population, sample, variables measured, and instruments used must be made.

The first assumption is that the freshman class of 1960 is typical of all freshmen classes that enter the College of Education.

Second, the assumption has to be made that a freshman class at a state university can be treated as a normal population.

Third, it must be assumed that the sample used to represent the class of 1960 is adequate for the statistical treatment of the data.

Fourth, the variables in the study can be measured to an acceptable degree of accuracy and the measuring instruments used in the study are sufficiently adequate for measuring the variables.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this chapter is to present the findings in the literature that are relative to the study. Research of the literature was made from information related to the value of general education, achievement tests used for the assessment of level of general education development, and studies made of general education programs. To find information concerning academic ability and college success, three types of studies were reviewed: Those which studied achievement and college success, intelligence and college success, and aptitude and college success. Four other areas were reviewed for findings relative to the study -- reading level and college success, high school grade point average and college success, guidance and its relation to general education, and teacher screening and general education.

Importance of General Education

The concern for people in different areas of specialization to be more skilled in communicating with each other, to have a better understanding of themselves and their behavior, to interact with and understand the behavior of

others, and to understand and have a better appreciation of the environment in which they live has helped to win a place for general education in the college curricula.

There appears to be a relationship between the level of general education development and the ability to compete in a higher educational situation. People with a sufficient level of general education development are capable of doing satisfactory work in college even though they have not completed high school work. It was found in one study that if a student was properly motivated, of average aptitude, with three years of high school work completed, and had a sufficient level of general education, then he could compete successfully in college with high school graduates.[1]

Another study of 73 veterans with a sufficient level of general education development and who did not complete high school showed them to perform much as high school graduates. They made grades ranging from failing to perfect.[2] However, high levels of motivation and maturity of this select group could cause the results to be misleading.

In a study by West of some graduates of Vassar College, it was found that most students feel that the general type

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[1]Phil H. Putnan, "Scholastic Achievement of G.E.D. Students at the Vanport Extension Center," School and Society (August 30, 1947), pp. 161-163.

[2]L. I. Love and L. E. Love, "Performance of Veterans," The Journal of Higher Education (February, 1947), pp. 95-99.

curriculum is more important to them than the more specialized training.[3]

One of the effects of a teacher-training program should be to help students become interested and active citizens. In a study designed to measure college graduates of Syracuse University for the amount of participation in activities related to broad fields of social science, humanities, and science, Pace says:

> Graduates of Liberal Arts exhibit a more balanced picture of interest and attitudes than do graduates of the professional and technical schools. They are more active participants in a larger number of fields, and their few low scores on the various scales are not as low as the low score of graduates of the professional and technical schools. It is possible, of course, that similar patterns existed at the time these men and women entered the University. Whether college was entirely responsible for making them this way is not the basic question. The simple descriptive fact is that these differences exist and that they correspond fairly well to the differences in academic emphasis between liberal and general education on the one hand, and professional and technical education on the other. We cannot say that the particular pattern of adult behavior was caused by the particular pattern of academic curriculum, but it has surely been influenced by it. College does make a difference; and the particular kind of college education also makes a difference.[4]

Achievement Test: A Measure of Success

This study is an attempt to measure the amount of growth in general education more objectively. It is felt that this

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[3]Patricia West, "Social Mobility Among College Graduates," Class, Status, and Power, eds. R. Bendix and M. Lipset (Glencoe, Illinois, 1953), pp. 465-480.

[4]C. R. Pace, "University Wide Studies in Evaluation of General Education at Syracuse," Evaluation in General Education, ed. P. L. Dressell (Dubuque, Iowa, 1954), p. 23.

can be done by using an achievement test for both a pre-test and a post-test for assessing the change in general education over a two-year period of time. Most studies in this area are based on the grade point average as the criteria for measuring the success of a student in a subject matter.

The high school grade point average has proved many times to be the best predictor for success in college work. However, success as defined in most of the studies has also been in terms of grade point average. One should expect the grade point average of high school work to be a good predictor of grade point average of college course work. After all, the methods used (whatever they are) for obtaining grades in high school would be very similar to the methods used for obtaining college grades. It is possible, however, for a high correlation to exist and still not have a good measure of the achievement in subject matter for either high school or college work. It has been found that many instructors do not have faith in their grades reflecting general education development.[5] Sanford thinks that few teachers regard the academic average by itself as a satifactory criterion of educational outcome.[6]

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[5]Paul Heist and Harold Webster, "Differential Characteristics of Student Bodies - Implications for Selection and Study of Undergraduates," Selection and Educational Differentiation, ed. T. R. McConnell (University of California, Berkeley, 1959), p. 92.

[6]Nevitt Sanford, "Higher Education as a Social Problem," The American College, ed. Nevitt Sanford (New York, 1962), p. 26.

Even though grades are used for most colleges to measure success in a course, there are doubts cast upon their validity by writers such as McConnell when he writes:

> In spite of the fact that colleges use grades almost exclusively to express students' accomplishments (although there may be comments on personal qualities in the counseling and placement files), marks are, after all, an insufficient criterion of intellectual attainment, not to mention evidence of social and emotional maturity and stability. The validity of grades with respect to intellectual sophistication, which, in abstract terms, college teachers conceive to be the end of the educational process, is, in my mind, highly suspect. If, instead of predicing grades, we had to predict either critical or creative intellectual effectiveness (neither of which, I suspect, contaminates grades very greatly), we would throw up our hands. Yet these are the things we should be striving for, the intellectual criteria by which selection methods should be evaluated. In this connection, the fact is worth noting that the highly creative scientists and architects studied by MacKinnon and his associates did not always get top grades. It also gives one pause when he discovers Dr. Fred Tyler, at the Center for the Study of Higher Education, has found a correlation of -.25 between the college grades made by a group of National Merit Scholarship Corporation winners and their pre-college scores on the test of Originality included in the Center's Omnibus Personality Inventory. One might look at this correlation as a reflection on the predictor or on the criterion. I choose, in our present state of relative ignorance on the matter, to look at its reflection on the criterion. I suspect that originality is discouraged and conventionality or perfunctoriness is rewarded in the classroom and professors' grades reflect this preferential reinforcement.[7]

Bloom and Peters made a study of over 25,000 students in some 125 schools and about 600 colleges in predicting grades

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[7]T. R. McConnell, "Introduction," Selection and Educational Differentiation, ed. T. R. McConnell (University of California, Berkeley, 1959), p. vi.

of college students. They believe that high school grades should predict college grades; however, they think that this might just be predicting a student's "grade-getting ability" and not his actual achievement. They say that assigning grades is a complex process and that instruments for predicting college grades cannot be any more reliable than the reliability of the grades that they are predicting. They heartily agree with the statement that academic prediction is difficult because grades are "moving targets."[8]

The validity of classroom evaluation, grades, and transcripts were highly questioned in a speech given to the Oklahoma Inter-College Conference at Oklahoma State University by Donald P. Hoyt of the American College Testing Program.[9]

This study is concerned with a group of students who have been instructed by several different professors for their lower-division work in broad areas of general knowledge. The problem of grade point average is compounded in this case, because academic grades have a tendency to vary from professor to professor in the same course content. Also, in a broad area of general education it is harder to assess the amount of growth by a grade point average than in a more

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[8]Benjamin S. Bloom and Frank R. Peters, The Use of Academic Prediction Scales for Counseling and Selecting College Entrants, (Glencoe, Illinois, 1961), pp. 115-136.

[9]Donald P. Hoyt, The Educational Engineering of College Success, an address delivered to the Oklahoma Inter-College Conference, (Stillwater, Oklahoma, 1963), mimeo.

narrow course of study. Thus, achievement tests are used in this study to determine the change in level of general education development.

Studies of General Education Programs

The aim of this section is to discuss studies of general education programs that were reviewed in the literature. Because of the similarity between some general education programs and the traditional liberal arts curricula, some studies of the latter are included in this section.

Education, like other professions, recognizes the need for a well-balanced educational program for potential teachers. In a study by Dressel, Mayhue, and McGrath concerning the views of faculty members of professional schools about the liberal arts, a large percentage of the responding faculty members subscribed to the idea that all students should have some liberal arts education, that this is a matter which should not be left to individual initiative, and that liberal arts education is a proper function of the university, regardless of the quality of secondary education students experience.[10] In another study by Dressel and Lorimer in which they surveyed liberal arts faculties, they found that the liberal arts faculty members agreed with professional faculty members in that

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[10]Paul L. Dressel, Lewis B. Mayhew, and Earl J. McGrath, The Liberal Arts as Viewed by Faculty Members in Professional Schools, Bureau of Publications Teachers College (Columbia University, 1959), p. 57.

liberal arts enrich the education of college students and make them not only better persons but better members of a profession.[11]

Before proceeding to the literature of studies on general education programs, a description of Oklahoma State's program of general education should give the reader a better insight to how a student in the College of Education receives this phase of his education.

The general education program at Oklahoma State University for teacher education candidates could be classified as eclectic in nature. The courses that are included in the requirements of general education are taught in the College of Arts and Sciences. There is a general studies program within the College of Arts and Sciences which offers general education courses in five areas -- biological science, the humanities, physical science, social studies, and mathematics. These are survey-type courses designed to let students explore the major fields before choosing a field of specialization and to help the student to mature in his personal, social, intellectual, and vocational development. However, general education requirements may be met with fundamental courses in respective departments. Therefore, the teacher's fifty

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[11]Paul L. Dressel and Margaret F. Lorimer, Attitudes of Liberal Arts Faculty Members Toward Liberal and Professional Education, Bureau of Publications Teachers College (Columbia University, 1960), p. 53.

hours of general education can be discipline oriented by electing beginning courses in specific departments.

The general education program at Oklahoma State University differs in organization and in administration from institutions such as the University of Florida with its University College, Michigan State University with its Basic College, and the University of Minnesota with its General College.[12] It varies in structure from institutions such as Sara Lawrence but is also similar to them in that neither draws a sharp line of demarcation between general and liberal education. Thus, Harold Taylor's comment on the philosophy of Sara Lawrence's program seems appropriate to Oklahoma State's philosophy when he writes:

> This program assumes that studies in liberal arts are important not only because they afford a broader and deeper experience of our culture, but because of the deepening and broadening effects they may have on the emotional and intellectual development of the students as a person.[13]

Research at the college level in instruction, methods, curriculum, and psychological factors of the student is increasing, and rightly so, for too little is known in higher education about these areas. Murphy and Raushenbush say:

> In the past thirty years the effort to learn something about the behavior of children in a normal environment has resulted in bringing new insights

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[12]Lewis B. Mayhew, General Education: An Account and Appraisal, Harper and Brothers (New York, 1960), pp. 32-40.

[13]Harold Taylor, "An Approach to Education," Achievement in the College Years, eds. Lois B. Murphy and Esther Raushenbush, Harper and Brothers (New York, 1960), p. 41.

> into the understanding of childhood. There is little to compare with that effort in the study of young people emerging from adolescence. But recently a mounting wonder about what and how much we are accomplishing has turned men and women in the colleges to research in this field. In a number of colleges and universities, an effort is now being made to discover what changes in the individual takes place during the four college years in the way the student functions intellectually; ...[14]

Some educators feel that the above research should be done while the student is still in school rather than as a follow-up study after he has graduated. To evaluate growth in general education, studies should focus on results at the end of one, two, three, and four years of college or at a point where the evidence has some immediate implications with regard to curriculum organization and methods.[15]

Mayhew thinks there is a great need for evaluation at the level of the total curriculum rather than evaluation at the level of single courses. Although there has been a lot of attention given to comprehensive examinations in America's higher education, they have only been successful in a few colleges such as Michigan State University. Mayhew believes that the commercially available tests such as the Graduate Record examinations or the Sequential Tests of Educational Progress may be useful, provided that the faculty study these

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[14]Lois B. Murphy and Esther Raushenbush, eds., Achievement in the College Years, Harper and Brothers (New York, 1960), p. vii.

[15]Mayhew, p. 174.

in detail in advance of using them and accepts the examinations as having applicability to their program.[16]

A survey of the literature to find problems that study general education development at the college level and by using achievement tests to measure growth or success has not been too rewarding. This type of data appears to be rare for studies done with a college population.

In a study of students in forty-five colleges by Learned and Wood, all were found to have made gains in knowledge on average test scores. Entering freshmen were pre-tested with achievement tests and then post-tested at the end of their sophomore year.[17]

Several studies undertaken in the Basic College at Michigan State University used a general education pre-test to administer to entering freshmen in the fall and again at the end of the spring term. It was found that in almost every case gains were shown for each basic course. This held true for the control groups that did not have instruction in the courses.[18]

Correlations between scores on the General Education Development tests and college success (grade point average) was found to be significant by different investigators. Callis

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[16]Ibid., p. 180.

[17]William S. Learned and Ben D. Wood, The Student and His Knowledge, The Carnegie Foundation for the Advancement of Teaching (New York, 1938), p. 16.

[18]Paul L. Dressel, Evaluation in the Basic College, Harper and Brothers (New York, 1958), p. 116.

and Wrenn found a correlation of .72.[19] In another study by Dryer the correlation was .46.[20] Crawford and Burnham's results were .56, and in the same study they found a correlation of .72 between the College Entrance Examinations Board test and the General Educational Development Tests.[21]

Ability and College Success

One part of this study is to divide the sample into high ability and low ability groups to see if the same relationship exists between each group and academic achievement. Shadmi found that high ability predicted achievement but found no relationship between low ability and achievement. His conclusion was that there might be a non-linear relationship between ability and achievement.[22]

The ACT test is used in this study to group students into levels of ability. The ACT test is an attempt to measure

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[19]Robert Callis and C. Gilbert Wrenn, "The GED Tests as Predictors of Scholastic Success," Educational and Psychological Measurement (Spring, 1947), pp. 93-100.

[20]Henry S. Dryer, "Evidence on Validity of the Armed Forces Institute Tests of General Educational Development (College Level)," Educational and Psychological Measurement (Winter, 1945), pp. 321-333.

[21]A. B. Crawford and P. S. Burnham, "Trial at Yale University of the Armed Forces Institute General Educational Development Tests," Educational and Psychological Measurement (Winter, 1945), pp. 261-270.

[22]Rena M. Shadmi, "An Investigation of the Interaction Between Selected Non-Intellective Variables, Ability, and Academic Achievement of Engineering and Science Freshmen," (unpub. Ph.D. thesis, Columbia University, 1960), p. 123.

a student's ability to do college work by measuring his ability to apply past experiences to a new learning situation similar to academic problems found in college. Thus, in reviewing the literature, the three areas of achievement tests, intelligence tests, and aptitude tests and their relationship to college success were grouped together under the one heading of ability and college success. This seems justifiable by the fact that the ACT test attempts to tap all three of these areas.

Although the studies found in the literature used grade point average as the criterion for success, they still help establish a precedent for dividing the sample into different levels of ability for the study. If grade point average and growth in general education are related, then it could be assumed that the level of achievement, intelligence, and aptitude would divide students into groups with different potentials of academic ability.

Achievement Tests

Achievement tests have proved to be one of the better predictors of college success. In a summary of the literature in this area, Garrett found them second only to grade point average in predicting college success. He found, as summarized in Table III, in sixteen studies using achievement tests in predicting general scholastic achievement in college, that the twenty-four correlation coefficients ranged from .23 to .85 with a median correlation coefficient of .49. In the same survey Garrett found in fourteen studies using achievement

TABLE III

STUDIES IN THE USE OF GENERAL ACHIEVEMENT TEST IN PREDICTING GENERAL SCHOLASTIC ACHIEVEMENT IN COLLEGE (AFTER GARRETT[23])

Date	Reference	Institution	No.	r
Work prior to 1930 omitted.				
1930	Prosser	Iowa University	280w.	.65
1931	Segal	Long Beach Jr. College	90	.23
1936	Reed	Wichita University	400	.44
1936	Reed	Wichita University	400	.48
1936	Reed	Wichita University	400	.43
1937-1941	Weber	Wells College	59	.47
1937-1941	Weber	Wells College	48	.55
1937	Butsch	Marquette University	750	.47
1941	Weaver	Mount Holyoke	96	.57
1942	Weaver	Mount Holyoke	261	.57
1941	Weber	Wells College		.46
1941	Weber	Wells College		.41

Total coefficients = 24

Range of coefficients = .23 to .85

Median = .49

tests in specific subject matter fields in predicting general scholastic achievement in college that the fifty-seven correlation coefficients ranged from .10 to .70 with a median

[23]Harley F. Garrett, "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Sciences and Teachers Colleges," Journal of Experimental Education, XVIII (February, 1949), p. 100.

correlation coefficient of .40. For a summary of these results, see Table IV. When he found the average correlation coefficients between achievement test scores in specific subject matter fields and general scholastic achievement in college,

TABLE IV

STUDIES IN THE USE OF ACHIEVEMENT TESTS IN SPECIFIC SUBJECT MATTER FIELD IN PREDICTING GENERAL SCHOLASTIC ACHIEVEMENT IN COLLEGE[24] (AFTER GARRETT[24])

Date	Reference	Institution	No.	r
Work prior to 1930 omitted.				
1934	Freeman	Minnesota University	951	.36
1934	Freeman	Minnesota University	951	.36
1935	Freeman	Minnesota University	827	.38
1935	Freeman	Minnesota University	827	.37
1935	Freeman	Minnesota University	827	.36
1935	Freeman	Minnesota University	827	.34
1934	Freeman	Minnesota University	827	.25
1941	Weaver	Mount Holyoke	96	.40 to .69
1941	Votaw	Southwest Texas	31	.46 & .53
1945	Smith	Fresno State College	903	.44 & .39

Total coefficients = 57

Range of coefficients = .10 to .70

Median = .40

seven correlation coefficients for mathematics had an average correlation coefficient of .42; seven correlation coefficients for social studies had an average of .39; and five correlation

[24] Ibid., pp. 102-103.

coefficients for science had an average of .35.[25] Refer to Table V for the summary of these results.

TABLE V

THE AVERAGE COEFFICIENT OF CORRELATION BETWEEN ACHIEVEMENT TEST SCORES IN SPECIFIC SUBJECT MATTER FIELDS AND GENERAL SCHOLASTIC ACHIEVEMENT IN COLLEGE (AFTER GARRETT[26])

Subject	No. Reported	Average r
Latin	2	.63
French	4	.57
Reading (general)	8	.42
Mathematics	7	.42
Social Studies	7	.39
Science	5	.35
Reading Comprehension	2	.34
Reading Rate	2	.13

In 1943, Durflinger made a survey of the correlation coefficients that had been found between achievement examination and college scholarships. His computed median correlation coefficients for these were .55 for studies done before 1934 and .48 for studies done after 1934.[27] The results are summarized in Table VI.

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[25] Ibid., pp. 91-138.

[26] Ibid., p. 105.

[27] G. W. Durflinger, "The Prediction of College Success," Journal of the American Association of College Registrars, XIX (June, 1943), pp. 68-78.

TABLE VI

MEDIAN COEFFICIENTS OF CORRELATION BETWEEN ACHIEVEMENT EXAMINATIONS AND COLLEGE SCHOLARSHIP, FROM SUMMARIES MADE BEFORE AND AFTER 1934 (AFTER DURFLINGER[28])

Author	Date Before 1934	Number	Median
Harl R. Douglass	1931	67	.55
David Segal	1934	13	.54
Mizie E. Wagner	1934	88	.56
			.55
	After 1934		
G. W. Durflinger	1942	20	.48

In reviewing research where studies of achievement and its relationship to college success were made, Bloom and Peters found that achievement was probably superior to aptitude for predicting college success. Also, they say that late studies using achievement to predict college success give very similar data to studies done in the 1940's.[29]

[28]Ibid., p. 75.

[29]Bloom and Peters, pp. 23-24.

Intelligence Tests

Interest in the fact that people vary in abilities began to appear in France following the French Revolution. Scientific attempts to measure ability to perform mental tasks has its roots in the work of Binet and has since developed into the most explored area of psychological testing.

After being introduced in America by Cattell in 1890, interest in mental testing grew in this country with vigor. However, at this time mental ability was believed to be highly related to motor skills, sensory perception, memory and physical strength. Thus, mental testing was set back in 1901 when Wissler showed by correlation coefficients that the above abilities had little relationship to academic success.

Following World War I, after group intelligence tests such as the Army Alpha had been developed and tried on a large number of people, interest in mental testing was revived. Studies on intelligence and its relationship to academic success flourished.

In Durflinger's summary of 741 studies between intelligence and college success, he found an average correlation coefficient of .45.[30] These findings are summarized in Table VII.

In Garrett's survey of forty-nine studies done from 1919 to 1945 in the correlation of intelligence with general

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[30]Durflinger, pp. 68-78.

TABLE VII

SUMMARY AVERAGES OF COEFFICIENTS OF CORRELATION REPORTED BETWEEN INTELLIGENCE TESTS AND COLLEGE GRADES (AFTER DURFLINGER[31])

Author	Date	No. of Coefficients	Mean	Median
Harl R. Douglass	1931	160	.44	.45
L. B. Kinney	1932	442	.45	
David Segal	1934	100		.44
Mazie E. Wagner	1934	39		(.40 to .50)
Average figure (whether mean or median)				.45

scholastic success in college, he found that ninety-four correlation coefficients ranged from .17 to .67 with a median correlation coefficient of .45.[32] See Table VIII for the summary of his findings.

Aptitude Tests

In the early nineteenth century theories began to emerge that intelligence consisted of specific factors as well as general intelligence. Thus, attempts were made to develop aptitude tests and aptitude test batteries to measure abilities in these specific factors. A two-factor theory was first placed upon an emperical basis with the publication of

[31] Ibid., p. 76.

[32] Garrett, p. 106.

Spearman's 1904 article; and later multiple-factor theories developed by men such as Kelly, Thurston, and Guilford.[33]

TABLE VIII

STUDIES IN THE CORRELATION OF INTELLIGENCE WITH GENERAL SCHOLASTIC SUCCESS IN COLLEGE (AFTER GARRETT[34])

Date	Reference	Institution	r
Work prior to 1936 omitted.			
1936	Read	Wichita University	.42
1937	Butsch	Marquette University	.53
1939	Prescott & Garrettson	Phoenix Jr. College	.21
1939	Prescott & Garrettson	Arizona University	.42
1939	Dubois	New Mexico University	.44
1940	Attender	Patterson, N. J., State Teachers College	.35
1940	Garrett	52 colleges	.61
1941	Votaw	Southwest Texas	.53
1944	Weber	Wells College	.45
1945	Smith	Fresno State College	.42
1945	Smith	Fresno State College	.38
1947	Bent	Arkansas University	.63

Number of coefficients	=	94
Range of coefficients	=	.17 to .67
Interquartile range	=	14.59
Median	=	.47
S.D.	=	.24
A.D.	=	.12

[33]Anne Anastasi, Differential Psychology (New York, 1958), pp. 322-327.

[34]Garrett, pp. 107-109.

As with other types of tests, studies have been made to find the relationships between aptitude scores and academic success. Table IX summarizes Garrett's survey of ten studies done from 1923 to 1939 of the relationship between general college aptitude tests and scholastic achievement in college.

TABLE IX

RELATION BETWEEN GENERAL COLLEGE AND APTITUDE TESTS AND SCHOLASTIC ACHIEVEMENT IN COLLEGE (AFTER GARRETT[35])

Date	Reference	Institution	No.	r
Work prior to 1929 omitted.				
1929	Crawford	Yale University	591	.41
1933	Williamson & Freeman	Minnesota University	379	.25
1933	Wrenn & Crandall	Stanford University	193 to 345	.43 to .45
1934	Williamson & Freeman	Minnesota University	293 to 827	.38 to .50
1934	Douglass & Lovegren	Minnesota University	190	.41
1934	Finch & Nemzek	Minnesota University	90 to 118	.40 to .42
1939	Durflinger	Nebraska State Teachers College	328 m. & w.	.48

Total coefficients	=	28
Range of coefficients	=	.12 to .56
Mean	=	.42
Median	=	.43
S.D.	=	.13

[35] Ibid., p. 111.

It shows that the twenty-eight correlation coefficients ranged from .12 to .56 and had a median correlation coefficient of .43 with a standard deviation of .13. When he surveyed seven studies done from 1929 to 1944 in the use of special aptitude tests in predicting general scholastic achievement, he found that the fifteen correlation coefficients ranged from -.04 to .65 and had a median correlation coefficient of .41.[36] (See Table X.)

Vineyard made a study in 1955 of the relationship between scores made on the Differential Aptitude Test by a sample of high school freshmen and the average of their grades made as freshmen at Oklahoma State University. He found that scores on the Differential Aptitude Tests were helpful in advising students about long range plans in higher education.[37]

Bowers studied the tests given in the counseling program of the Oklahoma Institute of Technology at Oklahoma State University. His results indicated that the Pre-Engineering Ability Test was the most effective predictor for first semester grades of engineering students at Oklahoma State University. One of his groups showed a correlation coefficient of .58 and the other one .60. When the Cooperative Algebra Test was used for the same purpose, the correlation

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[36] Ibid., pp. 111-113.

[37] Edwin E. Vineyard, "A Longitudinal Study of the Relationship of Differential Aptitude Test Scores with College Success," (unpub. Ed.D. dissertation, Oklahoma State University, 1955), pp. 96-98.

TABLE X

STUDIES IN THE USE OF SPECIAL APTITUDE TESTS IN PREDICTING GENERAL SCHOLASTIC ACHIEVEMENT (AFTER GARRETT[38])

Date	Reference	Institution	No.	r
1929	Cuff	Kentucky State	393	.37
1929	Crawford	Yale University	591	.41
1929	Fritz	Pittsburg, Kansas, State Teachers College	100	.63
1934	Douglass & Lovegren	Minnesota University	190	.04
1934	Douglass & Lovegren	Minnesota University	190	.05
1934	Douglass & Lovegren	Minnesota University	190	.65
1933	Patterson	Minnesota University College of Education	538	.25
1939	Prescott & Garrettson	Arizona University	153	.49
1939	Prescott & Garrettson	Phoenix Jr. College Various Colleges	1537 to 3441	.23 to .58

Total coefficients = 15
Range of coefficients = -.04 to .65
Median = .41

coefficient for Group I was .58 and .55 for Group II. By combining the two tests for a multiple predictor, Bowers found a correlation coefficient of .613.[39]

[38]Garrett, p. 113.

[39]Royal H. Bowers, "The Selection of the Optimal Predictors of Success in the First Semester of the Engineering Program of the Oklahoma Institute of Technology" (unpub. Ed.D. dissertation, Oklahoma State University, 1956), pp. 86-93.

Holland studied a sample of exceptionally talented college freshmen attending 291 colleges and universities and found the California Psychological Inventory and Scholastic Aptitude Test useful in predicting college freshmen grades for high aptitude high school seniors.[40]

Current findings of correlation between aptitude tests and college grades are consistent with studies made during the past forty years. Bloom and Peters found them to be almost identical in level of precision to correlations found in the 1920's.[41]

Reading Level and College Success

The adjustment to and understanding of our cultural setting, communicating within our society, and the transmission of knowledge are all so dependent upon verbal skills that the author used reading levels as another variable in the study. It was felt that reading is used so extensively in college for learning subject matter that it should have some relationship to growth in the area of general education.

Reading scores have not proved to be as reliable in predicting academic success as achievement tests or ability tests. Cuff found correlation coefficients of .36 with the

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[40] John L. Holland, "The Prediction of College Grades from the California Psychological Inventory and the Scholastic Aptitude Tests," Journal of Educational Psychology, L (August, 1959), pp. 135-142.

[41] Bloom and Peters, p. 22.

Whipple Reading test, .25 with the Monroe Silent Reading comprehension, and .10 with reading rate when they were correlated with academic success.[42]

In 1930, Nelson found a correlation coefficient of .45 between the Nelson-Denny Reading test and academic success and again in 1931 a correlation coefficient of .67 between the same two variables.[43]

In another study Patterson found correlation coefficients of .28, .38, and .36 between the Minnesota Reading test and academic success.[44]

Read's correlation coefficient between the Iowa Reading Comprehensive and college success was .42, but the Iowa Reading Rate only showed .16 for a correlation coefficient when used for the same comparison.[45]

In a study of 114 college freshmen in reading ability, listening skill, intelligence, and scholastic achievement by Vineyard and Bailey, a correlation coefficient of .531 was

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[42]N. B. Cuff, "Prognosis of and Diagnosis of Success in College," Journal of Applied Psychology, XIV (December, 1930), pp. 612-619.

[43]M. J. Nelson, "Study in the Value of Entrance Requirements for Iowa State Teachers College," School and Society, XXXVII (February, 1933), pp. 262-264.

[44]Dale O. Patterson, "The Relationship Between Certain Factors and Scholastic Success in the University of Minnesota College of Education," Bulletin of the American Association of Collegiate Registrars, XII (April, 1937), pp. 191-201.

[45]C. R. Read, "Prediction of Scholastic Success in a Municipal University," School and Society, XLVIII (August, 1938), pp. 187-188.

found between reading ability and one year of scholastic achievement. When either listening or intelligence was partialed out, reading and achievement were still significantly related. After intelligence and listening were both partialed out by a second order partial correlation, reading and achievement were not significantly related.[46]

TABLE XI

RELATIONSHIP OF ALL VARIABLES WITH COLLEGE GRADE AVERAGE (AFTER VINEYARD AND BAILEY[47])

Variable	r
Vocabulary	0.513
Speed of paragraph comprehension	0.433
Spelling	0.557
Intelligence	0.518

Vineyard and Massey found in a study of the interrelationship of linguistic skills and their relationship to scholastic achievement that vocabulary, speed of paragraph comprehension, spelling, and intelligence were all correlated to academic achievement. See Table XI for a summary of the correlation coefficients. However, when intelligence was held constant,

[46]Edwin E. Vineyard and Robert B. Bailey, "Interrelationships of Reading Ability, Listening Skill, Intelligence, and Scholastic Achievement," Journal of Developmental Reading, III (Spring, 1960), pp. 175-178.

[47]Ibid., p. 283.

these relationships were reduced considerably with speed of paragraph comprehension becoming nonsignificant.[48] For a summary of the results, see Table XII.

TABLE XII

RELATIONSHIP BETWEEN LINGUISTIC SKILLS AND GRADE AVERAGE WITH INTELLIGENCE RULED CONSTANT (AFTER VINEYARD AND MASSEY[49])

Variable	Partial r
Vocabulary	0.245
Speed of paragraph comprehension	0.144
Spelling	0.373

Garrett computed an average coefficient of correlation between reading test scores and general scholastic achievement in college and found them to be .42 for reading in general, .34 for reading comprehension, and .13 for reading rate.[50]

When two variables are used for the prediction of college success, there appears to be an increase in the correlation

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[48] Edwin E. Vineyard and Harold W. Massey, "The Interrelationship of Certain Linguistic Skills and Their Relationship with Scholastic Achievement When Intelligence is Ruled Constant," Journal of Educational Psychology, XLVIII (May, 1957), pp. 279-286.

[49] Ibid., p. 284.

[50] Garrett, p. 46.

coefficient. When Cuff used the Whipple Reading Test and the Miller Analogies Test for a multiple correlation coefficient to predict college success, he found a correlation coefficient of .49.[51]

By using high school grade average and the Iowa Silent Reading comprehensive to predict college success, Read found a multiple correlation coefficient of .68; when he used the Iowa Silent Reading comprehensive and the Iowa High School Content test, the correlation coefficient was .49; by using the Ohio University Psychological test and the Silent Reading comprehensive, a correlation coefficient of .47 was obtained.[52]

However, some attempts to correlate reading ability and academic success do not show a relationship to exist between them. In summarizing his study, McQueen says:

> The present inquiry sought to ascertain the relationship between several criteria of reading efficiency and college achievement. The Diagnostic Reading Test, yielding scores for vocabulary, comprehension, and reading speed, was administered to 246 university freshmen. Each of the reading scores was subsequently correlated with grade point average and achievement of the ACE. The anticipation that college marks would correlate moderately high with reading scores was not met. The obtained r's were all virtually zero. There was, however, a moderate correlation between total scores on the DRT and the ACE. The conclusion was reached that college grade point achievement is influenced less by specific factors of reading efficiency than by other factors such as student motivation and time to study.[53]

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[51]Cuff, p. 618.

[52]Read, p. 188.

[53]Robert McQueen, "Diagnostic Reading Scores and College Achievement," Psychological Report, III (1957), pp. 627-629.

High School Grades and College Success

High school grades have been used for many years to determine students' ability to succeed in college. These have proved many times to be one of the better predictors. However, some investigators believe this to be true because they measure both ability and motivational factors that were taken under similar circumstances as college grades are earned. Vineyard found that most investigators find high school marks to be the most accurate method of predicting academic success in college.[54]

It was found in a study by Long that high school quality points are the best one predictor of college success.[55]

Because of the high correlation between high school grades and college grades, the writer feels that it would add to the study to compute a correlation coefficient between high school grades in general education subjects and the change in level of general education development as measured by the Sequential Tests of Educational Progress.

Table XIII summarizes data found by Tribilock. By classifying students in either high, low, or middle one third of their high school graduating class, Tribilock found the

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[54]Vineyard, p. 53.

[55]John M. Long, "The Prediction of College Success from a Battery of Tests and from High School Schievement," (unpub. Ed.D. thesis, University of Virginia, 1960), p. 67.

higher one third receiving more A's and B's in college and the lower one third receiving more F's.[56]

TABLE XIII

SUMMARY OF COLLEGE GRADES RECEIVED BY THE RESPECTIVE THIRDS
651 CASES
(AFTER TRIBILOCK[57])

	Total No. Hrs. Carried	%A	%B	%C	%D	%E (F)	Total
Highest Third	4362	22.5	38.9	31.9	6.1	.5	100
Middle Third	3100	7.3	27.8	44.6	16.2	4.1	100
Lowest Third	2002	4.1	24.2	44.1	16.3	10.7	100

In reviewing the literature, Garrett's survey of studies was very helpful. In summarizing fourteen studies made of students' rank in high school graduating classes and their relationship to college grades, he found the twenty-nine correlation coefficients to range from .18 to .72 and the median correlation coefficient to be .548. For a summary of the results, see Table XIV. When he summarized twenty-one studies between high school scholarship and college scholarship, he found the thirty-two correlation coefficients to

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[56] W. E. Tribilock, "Many of the Lowest Third of Our Graduates are College Material," Clearing House, XII (May, 1938), pp. 544-546.

[57] Ibid., p. 546.

TABLE XIV

STUDIES MADE OF STUDENTS' RANK IN HIGH SCHOOL GRADUATION CLASS AND THEIR GRADES IN COLLEGE (AFTER GARRETT[58])

Date	Reference	Institution	No.	r
Work prior to 1931 omitted.				
1931	Segal	Long Beach Jr. College	90w.	.42
1931	Patterson	Minnesota University	300	.27
1931	Patterson	Minnesota University	229	.49
1933	Williamson & Freeman	Minnesota University	379	.47
1934	Williamson & Freeman	Minnesota University	951	.45
1934	Williamson & Freeman	Minnesota University	283	.52
1934	Douglass & Lovegren	Minnesota University	190	.43
1935	Douglass & Lovegren	Minnesota University	827	.54
1936	Martin	Trenton State Teachers College	228	.26
1936	Martin	Trenton State Teachers College	123	.30
1937	Butsch	Marquette University	750	.56
1939	Seyler	Illinois University	3006	.60

Total coefficients = 29
Range of coefficients = .18 to .72
Median = .548
S.D. = 24.66

range from .29 to .83 and to have a median correlation coefficient of .56.[59] The findings are summarized in Table XV.

[58] Garrett, p. 97.

[59] Ibid., pp. 94-97.

TABLE XV

STUDIES IN THE CORRELATION OF AVERAGE HIGH SCHOOL SCHOLARSHIP WITH COLLEGE AVERAGE (AFTER GARRETT[60])

Date	Reference	Institution	No.	r
Work prior to 1928 omitted.				
1928	Pierson	"College"	50	.52
1928	Hartson	Oberlin College		.55
1928	Hartson	Oberlin College	w.	.45
1929	Whitney	Colorado State Teachers College	899	.50
1930	Prosser	Iowa University	280	.51
1931	Crawford & Burnham	Yale University	3277	.57
1931	Patterson	Minnesota University	309	.31
1931	Patterson	Minnesota University	229	.45
1932	Hartson	Oberlin College	150w.	.47
1932	Hartson	Oberlin College	120m.	.45
1934	Finch & Nemzek	Minnesota University	90	.79
1935	Byrns & Henmon	Minnesota University	250	.72
1936	Read	Wichita University	400	.63
1936	Read	Wichita University	400	.64
1936	Read	Wichita University	400	.67
1935	Garrett	52 colleges	200	.67

Total coefficients = 32
Range of coefficients = .29 to .83
Median = .56

In 1954, Stone reported the results of a predictive study made at Brigham Young University. He found high school grades

[60] Ibid., p. 94.

to be a better predictor than either the ACE Psychological Examination or the Cooperative General Culture Test.[61]

Bloom and Peters say that current studies of predicting college success by high school grades show about the same results as those made thirty or forty years ago.[62]

Guidance and General Education

The importance of an adequate general education program for all vocations is acknowledged by most people in education today. Wrenn sees level of education to be the most important factor in the years ahead for labor force entrants to get the better jobs. For people entering professional and technical occupations, he thinks that the kind of education will be important; but for most people the most important part of their education will be the amount of what they have learned generally about the world, themselves, and the skills of communication.[63]

The teacher education program at Oklahoma State University has three purposes: One, it ensures breadth in the program by requiring fifty hours of appropriately distributed general education. Two, it provides courses in professional education

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[61] Joics B. Stone, "Differential Prediction of Academic Success at Brigham Young University," Journal of Applied Psychology, XXXVIII (March, 1954), pp. 109-110.

[62] Bloom and Peters, pp. 7-8.

[63] C. Gilbert Wrenn, The Counselor in a Changing World, American Personnel and Guidance Association (Washington, D.C., 1962), p. 23.

for developing the student into a competent person within his profession. Three, it gives depth in some area in which the student in preparing to teach. This study hopes to give a better insight into the general education program and some variables that appear to be important to success in it. This, in turn, should provide guidance workers with more information upon which to advise a student about a program in which he will spend almost fifty per cent of his academic time. Also, by a better understanding of the general education program, the guidance service and administration can evaluate its efficiency and possibly initiate changes to improve it if it is needed. To quote Johnson:

> By assembling and making available information regarding students; by making staff members aware of the problems, abilities, goals, and interests of individual students; by giving the administration data upon which to base sound policy and procedures, the guidance program can provide a motivating force and directional focus for the entire general education program.[64]

General education and student personnel are basically concerned with the same thing, the development of the total individual in an academic setting. In summarizing the research in general education for the Encyclopedia of Educational Research, Dressel and Lorimer say:

> Both general education and student personnel work are concerned with providing experiences which will foster the development of the student as a social humane individual rather than as an intellect;

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[64] B. Lamar Johnson, General Education in Action, American Council on Education (Washington, D.C., 1952), p. 77.

> both are concerned with helping the individual find himself in college and in life; and both recognize that some restructuring of college organization and faculty views is necessary to achieve these ends. General education, by providing exploratory work in the major divisions of human knowledge, greatly assists in the orientation of students.[65]

Lloyd-Jones believes that some creative educators and personnel workers, through practical methods, can make many fundamental contributions to their respective educational institutions' purposes and methods by virtues of general education.[66]

The value of guidance and counseling in the student personnel services is becoming recognized more and more each year for its contributions in helping to provide students with better planned and realistic programs of study. The President's Commission on Higher Education recommended an effective guidance and counseling program as one of the most important instruments for accomplishing the purposes of higher education. The report expressed the opinion that, in mass education, counseling provides the most likely means for adapting the institution to the individual student.[67]

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[65]Paul L. Dressel and Margaret F. Lorimer, "General Education," Encyclopedia of Educational Research, ed. Chester W. Harris (New York, 1960), p. 577.

[66]Esther Lloyd-Jones, "Personnel Work and General Education," The Fifty-First Yearbook of the National Society for the Study of Education, Part I, ed. Nelson B. Henry (Chicago, 1952), pp. 226-227.

[67]Higher Education for American Democracy: A Report of the President's Commission on Higher Education (New York, 1948), p. 65.

The President's Commission on Education Beyond the High School agreed in 1957 that more emphasis should be placed upon counseling and guidance to help the student determine his interests and abilities.[68]

Johnson relates that, by using the guidance program, students come to a better understanding of themselves, their abilities, their interests, their problems, and their values; they may define goals which they wish to accept as their own, and they may project plans for achieving these goals.[69]

Guidance of a student in teacher education is enhanced by the general education program. Many times this helps him to choose a major area of concentration by having an opportunity to explore the major fields of learning. Hill and Dressel are confident that this exploratory work in general education provides an opportunity to assist the student in deciding a major interest or to decide whether or not a suspected interest is a real one. These writers are of the opinion that counseling should assist in making this a planned exploration rather than a haphazard one. They add that a common core of general education gives the student an

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[68] Report of the Mid-Atlantic Regional Conference: The President's Committee on Education Beyond the High School (New York, 1947), p. 16.

[69] Johnson, p. 55.

opportunity to change from one major to another without serious loss of credit.[70]

Teacher Screening and General Education

The screening of teachers to improve the quality of teachers coming to the profession has received much attention in the last fifteen years. Lofthouse writes:

> One of the discoveries made by education programs in other countries is that only one out of six who apply for teaching is accepted into preparation programs. The high status being enjoyed by teachers in other parts of the world is common knowledge. Perhaps one clue to improved status for teachers in this country lies in the development of better selection procedures.
>
> Selection is a two-way process. The individual may choose to enter the profession, but the profession must insist on the privilege of ultimately accepting or rejecting any individual. Not only should the profession be charged with the responsibility for licensing, but it should have the right to invalidate any license in the case of malpractice.[71]

Accrediting associations and professional organizations are placing an emphasis on the selection of teachers. The National Council for Accreditation of Teacher Education requires each teacher education institution to meet certain minimum requirements to be accredited. Educators in Oklahoma

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[70]Walker H. Hill and Paul Dressel, "Evaluation in the Basic College of Michigan State College," Evaluation in General Education, ed. Paul L. Dressel (Dubuque, Iowa, 1954), p. 293.

[71]Yvonne Lofthouse, "Selection and Counseling: Avenues to Quality Control," The Outlook in Student Teaching: Forty First Yearbook, ed. Aleyne C. Haines (Dubuque, Iowa, 1962), p. 140.

are becoming concerned in this area. In a speech to the members of the Oklahoma Council on Teacher Education at their 1961 meeting at Central State College, Dr. E. W. James told the group that a good project for the council would be to develop procedures and instruments for a state-wide approach to the selective recruitment and selective admission into the teaching profession.[72]

The fact that a student has completed a specified number of courses and maintained a minimum level grade point average is one of the better criteria for selection of students into teacher education, but grade point average alone may represent too little evidence for administrators to place a value judgment on the selection of potential teachers into a program. Horst comments that he does not know of a definitive study that shows that first quarter, semester, or first year grades give any good indication of final achievement in college. (Final achievement is interpreted here to mean the actual practical knowledge attained in the course.) He says further that this is a simple way of getting results quickly but does not think it is adequate for establishing selection and admission standards or differential guidance procedures.[73]

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[72] Annual Meeting of the Oklahoma Council on Teacher Education (Edmond, Oklahoma, 1961), p. 18.

[73] Paul Horst, "Differential Prediction of Academic Success," Selection and Educational Differentiation, ed. T. R. McConnell (Berkeley, California, 1959), pp. 33-34.

An assessment of a student's knowledge in general education is one criterion being used along with other selective factors to admit teacher candidates into a program of study. A passage by Mayhew in his book about general education says:

> More of our selection, orientation, and placement activity should be based upon achievement type of examinations which measure the competencies of students relative to the broad area of knowledge and general education type objectives.[74]

Oklahoma State University uses a level of general education, as measured by the Sequential Tests of Educational Progress, for one criterion in selecting students for admisto the professional phase of teacher education. This study is concerned with the amount of growth in each area of general education prior to taking achievement tests for admission to the program.

Summary

A systematic review of the literature reveals the level of general and liberal education to be related to ability to compete in a college learning situation, the success of students after leaving school, and the development of good citizens.

Growth in general education for this study is measured by achievement tests, because the literature indicates them to be a good measure of success in broad areas of general

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[74]Mayhew, p. 174.

education development. When a review of the literature was made for studies in which achievement tests were used as pre-tests and post-tests to determine growth in general education, very few studies were found. However, those studies that were found gave indications that achievement tests successfully measured general educational development.

To make an evaluation of the relationship between ability to do work and success in college work possible, the ACT tests are used in this paper to group students according to their ability. The ACT test involves students' aptitudes, intelligence, and achievement; thus, the literature for these three types of tests was reviewed. All three tests were found to be related to college success in terms of grade point average.

The literature was reviewed for research problems that studied reading level and college success, because reading level is another variable in this study that is tested for its relationship to college success. Examination of the literature showed reading level to correlate with college success as measured by grade point average.

The review of the literature shows high school grade point average to be consistently the best predictor of college grade point average. Therefore, this study correlates growth as measured by achievement pre-tests and post-tests with grade point average to see if a relationship exists between them.

The literature supports the theory that general education assists the student personnel program in counseling and

guidance for developing the total individual and at the same time giving the student an insight into different fields of education from which to choose his area of concentration.

According to the literature, screening teacher education candidates is becoming very popular, with general education being one of the criteria used to admit students to teacher education. Oklahoma State University uses general education level in its teacher screening program; thus, this study is concerned with the growth in this area for the students' two years of lower division work.

CHAPTER III

THE MEASURING INSTRUMENTS

This chapter is dedicated to the justification and description of the tests used in the study. Skilled persons who must make quantifying and qualifying evaluations in their work depend upon good measuring instruments to produce successful results. The educational researcher's evaluations are based upon psychological measurements and, therefore, may have many human errors injected into his descriptions, assessments, or predictions. Consequently, analysis or description of his measuring instruments becomes very important in his technical reporting. This is why the author feels that it is justifiable to devote a separate chapter to the tests used in this study.

It is important that people in education have an understanding of the tests used in educational measurements. Each year educators rely more and more on standardized tests to help solve their problems in student personnel and guidance work; therefore, they should have a good insight into the characteristics which determine a good instrument for student evaluation. Also, an understanding of tests for interpreting research is important to the modern educator, because he

bases many of his theories upon educational research. Too many times "blind faith" is placed in an evaluating instrument when the user or reader knows little about the test or what it can or cannot do.

Not only are the general description and background important aspects of test information; but also score interpretation, group characteristics on which the test was normed, reliability data, and validity confirmation are essential to understanding individual tests.

Comparing two raw scores on different tests has little meaning unless they are equated in some manner. As an illustration, one man might be described to be 6 feet tall and another man to be 1.76 meters tall. There would be no way of expressing their comparable heights unless we know a relationship between feet and meters. In psychological measurements, scores are usually converted into standard scores in order to equate them or describe them in terms of the normal distribution. To quote Seashore:

> An individual's test score acquires meaning when it can be compared with the scores of well-identified groups of people. Manuals for tests provide tables of norms to make it easy to compare individuals and groups. Several systems for deriving more meaningful "standard scores" from raw scores have been widely adopted. All of them reveal the relative status of individuals within a group.[1]

When statistical tables are constructed on the basis of standard scores, then it does not matter what our original

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[1]Harold G. Seashore, "Methods of Expressing Test Scores," Test Service Bulletin, XL (January, 1955), p. 7.

means and standard deviations were numerically; because reducing all raw scores to standard scores places them all on the same basis or common denominator.[2]

Tests are used to evaluate individuals or groups of people in various traits; therefore, criterion groups are important for some standard to use as a reference point for measuring. Little is known about an individual or group of scores on a given test unless some standard measure for comparison is available. An analogy can be drawn by using a physical scale as an example. A piece of fruit that weighs three ounces might be considered of average weight if compared to lemons as the normal group, exceedingly large when compared to cherries, and small if compared to grapefruits. If a test is to contribute to the understanding of the individual, then we must know something about how others have performed on the test; norms provide this information.[3] A raw point score can be given meaning only when it is referred to some type of group or groups; a raw score by itself cannot be considered high or low, good or bad, but it is higher or lower, better or worse.[4]

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[2]J. P. Guilford, Fundamental Statistics in Psychology and Education, 3rd ed. (New York, 1956), p. 122.

[3]James H. Ricks, Jr. and Harold G. Seashore, "Norms Must Be Relevant," Test Service Bulletin, XXXIX (May, 1950), p. 16.

[4]Robert L. Thorndike and Elizabeth Hagen, Measurement and Evaluation in Psychology and Education (New York, 1955), p. 156.

A consistent measuring instrument is necessary for accurate results. If little faith can be put in a test to remain stable from individual to individual, from group to group, or time to time, then doubt is cast upon the outcome of a research project that uses it as one of its techniques for differentiation.

The consistency or stability of a test is termed in testing as its reliability and is expressed statistically as a correlation coefficient. In an article in the Test Service Bulletin published by the Psychological Corporation, Wesman explains how this characteristic of a test can many times be inadequately reported in the literature. He concludes his article by saying:

> A reliability coefficient is a statistic--simply a number which summarizes a relationship. Before it takes on meaning, its reader must understand the logic of the study from which the coefficient was derived, the nature of the coefficient, and the forces which affect it. Statistics may reveal or conceal--what they do depends to a very large extent on the logical ability and awareness the reader brings to them. Figures do lie, to those who don't or won't understand them.[5]

Thorndike and Hagen believe that when we question a test's reliability that we are not asking what the test measures but how accurately it measures what it does measure.[6] Similarly, Nunnally believes that reliability concerns the

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[5]Alexander G. Wesman, "Reliability and Confidence," Test Service Bulletin, XLIV (May, 1952), pp. 2-7.

[6]Thorndike and Hagen, p. 123.

precision of measurement regardless of what it measures.[7] Guilford expresses it more mathematically by defining the reliability of any set of measures as the proportion of their variance which is true variance.[8]

The researcher should be concerned with the type of reliability coefficient used for reporting the reliability of tests used in his problem. There are three general statistical methods used to compute reliability: One, the test-retest method using the same form, which is a better measure of the stability of the test over a period of time. Two, the test-retest method with equivalent forms that gives more information about content sampling. Three, the different split-half and intercorrelation of items methods which measure the internal consistency of the test. Dressel and Schmid comment:

> A reliable test must yield consistent scores in repeated measurements of an individual. Commonly, reliability is estimated by a coefficient of correlation obtained by any of several methods. The methods used should be stipulated since results may vary considerably with the method.[9]

Another important function of a test is that it measures the thing that it was designed to measure. There would be little need for a measuring instrument which told the user

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[7]Jum C. Nunnally, Jr., Tests and Measurements: Assessment and Prediction (New York, 1959), p. 95.

[8]Guilford, p. 436.

[9]Paul L. Dressel and John Schmid, An Evaluation of the Tests of General Educational Development (Washington, D.C., 1951), p. 18.

nothing about the variable that he is measuring. This characteristic of a test is called its validity and is determined sometimes by critical examination and professional judgement and/or many times it is expressed as a correlation coefficient between itself and another criterion of validity.

Thorndike and Hagen say that when we ask the question of how valid a test is, then we are inquiring whether the test measures what we want it to measure, all of what we want it to measure, and nothing but what we want it to measure.[10] They think also that validity, insofar as we can appraise it, is the crucial test of measurement procedure.[11]

Although validity is one of the most important characteristics of a good test, it is one that is sometimes hard to verify or define depending on the function of the test. Nunnally stresses three types of tests and their validation: (a) If the test is for the purpose of assessment, then sampling of content inevitably involves human judgement and human values. (b) If the test is for the purpose of prediction, then its relative accuracy is determined from statistical analysis. This includes statistical description of the number of people who are properly and improperly classified, statistical estimates of the per cent of persons who can be safely forecast at particular levels on the assessment, and statistical estimates of the amount of money that can be saved by using a predictor. (c) If the test cannot be classified either as

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[10] Thorndike and Hagen, p. 108.

[11] Ibid., p. 134.

assessment or predictor, then its validation consists of defining the measure in terms of numerous research findings.[12]

Guilford sees validity as a serious problem because conclusions after conclusions about supposed underlying properties are built upon evidence of measurements which may not have much to do with these properties; or he sometimes questions the existence of such properties. He thinks, in its crudest terms, that a test is valid when it measures what it is presumed to measure but adds that this is only one step better than the definition that a test is valid if it measures the truth. According to Guilford, if we ask the question, "Is this test valid?" then the answer should be in the form of another question, "Valid for what?"[13]

The American College Test (ACT) tests, Science Research Associates (SRA) Reading Record, and the Sequential Tests of Educational Progress (STEP) are used in this study. They shall be discussed not only by their general nature but by some of their more technical characteristics such as norms, reliability, and validity.

The ACT Tests

In an effort to test college bound students on a large scale for colleges to have a better cross-sectional analysis of entering students and at the same time do it more efficiently

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[12]Nunnally, pp. 60-66.

[13]Guilford, p. 461.

in terms of time, personnel, and money, a plan was devised in 1959 to coordinate similar programs in a large number of states. This was accomplished under the leadership of Professor E. F. Lindquist and Ted McCarrel at the State University of Iowa and was entitled the American College Testing Program, Inc.[14]

The ACT tests are used in this study to divide students according to their ability to do college work. There are four subscores on the ACT tests; one each for English, mathematics, social studies, and natural science. The fifth or composite score is the mean (average) of these four scores and provides an over-all estimate of the students' ability to succeed in college.[15]

According to Lindquist, the ACT tests tap the ability of students to do college work. He writes:

> In the development of the ACT tests, the paramount criterion in the choice of test content was that the tests used must measure as directly as possible the ability of the student to do the very things required for academic success in college. What we would like to be able to say, with reference to the social studies, for example is: "This student has demonstrated in a controlled test situation that he can perform complex intellectual tasks representative of those commonly met in the work-study situation in college courses in the social studies." If then the student's grades are low, we may know that it is not because of the lack of ability on his part, but for some other reason, such as the lack of adequate motivation or misdirected effort. Low

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[14] ACT: A Message to College Presidents (Iowa City, Iowa, 1960), pp. 4-5.

[15] ACT: Student's Booklet (Chicago, 1960), p. 1.

> correlations between the test scores and grades would then point, not to weaknesses in the test, but to problems possibly unique to the group measured, such as unreliability of grades and variable standards in grading, or other factors to be considered later.[16]

Norms

The norms for college bound students on the ACT tests were derived from the 120,307 high school seniors who took the tests during the school year 1959-60. Scores on these tests were converted to the standard scores used by the Iowa Tests of Educational Development (ITED) and reported by percentile rank norms.

Reliability

The reliability coefficients for both Form 1-A and Form 1-B for the ACT tests were computed by the Spearman-Brown odds-evens method.

A sample of 1,031 high school seniors were selected at random from the participants in the testing program in November of 1959 to study the reliability for Form 1-A. The reliability of the composite score and each subscore was determined from this sample.

The reliability coefficients for Form 1-B were computed from a sample of 864 high school seniors drawn from the testing in February 1960.

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[16] E. F. Lindquist, ACT: Research Service to Individual Colleges (Chicago, 1961), p. 3.

The reliability coefficients of the subtests ranged from .83 to .88 for the two forms. However, the two composite coefficients were .94 for Form 1-A and .95 for Form 1-B; and each has a standard error of measurement of 1.1 standard score units. The two composite scores are of more interest to the author, because they are used to divide students into ability levels in this study.

Other statistics show the means to vary from 19.25 in mathematics on Form 1-B to 21.39 in natural science on Form 1-A, and standard deviations to vary from 4.57 in English on Form 1-B to 6.62 in mathematics on Form 1-A. Again, the composite scores are close with Form 1-A having a mean of 20.71 and a standard deviation of 4.70 and Form 1-A having a mean of 20.03 and a standard deviation of 4.66. (See Table XVI.)

The four test scores on the ACT battery are combined to make the composite score. Consequently, it is of value to know whether or not these are four independent tests which contribute their part to the composite score. If they do not, then it would be hard to justify a composite score for the four subscores. This can be analyzed by a correlation matrix by looking at the intercorrelations of the tests.

The ACT Technical Report shows the intercorrelations for English, mathematics, social studies, and natural science to range from .46 to .77 with an average correlation of 58.8. (See Table XVII.) This is high enough to show that each test contributes to the composite score but not so high to suspect

TABLE XVI

MEANS, STANDARD DEVIATIONS, RELIABILITY ESTIMATES, AND STANDARD ERROR OF MEASUREMENT FOR 1959-60 ACT TESTS[17]

	Mean	S.D.	O-E	SEM
Form 1-A (N = 1,031)				
1--English	19.38	4.67	.84	1.9
2--Mathematics	20.55	6.62	.85	2.6
3--Social Studies	21.07	5.46	.86	2.0
4--Natural Sciences	21.39	5.77	.84	2.3
Composite	20.71	4.70	.94	1.1

	Mean	S.D.	O-E rc	SEM
Form 1-B (N = 864)				
1--English	19.28	4.57	.88	1.6
2--Mathematics	19.25	6.48	.88	2.2
3--Social Studies	20.30	5.33	.85	2.1
4--Natural Sciences	20.83	5.95	.83	2.4
Composite	20.03	4.66	.95	1.1

each test of measuring the same thing or being equivalent tests. Correlations between each subtest and the composite score on Form 1-A and Form 1-B range from .75 to .89.[18]

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[17] ACT: Technical Report 1960-61 Edition (Chicago, 1960), pp. 16-17.

[18] Ibid.

TABLE XVII

INTERCORRELATIONS OF THE FOUR ACT SCORES[19]

Row 1: ACT Form 1-A (N = 1,031)

Row 2: ACT Form 1-B (N = 864)

Subscore	1	2	3	4
1--English	(.84)*	.46	.59	.54
	(.88)	.46	.61	.58
2--Mathematics	.46	(.85)	.56	.64
	.46	(.88)	.55	.60
3--Social Studies	.59	.56	(.86)	.77
	.61	.55	(.85)	.70
4--Natural Sciences	.54	.64	.77	(.84)
	.58	.60	.70	(.83)

*Subscore reliabilities are shown in parentheses.

Validity

The authors of the ACT tests take issue with the factorial and empirical approach to constructing tests of scholastic aptitude. They think that such tests identifying specific skills or traits bear no necessary relationship to college performance. The skills might, themselves, be meaningless or unimportant when all that is required of them is to correlate highly with grade point average. The ACT writers believe that what really matters in determining college success is not that the student has mastered a number of independent skills, but rather they think that college

[19]Ibid., p. 17.

success depends upon how well the student can combine these skills in an integrated attack upon complicated problems.[20]

The contents of the ACT tests were developed with the philosophy that the best way to predict college success was to measure as directly as possible the abilities the student will have occasion to employ in his college work. Thus, the tests measure few narrow skills but a large proportion of complex problem-solving exercises. Also, rather than being oriented around a factorial definition of intelligence, they are built around major areas of the college and high school instructional program.[21]

Content validity for the test battery is based upon the above rationale for the contents of the tests. That is, they are designed to measure the degree to which each student has developed the generalized skills and abilities to succeed in college.[22] It was felt that content validity was insured by the eleven authors who composed the item pool. They were chosen for their knowledge in test construction and depth in subject matter.

A study of 3,353 Purdue freshmen by Burns showed the ACT to be significant in predicting grade point average for the first semester of college work.[23]

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[20]Ibid., p. 6.

[21]Ibid.

[22]Ibid., p. 17.

[23]Richard L. Burns, "An Investigation of the Value of the American College Testing Program, the Scholastic Aptitude Tests and the Purdue Placement Test in Prediction of Academic Success of Purdue University Freshmen," (unpub. Ph.D. thesis, Purdue University, 1965), p. 215.

A study by the Chemistry Department at Oklahoma State University found the ACT to give a good indication of grades received by 590 students enrolled in freshman chemistry. Of those students who made A's, 61 per cent were above the 74th percentile, 26 per cent were between the 35th and 75th percentile, and 13 per cent were below the 36th percentile. Of those who failed, only 3 per cent were above the 74th percentile, 16 per cent were between the 35th and 75th percentile, and 81 per cent were below the 36th percentile.[24]

National Merit Scholarship Qualification Tests (NMSQT) forms and the ACT forms are constructed from common item pools, at comparable difficulty levels, and are presented in similar formats. Therefore, the NMSQT forms and the ACT forms are parallel and make NMSQT predictive studies of college success useful for estimating the predictive validity of the ACT battery.

For the six studies reported in the Technical Report for the ACT tests between NMSQT and college grade point average, the correlation coefficients ranged from .35 to .59. However, because of the longer length of time to compare data when using the NMSQT, it is estimated that these coefficients are smaller than would have been found using the ACT tests.[25]

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[24]Henry P. Johnston, "A Predictive Study of Chemistry Grades in Relation to ACT Scores," (unpub. paper, Oklahoma State University, 1961), mimeo.

[25]ACT: Technical Report. . ., pp. 17-20.

In a follow-up study of 3,441 seniors in Iowa using the ITED to predict college grades, correlation coefficients were found to range from .47 to .72 with a median of .62. These studies are also reported as evidence of predictive validity of the ACT tests, because the ACT forms are parallel to the ITED. The ITED has subtests and is longer; therefore, the authors of the ACT test feel that the above coefficients probably run higher than if the ACT test had been used for the studies.[26]

The SRA Reading Record

The Science Research Associates (SRA) Reading Record was designed in 1947 for grades 6 through 12 to diagnose students' strengths and weaknesses in reading skills. The student is tested not only on reading that he meets in school situations but reading situations that he comes in contact within his everyday life.

In his evaluation of the Reading Record in the Fourth Mental Measurements Yearbook, Turnbull thought it was probably of value in obtaining a general reading ability for a group but less valuable for an individual.[27]

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[26] Ibid., pp. 20-21.

[27] William W. Turnbull, Fourth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1953), p. 588.

When the Reading Record was originally designed, it gave a total score and a separate score for each of its ten subtests: (1) Reading rate (2) Comprehensive (3) Paragraph meaning (4) Directory reading (5) Map-Table-Graph (6) Advertisements (7) Index usage (8) Technical vocabulary (9) Sentence meaning (10) General vocabulary. Tiggs, in his comments in the Third Mental Measurements Yearbook on the Reading Record, says that these skills, as well as the superficial skills measured by the test, are all study-type reading skills needed by students.[28]

In 1958, the Reading Record was revised and the above ten subtests were analyzed with a correlation matrix. (See Table XVIII.) There is still a total score, however; the ten scores are combined and reported with four scores: (A) Reading Rate (B) Reading Comprehension (C) Everyday Reading Skills (D) Vocabulary.

The similarity of tests 8, 9, and 10 in the correlation matrix suggested that these three be combined into one score D. Because of their homogeneity, tests 4, 5, 6, and 7 were expressed as score C; test 3 was retained as a "check score"; and tests 2 and 1 were kept as individual scores for B and A respectively.

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[28]Francis O. Tiggs, Third Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1949), p. 533.

TABLE XVIII

CORRELATION ANALYSIS LEADING TO THE FOUR READING RECORD PART SCORES (AFTER BUSWELL[29])

(N = 310)

TESTS	1	2	3	4	5	6	7	8	9	10
1-Reading Rate	...	.31	.39	.23	.29	.29	.33	.38	.38	.31
2-Comprehension	.31	...	.44	.35	.39	.37	.41	.52	.50	.51
3-Paragraph Meaning	.39	.44	...	.37	.49	.44	.48	.57	.59	.56
4-Directory Reading	.23	.35	.37	...	.50	.52	.55	.47	.45	.35
5-Map-Table-Graph	.29	.39	.49	.50	...	.49	.55	.50	.46	.40
6-Advertisements	.29	.37	.44	.52	.49	...	.57	.51	.57	.44
7-Index Usage	.33	.41	.48	.55	.55	.57	...	.55	.53	.47
8-Technical Vocabulary	.38	.52	.57	.47	.50	.51	.55	...	.70	.69
9-Sentence Meaning	.38	.50	.59	.45	.46	.57	.53	.70	...	.67
10-General Vocabulary	.31	.51	.56	.35	.40	.44	.47	.69	.67	...

Part Scores	A	B	--	C	D

Norms

The 1947 norms were based on 3,500 students in 25 high schools and colleges throughout the United States. The number at each grade level was 500 to 600 students. The norms were reported on a percentile-in-grade method.

The 1958 norms were developed independently of the 1947 norms but came out very similar to the 1947 norms. They,

[29]Guy T. Buswell, Manual for the SRA Reading Record, 2nd ed. (Chicago, 1959), p. 10.

too, were expressed by a percentile-in-grade type of norm. To provide a common point-of-reference for comparing the Reading Record to other SRA test publications, the 1958 norms were developed by equi-percentile equating with the publisher's core tests.[30]

Reliability

The 1947 report of the Reading Record subtests reliabilities was highly questioned. It was believed that these short speed tests whose reliability coefficients were computed by the Spearman-Brown method were too high. However, reliability of the total score (the score used in this study to divide students into reading levels) was high enough that it could be used with confidence that it would not vary markedly on retests.[31] Before the revision in 1958, the ten separate subtests were still being questioned by experts. In 1953, Turnbull criticized the reliabilities of the ten separate subtests.[32]

New reliability studies were made in the 1958 revision using the four combined subtests rather than the ten subtests. Two methods, the Kuder-Richardson formula 21 and the Spearman-Brown, were used to estimate the reliability coefficients. This strengthened the confidence in the subtests'

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[30]Ibid., pp. 7-9.

[31]Tiggs, p. 532.

[32]Turnbull, p. 588.

reliabilities, because they were lengthened. Still, the main concern of this study was the confidence in the total score. Again the total score was good; the twelfth grade Reading Record's reliabilities were .92 by the Kuder-Richardson formula and .91 with the Spearman-Brown. (See Table XIX.)[33]

TABLE XIX

RELIABILITY OF THE READING RECORD SCORES
(AFTER BUSWELL[34])

Kuder-Richardson Formula 21 Reliabilities	Grade 6	Grade 9	Grade 12
A - Reading Rate	(D - R not applicable)		
B - Reading Comprehension	.61	.56	.52
C - Everyday Reading Skills	.85	.83	.87
D - Vocabulary	.80	.86	.86
Total Score	.91	.93	.92
	(N = 284)	(N = 285)	(N = 255)

Spearman-Brown Reliabilities	Grade 6	Grade 9	Grade 12
A - Reading Rate	.80	.73	.77
B - Reading Comprehension	.59	.59	.63
C - Everyday Reading Skills	.92	.82	.84
D - Vocabulary	.72	.84	.88
Total Score	.88	.90	.91
	(N = 331)	(N = 310)	(N = 314)

[33]Buswell, p. 11.

[34]Ibid.

The people responsible for the Reading Record were criticized in Buros' Third Mental Measurements Yearbook by Tiggs for stating in their Technical Report that the relationship between tests were moderately high but still not giving this information.[35] Again, in the Fourth Mental Measurements Yearbook it was stressed, by Turnbull, that without this information it was impossible to judge whether or not the subtests were independent.[36]

Not only is the intercorrelation matrix for the ten subtests given in the 1958 technical manual, but an intercorrelation matrix for the total and the four new combined subscores is also given. (See Table XX.)

Validity

The Reading Record's validity was questioned in 1947 by Tiggs for having homogeneous tests; she thought that some of them measured the same thing.[37] However, the test constructors say that the test is designed to measure a wide variety of reading skills; and these are sampled in both in-school and out-of-school reading experiences. Therefore, they think that content validity is inferred from the comprehensive scope of the ten subtests in reading skills; the test materials were selected as interesting and realistic as possible;

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[35]Tiggs, p. 533.

[36]Turnbull, p. 588.

[37]Tiggs, p. 533.

TABLE XX

INTERCORRELATIONS OF THE READING RECORD SCORES
(AFTER BUSWELL[38])

Row 1: Grade 6 (N = 284)

Row 2: Grade 9 (N = 285)

Row 3: Grade 12 (N = 255)

	A	B	C	D	Total
A - Reading Rate	...	.27	.42	.49	.49
	...	.30	.33	.39	.40
	...	.37	.47	.39	.48
B - Reading Comprehension	.27	...	.52	.53	.67
	.30	...	.47	.58	.66
	.37	...	.52	.56	.67
C - Everyday Reading Skills	.42	.52	...	.67	.92
	.33	.47	...	.66	.90
	.47	.52	...	.67	.91
D - Vocabulary	.49	.53	.67	...	.89
	.39	.58	.66	...	.91
	.39	.56	.67	...	.91
Total Score	.49	.67	.92	.89	...
	.40	.66	.90	.91	...
	.48	.67	.91	.91	...

test questions were developed to provide effective discriminators at each level and approximate average difficulty at the ninth grade level.[39]

When Turnbull wrote his evaluation in 1953, he did not think that enough statistical data was given concerning the

[38] Buswell, p. 12.

[39] Ibid., p. 10.

validity of the Reading Record.[40] Consequently, the 1958 revision provided more information. Correlations with outside criteria were made to provide evidence that the test had succeeded in providing a broad coverage of reading skills that are important in school situations. The twelfth grade test (the one used in this study) was found to correlate .81 with the SRA Tests of Educational Ability, .79 with the Kuhlman-Anderson Intelligence Test, .82 with the Iowa Tests of Educational Development, and .58 with teachers' grades.[41]

The STEP

The Sequential Tests of Educational Progress (STEP) were developed in a real "cooperative" enterprise, through the joint efforts of staff members in the Educational Testing Service (ETS), who are test construction specialists as well as subject matter specialists, and a committee of educators in the United States, who were recognized as competent in each subject matter area included in the tests.

After ETS had made tentative plans for the new achievement tests, each planning committee, recommended by national professional organizations, was chosen to compile a list of abilities and understandings which they felt were important in achieving the curriculum objectives in their subject matter area. Then the planning committee chose outstanding educators in each subject matter area to help write the tests.

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[40] Turnbull, p. 588.

[41] Buswell, pp. 12-14.

In the summer of 1955 the ETS specialists and educators were assembled in workshops at Princeton. Through committee and sub-committee work, the STEP grew out of this summer of coordinated work.

A manual for the interpreting scores describes the STEP as follows:

> The Sequential Tests of Education Progress (STEP) are a special kind of achievement-test series -- a series growing out of the demands of educators for instruments measuring the broad outcomes of general education, rather than the relatively narrow results of any specific subject-matter course. STEP focuses on skill in solving new problems on the basis of information learned, rather than on ability to handle only "lesson material."
>
> STEP provides for continuous measurement of skills over nearly all of the years of general education, so that the cumulative effects of instruction can be ascertained. Most important, the series was built on the assumption that the primary goal of the whole educational process is the development of the individual student. The tests are long enough and broad enough to provide data for sound individual interpretation.[42]

The test constructors built tests for seven areas, but only four are used in this study. They are writing, mathematics, social studies, and science. Evaluations are given for each separate test under its area title in the Fifth Mental Measurements Yearbook. Comments by these authors, about the four tests above, give a good insight into the tests and how testing specialists view them.

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[42] STEP: Manual for Interpreting Scores (Princeton, New Jersey), p. 5.

Writing

Concerning the writing tests, Davis says:

> Probably the most notable features of these tests is that they are available at four levels, with a single, continuous score scale. Regarded as a whole, they should provide, within the limitations of the individual forms, a valuable standardized instrument for measuring a pupil's growth over many years in the abilities tested. The tests should also be useful for evaluating classes, grades, and larger groups on the basis of the norms supplied. Although the tests might be improved both in general design and in specific content, the authors are to be commended for making progress in testing some of the important but hard-to-measure skills related to good writing.[43]

And Stalnaker believes:

> Taken singly, this test at least indicates how much a student knows about the skills of written composition, even though it leaves open the question of whether or not he can apply them in practice; and it directs the attention of student and teacher alike to the importance of details.[44]

Mathematics

In summarizing the mathematics tests, Fifer writes:

> The STEP mathematics tests represent a significant addition to modern educational evaluation. At all levels the tests measure mathematical competence comprehensively and functionally, if somewhat too verbosely. Persons interested in measuring achievement in particular units or courses will have to rely on traditional measures, but the educator concerned with general mathematical facility in

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[43] Charlotte Croon Davis, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 361.

[44] John M. Stalnaker, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 363.

realistic and significant situations will welcome this series.[45]

And in summary, Lamke concludes:

> These are probably the best available published tests of competence in the mathematics of general mathematics of general education. The user should nevertheless assure himself that the testmakers' concept of general education coincides with his own. The format is attractive. The technical work, while frequently good, leaves the following shortcomings to be corrected: (a) Reliability for Form B and alternate forms reliability for Forms A and B are not given. (b) The norms groups are insufficiently described, with the result that a sounder, more detailed argument is needed to prove that the norms groups are representative of the general population. (c) No evidence is given for certain implied or suggested uses of test scores. (d) The test is too difficult for most fourth graders.[46]

Social Studies

Gross expresses his opinion of social studies tests by writing:

> The reviewer feels strongly that many of the social science competencies necessary to do well on these tests are being neglected in too many schools across the country. In his opinion, if tests like these are used often enough in such situations, they may serve a significant purpose in upgrading instruction and promoting needed alterations in curricular emphasis. Therefore, in addition to their valuable evaluation role, these tests promise to make a real contribution towards improved and more functional social studies programs.[47]

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[45] Gordon Fifer, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 572.

[46] Tom A. Lamke, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 574.

[47] Richard E. Gross, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), pp. 845-846.

And Tyler comments further:

> This reviewer has long urged the construction of tests which are built to appraise directly the students' attainment of objectives actually sought by good teachers and the more extended use of such tests to take the place of tests which are based only on an analysis of common content of textbooks and courses of study. This is necessary both to obtain a valid measure of student achievement and also to focus the attention of students and teachers upon the important educational aims rather than upon memorization of course content. Tests exert a powerful influence on teaching and learning. Slowly testmakers are moving in this direction. The STEP tests are a fine contribution to this essential improvement in education.[48]

Science

For his conclusion for the evaluation of the science tests, Johnson states:

> Certainly the emphasis upon testing problem solving ability and the continuity of measurement of this important outcome over long periods is to be highly commended. The tests should be especially useful as instruments in developing integrated, graduated, and well articulated programs of science particularly designed for general educational purposes. As they are used, evidence resulting from carefully controlled study should reduce to secondary importance reliance on the judgement of the teachers who constructed them and on statistics based on fragmentary data whose representativeness has still to be established. The STEP tests go hand in hand with the kind of curricular organization which should increase the efficiency of learning experiences.[49]

And Stanley says:

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[48] Ralph W. Tyler, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 848.

[49] Palmer O. Johnson, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 803.

> Overall, the STEP science tests meet excellently the need for a well planned, coordinated survey series stressing application of common curricular material to familiar situations. By being more a la carte than most batteries, STEP provides virtually everyone, from the least technically informed classroom teacher to the most statistically oriented measurement specialist, with instruments he can use and understand.[50]

Although there are eight forms of the STEP battery, the discussion concerning norms, reliabilities, and validities will be more concerned with Form 1-A and Form 1-B. These are designed for the freshman and sophomore levels in college; consequently, they are used for this study.

Norms

Two freshmen and two sophomores were selected at random from each of 120 colleges to take the tests for each area of the STEP battery. By classifying the United States by regions and the colleges by types, a stratified type of sampling was possible.[51]

Form 1-B for writing was found to have several ambiguous items after the norms were completed. However, Writing 1-B was edited and equated and then published early in 1958. To horizontally equate Forms 1-A and 1-B, they were given to students in four secondary schools and two colleges. To control for practice effect, one half of the students were

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[50] Julian C. Stanley, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 804.

[51] Sequential Tests of Educational Progress: Technical Report (Princeton, New Jersey), pp. 19-24.

chosen at random and given the tests in order; that is, 1-A was given first and 1-B second. The other one half was given the forms in reverse order.[52]

Standard scores were used to equate raw scores for each grade level, and then percentile norms were computed from the standard scores. The standard error was used to compute a percentile band to interpret individual scores. This is useful for comparing students' scores in the same or different areas or to analyze a student's growth in a subject area.

In general, the expert opinion of this type of scoring and the method for comparing the scores with their norm group is favorable. Most of the evaluators of STEP in the Fifth Mental Measurements Yearbook think ETS did a satisfactory job of norming the STEP battery. Fifer thinks that the standardization approaches the highest standards of educational measurement and that the norms provided are comprehensive, representative, and usable.[53] Another evaluator, Rayner, believes that the method of norming is good because when only two students are selected at random from 120 colleges that are stratified by region and type such as the ETS did, then a norm is more reliable than if more students had been chosen from a few colleges. According to Rayner, using improved sampling techniques are among the

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[52]Richard S. Levine, et al., SCAT-STEP Supplement 1958 (Princeton, New Jersey, 1958), p. 23.

[53]Fifer, p. 572.

commendable features of the STEP norms. He names two other important features of the norms; one, using the standard errors in the interpretation of scores; and two, the attempt to convert scores on all tests to a common scale.[54]

Reliability

The reliability coefficients for the STEP tests were estimated by the Kuder-Richardson Formula 20. They are estimates of internal consistency because they were results of internal analyses based on a single administration.[55]

Test specialists appear to be more concerned about the reliability coefficients of .74, .83, .87, and .80 for writing, mathematics, social studies, and science, respectively, than other statistical characteristics of the tests. (See Table XXI.) Some feel that these are too low. However, the length of the tests and the fact that they are basically power tests rather than speed tests are in the STEP tests' favor for estimating reliability with the Kuder-Richardson formula 20. Some allowance might be made for the low reliability on Writing Form 1-A. The low standard deviation suggests that this might be a homogeneous group which tends to lower test reliability.

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[54]S. A. Rayner, Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (New Brunswick, New Jersey, 1959), p. 846.

[55]STEP: Technical Report, p. 9.

TABLE XXI

ESTIMATED RELIABILITIES AND STANDARD ERRORS OF MEASUREMENT FOR SIX STEP TESTS[56]

Test	Number of Items	Total Group			100-Case Sample		
		N	Mean*	S.D.*	Mean*	Reliability	SE* Meas.
Reading							
Form 1-A, Grade 13	70	106	46.45	11.54	46.25	.91	3.42
Writing							
Form 1-A, Grade 13	60	98	35.47	6.78	35.05	.74	3.43
Listening							
Form 1-A, Grade 13	72	101	45.68	11.34	45.39	.90	3.62
Science							
Form 1-A, Grade 13	60	99	28.67	7.96	28.70	.80	3.52
Mathematics							
Form 1-A, Grade 13	50	102	21.45	7.59	21.25	.83	3.15
Social Studies							
Form 1-A, Grade 13	70	98	36.11	10.30	35.90	.87	3.74

*In raw-score units.

The STEP constructors established the reliabilities of the B forms by equating them to the A forms. They maintain that the results of the A forms should characterize the B forms reasonably well. Their justification is that the two forms are very similar in content.[57] However, this brought criticisms from some of the people who evaluated the tests.

[56] Ibid., p. 10.

[57] Ibid.

Validity

Since the STEP tests are basically tests of school achievement, content validity is of prime importance. The Educational Testing Service people feel that this can be accomplished best by relying on well-qualified persons as consultants in constucting the tests.[58] Some authorities do not agree with this, but many concur with this assumption. Lamke writes of the mathematics tests:

> It is usually difficult to obtain agreement on the kinds of specifics to be examined when devising tests for a general education program. The publisher attempted this by unusually extensive committee work and critical reviews. Very likely the objectives tested are those supported by a majority of authorities in the field at this time. Very likely, too, some authorities will disagree with the approach, exemplified by the test questions. In general, the questions seem to this reviewer to test concepts generally associated with mathematics.[59]

The 1962 SCAT-STEP Supplement reported one study using the STEP as a predictive instrument for college students. It was found, for 619 college freshmen, that scores on the STEP for mathematics, social studies, and science correlated .36, .49, and .38, respectively, with first-term grades.[60]

Use of Tests

This section is used to state briefly the peculiar values of each test for measuring the variables in this study.

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[58] Ibid.

[59] Lamke, p. 573.

[60] William H. Angoff, et al., SCAT-STEP Supplement 1962 (Princeton, New Jersey, 1962), p. 31.

ACT

Although the ACT is primarily a test of developed abilities which technically places it in an achievement test classification, it was constructed for the purpose of predicting college success, which casts it in the role of a college academic aptitude test. This study uses the ACT composite score to divide students into high and low levels of academic ability to determine the relationship between college academic aptitude and general education development. Students in the sample who scored nineteen or above are classified as having high academic aptitude, while those who scored eighteen and below are classified as having low academic aptitude.

SRA Reading Record

The SRA Reading Record was designed to assess the reading skills believed to be important for students in their everyday needs as well as in classroom situations. The SRA total score is used in this study to divide students into high and low levels of reading skills to determine the relationship between the level of reading skills and general education development. Those students in the sample scoring 103 and above are classified as being high in reading skills, while those scoring 102 and below are classified as being low in reading skills.

STEP

The STEP is an achievement test battery of general

education. It is used in this study to measure the sample's change in level of general education development in four areas over a two-year period of time.

Summary

There is a need for educators to become familiar with and to understand technical information concerning test data. This is especially true for those involved in educational measurements for educational research projects, either as a researcher or as a person who utilizes research information in his profession.

Research problems that require the use of objective tests as measuring instruments should include a report of this technical information for their justification in the study. This information generally consists of a description of the tests, score interpretations, normative data, and statistical information about the tests' reliability and validity.

Norms are used to statistically interpret individual or group scores in terms of some standardized criteria groups. Test reliability is a mathematical expression that quantifies the amount of faith a researcher can place in a test to give stable measures of his variable. The validity of a test expresses mathematically or empirically the relationship between what a test measures and some criterion for what it is designed to measure.

The ACT tests are designed to measure a student's ability to do college work. Its norms are based upon a large

representative sample of high school students. Reliability coefficients of .94 and .95 for its composite scores are impressive. Most of the ACT test's validity is based upon its contents and is contributed to the experience and knowledge of its constructors.

The SRA Reading Record is designed to measure a student's reading skills that are used both in and out of classroom situations. Its norms, based on 3,500 high school students from 25 representative high schools, appear satisfactory. Experts in Buros's Mental Measurements Yearbooks were critical of reliability coefficients for the subtests; however, the reliability coefficients of .91 and .92 for the total score was adequate for this study. Since the test is basically an achievement test, more concern is stressed for content validity than for other types of validity.

The STEP is a cooperative enterprise between educators and test specialists in developing an achievement test. It is used in this study to assess general education development and is thought by most experts in the Fifth Mental Measurements Yearbook to be a good test for this purpose. It would have been desirable for the four tests used in this study to have had larger reliability coefficients. The method of using two students from each freshman and sophomore class of 120 colleges, as a random sample, to establish norms is very satisfactory. Background of the constructors in subject matter and test construction helped to insure content validity.

CHAPTER IV

METHODOLOGY AND DESIGN

The purpose of this chapter is to describe the statistical methods and experimental designs used in the study. They will be discussed under six topics: a description of the study's population and sample, a discussion of the controls and variables used in the study, an explanation of the methods used for measuring the subjects in the sample, the definitions used in the study, how the data for the study was collected and processed, and the statistical designs used for testing the hypotheses of the study.

Population and Sample

The population consists of those students who enrolled in the College of Education at Oklahoma State University and, who two years later, made application for professional work in the teacher education program. It is assumed in this study that a college population is normally distributed and that the class of 1960 is a good representation of all classes enrolled in the College of Education. These two assumptions are basic to the statistical treatments being used in parts of the study.

The group of students in the College of Education who took Form 1-B of the STEP battery in the 1960 school year as beginning freshmen and who, also, took Form 1-A of the STEP battery in the Spring of 1962 to complete their application for upper division work compose the sample. This group has a number (n) of eighty four, and it represents approximately one third of the total group of 239 students in the College of Education making application for teacher education in the Spring semester of 1962.

Controls and Variables

If a group of individuals similar to those in the sample who were not instructed in a general program could have been measured for a change in general education development over the same period of time, then interpretations of the results would have been more meaningful. This would allow the investigator to quantify the amount of change due to the general program and the amount of change that could be contributed to other factors.

As much as a control group was desired, it was considered impractical for this problem. Since the subjects could not have been involved in any type of formal general education program, the control group would have had to come from a population outside of an institution of higher education. Therefore, after considering the problems involved in using a control group such as matching a group to the sample, pre-testing and post-testing the control group, keeping in contact

with the control group, and controlling variables such as a person's motive to do well on the STEP to reach his educational objective, it was decided not to use a control group.

The levels of achievement in the four areas of general education (writing, mathematics, social studies, and science) were used in parts of the study as dependent variables. These dependent variables were measured with the STEP, which is an achievement test in general education. The STEP was given as a pre-test in each of the four areas to determine the student's level of achievement and given again as a post-test to determine the change in level of achievement over a two-year period of time. The difference between the pre-test and post-test for each member in the sample was found in each area of general education. The mean difference for each area of general education was used for determining a significant change in the level of general education development.

The levels of achievement in the four areas of general education are dependent variables in the sense that they were measured for a change, after other variables were manipulated, to determine a relationship between level of achievement in general education and the other variables of the study.

The four areas of general education are independent variables. An assessment of the level of general education was made before and after the sample had participated in a general education program. The difference in the pre-test and post-test scores was computed for each member of the sample and a mean difference was used to determine whether

or not a significant change had developed in the four areas of general education.

Field of education is an independent variable that was used in the study to compare the change in level of general education development for secondary teacher education candidates with that of elementary teacher education candidates. This was done to see if the level of general education development varied as the program for different fields of teacher education varied. The difference between the pre-test and post-test was computed for each member in the sample and the mean difference found for both elementary and secondary teacher education candidates. These mean differences were tests for a significant difference in the level of general education development.

Academic ability was used in the study as an independent variable to determine the relationship between level of academic ability and level of general education development or to see if level of general education varied as level of academic ability varied. The difference between the pre-test and post-test was computed for each member in the sample, and a mean difference was found for teacher education candidates with high academic ability and those with low academic ability. These mean differences were tested for a significant difference in the level of general education development.

Reading skill was used in the study as an independent variable to determine the relationship between skill in reading and the level of general education development or

to see if level of general education varied as students' reading skill varied. The difference between the pre-test and the post-test was computed for each member in the sample, and a mean difference was found for teacher education candidates with high skill in reading and those with low skill in reading. These mean differences were tested for a significant difference in the level of general education development.

High school grade point average is an independent variable that was used in the study to check for a relationship between it and other independent and dependent variables in the study. A high school grade point average was computed for each member in the sample and correlated with the other variables to determine this relationship.

College grade point average is an independent variable that was used in the study to check for relationship between it and other independent and dependent variables in the study. A college grade point average was computed for each member in the sample and correlated with the other variables to determine this relationship.

Area of general education is an independent variable that was used in the study to determine the relationship between level of achievement and area of general education. This was done to see if level of general education development varies as the area of general education (writing, mathematics, social studies, and science) varies. The difference between the pre-test and post-test was computed for each member in the sample, and mean differences were

tested for a significant difference in the level of general education development.

Intervening variables are those variables in the study that cannot be measured; and therefore, they can only be inferred. Some of the intervening variables are: (1) Motivation - the desire to do well on the STEP. (2) Individual Study - how much a person improves himself in general education through individual study. (3) Environment - peer groups, family, type of part-time work that influences a person's level of general education.

Measuring the Sample

Teacher education candidates were divided into two groups -- elementary and secondary. They were placed into these two groups according to their plan of study; that is, by the level of education in which they indicated they were preparing to teach.

The students used in the sample were measured by the ACT tests, described in Chapter III, and divided into levels of ability. This test was considered to be a suitable criterion for determining a student's potential for doing college work. The standard score of nineteen and above was used to classify students as having high ability, and a standard score of eighteen and below classified students as having low ability for doing college work.

The SRA Reading Record, described in Chapter III, was used to divide the sample into two groups. One of these

groups was students having a high level in reading skills, and the other group was students having a low level in reading skills. Total scores of 103 and above were used to classify students as being high in reading skills and total scores of 102 and below classified students as being low in reading skills.

Growth in general education was measured by the STEP, which was described in Chapter III. A pre-test using the STEP Form 1-B was given; and after a two-year period of time, the STEP alternate Form 1-A was given as a post-test. The difference between these two tests was a measure of change in general education, which could be in a positive or negative direction. Raw scores were expressed as converted scores for both Form 1-A and Form 1-B before comparing them for growth in general education.

Total high school grade point averages were used in classifying students according to success in high school grades. Total grade point averages were computed by using only the grades received in four areas of general education; these were English, mathematics, social studies, and science. Weights of four for each A, three for each B, two for each C, one for each D, and zero for each F were assigned to each grade received in high school for the above subjects. The weights were totaled for these subjects and divided by the total number of subjects to get the grade point average.

A total grade point average for the freshman and sophomore college years was used as a criterion of success

in college work in terms of grades. These were computed by multiplying the number of hours in a course by the weight of a letter grade (the same weights used to compute high school grade point average were used to compute college grade point average). The products were added and their sum divided by the total number of hours completed in course work. The resulting quotient was the grade point average.

Definitions

The purpose of this section is to define the terms used in the study and to clarify their relationship to the problem.

Field of education is the level of education for which a student is preparing to teach. For this study, it consisted of students preparing for elementary or secondary teaching certificates. The students used in the sample were enrolled in the College of Education in the Fall semester of 1960 and chose their field of concentration between then and the Spring semester of 1962.

The ability level of a student in this study is an indication of his capabilities, potentials, or aptitudes for doing college work. Two levels, high and low, were used for studying the relationship between academic ability and the development of students in general education.

Reading level, as used here, is an indication of a person's skills in reading that are considered essential for classroom work as well as less demanding skills used outside the classroom. Two levels, high and low, were used to

study the relationship between skill in reading and growth in general education.

Area of general education designates any one of the four areas of general education used in this study. They are writing, mathematics, social studies, and science. The four areas are not comprehensive enough to encompass all aspects of general education; however, they are the only ones used in the study.

Growth in general education is the change in general education that occurs over a two-year period of college enrollment (freshman and sophomore years). This value could be in either a positive or negative direction. It is assumed in this study that this change can be assessed by measuring achievement in general education periodically.

Grade point average takes its common meaning in this study, a ratio between amount of work completed and total grade points received. High school grade point average was found by dividing the total number of grade points by the total number of courses taken in high school. College grade point average was found by dividing the number of grade points received during the freshman and sophomore years in college by the number of college hours carried.

Collecting and Processing the Data

This section is used to give a description of how the data were gathered and the methods used for processing them.

The field of education that a student is considering can fluctuate over a two-year period of time; thus, this study uses the field of education that a teacher education candidate indicates as his choice on his application for upper division work. This should give a more realistic picture of his background work because he bases his choice of teaching fields upon his prior work. The data were acquired in the office of the Director of Teacher Education at Oklahoma State University.

Data for grouping students into ability levels were collected from the administration of the 1959-60 school year ACT tests. These composite scores were taken from the students' records in the office of Counseling Services at Oklahoma State University.

The SRA Reading Record was administered during the 1960 Summer Orientation Clinics at Oklahoma State University. Again, this data was made available at the Counseling Services office. The total scores from this test were used for data to group students into different levels of reading skills.

To acquire data for determining growth in general education, the STEP Form 1-B was given in the areas of writing, mathematics, social studies, and science in the Fall of 1960 to freshmen enrolled in the College of Education. These tests were administered again in the Spring of 1962, using the alternate Form 1-A, to all applicants for upper division work in teacher education. The scores of students who remained in school for two years and who had taken both tests

were used as data to measure growth in general education. These data were made available through the cooperation of the Student Personnel office in the College of Education and the Bureau of Tests and Measurements at Oklahoma State University.

Transcripts in the Office of the Registrar were used to compute high school grade averages, and data computed by the electronic data processing machines and distributed by the Registrar were used for the college grade point average for the first two years of college.

Three different statistical designs were used to test the hypotheses of the study. The t-test was used where mean differences were tested for a significant difference. The analysis of variance was used to analyze the variances of groups in relation to each other and to test for interaction between different variables. Where variables were tested for a significant relationship between them, the Pearson product-moment correlation coefficient was used.

Data that required a t-test or the analysis of variance were computed with a desk calculator, and data which required a correlation coefficient were punched on data cards and processed in the Computing Center at Oklahoma State University.

Testing the Hypotheses

The purpose of this section is to describe the statistical designs used in testing the seventy-eight hypotheses of the study. In order to avoid a lengthy discussion which could

become boring to the reader, similar hypotheses were grouped and discussed under a common heading. Where treatment of data is the same, grouping these hypotheses helps to simplify the discussion. Those which were tested with the t-test are discussed under one heading, those analyzed by the analysis of variance are discussed under another heading, and those tested by a correlation coefficient are discussed under a third heading.

Hypotheses IA1 Through IJ

Hypothesis IA1 through hypothesis IJ were tested by the t-test for a significant difference between group means. To simplify the discussion, these twenty-two hypotheses were subdivided again.

Hypotheses IA1 Through IC4. The twelve hypotheses IA1 through IC4 were tested to determine whether or not there had been a significant change in the level of general education over a two-year period of time for teacher education candidates in the College of Education. Each of the four areas of general education were tested for elementary teacher education candidates, secondary teacher education candidates, and again for the total of these two groups. The group mean for each area of the STEP pre-test was tested against the group mean of the post-test in the same area.

Hypotheses ID1 Through ID4. The four hypotheses ID1 through ID4 were tested to see if there was a significant difference between elementary teacher education candidates'

and secondary teacher education candidates' growth in the four areas of general education. The group mean difference between the pre-test and post-test for elementary teacher education candidates was tested against the group mean difference of secondary teacher education candidates.

Hypotheses IE Through IJ. The six hypotheses IE through IJ were tested to determine whether or not the change in one area of general education was significantly higher than the change in any other area. The group mean difference between the pre-test and post-test in each area of general education was tested with the t-test against the other areas of general education.

Hypotheses IK1 Through IS4

The analysis of variance was used to test hypotheses IK1 through IS4. These were predictive statements about college academic aptitude and reading skills and their relationships to college success. The division of these thirty-six hypotheses into subgroups simplified the discussion of them.

Hypotheses IK1 Through IK4. The relationship between academic ability and change in level of general education development was tested in the four hypotheses IK1 through IK4. The members of the sample were grouped according to ability and tested with an F-ratio to see if the variance between the groups was significantly greater than the variance within the groups for each of the four areas of general education.

Hypotheses IL1 Through IL4. The relationship between reading skills and change in level of general education development was tested in the four hypotheses IL1 through IL4. The members of the sample were grouped according to skill in reading and tested with an F-ratio to see if the variance between the groups was significantly greater than the variance within the groups for each of the four areas of general education.

Hypotheses IM1 Through IR4. The twenty-four hypotheses IM1 through IR4 were tested to determine whether or not both academic ability and reading skills, considered at the same time, were related to change in level of general education development. The members of the sample were grouped into six groups which were made up of different combinations of high and low academic ability and reading skills. These six groups were tested by an F-ratio to see if the variance between the groups was significantly greater than the variance within the groups for each of the four areas of general education.

Hypotheses IS1 Through IS4. Four hypotheses, IS1 through IS4, were tested to see if college academic aptitude and level of reading skills interact in their relationship with change in level of general education development. The six groups formed by combinations of academic ability and reading skills were tested by an F-ratio to see if the variance contributed by the interaction of academic ability

and reading skills was significantly greater than the variance within the groups.

Hypotheses IIA Through VF

The last twenty hypotheses IIA through VF were tested by constructing an intercorrelation matrix using the Pearson product-moment method for computing correlation coefficients. From the matrix, correlation coefficients can be examined to test for a significant relationship between any two of the variables used in the problem. Subgrouping was used again to simplify discussion of the hypotheses.

Hypotheses IIA Through IIF. The purpose of testing the six hypotheses IIA through IIF was to see if the members of the sample tended to keep the same rank in the areas of writing, mathematics, social studies, and science when their general education development was considered in these areas. The tests were made by computing a correlation coefficient between each of the six possible combinations of the four areas of general education and checking the obtained r's for significance.

Hypotheses IIIA Through IIID. Four hypotheses IIIA through IIID were tested to determine the relationship between high school grade point average and change in the level of general education development. The tests were made by computing a correlation coefficient between the sample's growth in general education and their grade point average in high school. The obtained r's were checked for

significance. This was done in each of the four areas of general education.

Hypotheses IVA Through IVD. Four hypotheses, IVA through IVD, were tested to determine the relationship between college grade point average and change in the level of general education development. The tests were made by computing a correlation coefficient between the sample's growth in general education and their grade point average in college. The obtained r's were checked for significance. This was done in each of the four areas of general education.

Hypotheses VA Through VF. The last six hypotheses, VA through VF, were tested to determine whether or not a relationship existed between high school grade point average, college grade point average, the ACT composite score, and the SRA Reading Record total score. A correlation coefficient was computed for each combination of these six variables. To test for a significant relationship between any two variables in the group, the obtained r's were checked for significance.

Summary

The population and sample of the study are both confined within the College of Education at Oklahoma State University.

Although a control group was desired, one was not used in the study because of the problems encountered in using a sample drawn from individuals not in an institution of higher education; such as group matching, pre-testing and post-testing,

and controlling different variables. Variables in the study consist of three types -- dependent (such as level of achievement in general education), independent (such as academic ability), and intervening (such as motivation).

Members of the sample were measured and classified for growth in general education by the STEP battery, for academic ability by the ACT, for reading skills by the SRA Reading Record, for high school work by high school grade point average, and for college work by college grade point average.

Terms used in the study were defined to clarify their meanings, and notations were made to simplify discussions in analyzing the results of the study.

The Registrar's Office, the Student Personnel Office in the College of Education, the Counseling Service, and the Bureau of Tests and Measurements were used in collecting the data. The processing of the data was done with a desk calculator and the electronic data processing equipment in the Computing Center of Oklahoma State University.

Three types of statistical designs were used in testing the hypotheses of the study -- the t-test, F-ratio, and the Pearson product-moment correlation coefficient. Because of the large number of hypotheses, they were discussed in groups that were tested with the same statistical design. These groups were broken into smaller subgroups to simplify this discussion.

CHAPTER V

DESCRIPTION OF THE DATA AND ANALYSIS OF RESULTS

The purpose of this chapter is to present the data derived in the study and to analyze the results through statistical interpretation. Each of the hypotheses and the data related to it will be discussed under an appropriate section. Data for determining the change in the general education development of both elementary and secondary teacher education candidates will be summarized into tables and examined. Similarly, data concerned with the comparison of students preparing to be elementary teachers to those preparing to be secondary teachers will be presented. A discussion of relative growth in the four areas of general education will be undertaken and a table presented to summarize the results. Four analysis of variance (AOV) tables will be shown for demonstrating the relationship of academic ability and reading skills to level of general education development. Growth in writing, mathematics, social studies, and science, high school grade point average, college grade point average, ACT composite score, and SRA Reading Record total score will be intercorrelated and formed into a correlation matrix for analysis.

Change in Four Areas of General Education

The purpose of this section is to analyze the data for both elementary and secondary teacher education candidates to determine whether or not a significant change in writing, mathematics, social studies, and science has taken place. The results of these findings are summarized in Table XXII.

TABLE XXII

CHANGE IN LEVEL OF GENERAL EDUCATION DEVELOPMENT IN WRITING, MATHEMATICS, SOCIAL STUDIES, AND SCIENCE

	Mean of Pre-test	Mean of Post-test	Mean Difference	Std. Error Mean Diff.	t-ratio
Writing					
Elementary	301.77	306.58	4.81	1.82	2.64**
Secondary	301.73	308.28	6.55	1.74	3.76**
Total	301.75	307.23	5.48	1.28	4.28**
Mathematics					
Elementary	281.30	286.40	5.10	1.60	3.18**
Secondary	286.09	292.82	6.73	2.36	2.85**
Total	283.06	288.75	5.69	1.32	4.31**
Social Studies					
Elementary	290.15	297.15	7.00	1.06	6.60**
Secondary	295.60	301.78	6.18	1.78	3.48**
Total	292.27	298.95	6.68	.94	7.10**
Science					
Elementary	283.62	287.17	3.55	1.34	2.65**
Secondary	287.58	290.76	3.18	2.14	1.49
Total	285.15	288.56	3.41	1.14	2.99**

(N = 85)

*Significant at the .05 level.
**Significant at the .01 level.

The difference between the group means for the pre-test and the post-test of the STEP battery were tested for a significant difference. This was done for both elementary and secondary separate and for the total of these two. The t-test was employed to determine the significant difference at the .05 and .01 level of significance. The results of these findings allows an evaluation of the first twelve hypotheses, IA1 through IC4.

The t-ratios for elementary teacher education candidates ranged from 2.64 in writing to 6.60 in social studies. All of these tests were significant at the .01 level significance.

Hypotheses IA1 through IA4 which predicted no significant change for elementary teacher education candidates in areas of writing, mathematics, social studies, and science were rejected.

Secondary teacher education candidates ranged from 1.49 in science to 3.76 in writing when their t-ratios were computed. With the exception of science, all of these t-ratios were significant at the .01 level of significance. The t-ratio for science was not significant.

Hypotheses IB1, IB2, and IB3, which predicted no significant change in the areas of writing, mathematics, and social studies respectively for secondary teacher education candidates, were rejected. The findings failed to support the rejection of Hypotheses IB4, which predicted no significant change in the area of science.

The t-ratios for the total group of teacher education candidates ranged from 2.99 in science to 7.10 in social

studies. Each of the t-ratios were significant at the .01 level of significance.

The predictions that there would be no significant change for the total of elementary and secondary teacher education candidates in the level of writing, mathematics, social studies, and science by the hypotheses IC1, IC2, IC3, and IC4 respectively were rejected.

The standard error of the mean differences ranged from .94 for the total group in social studies to 2.36 for secondary group in mathematics. This suggests that although all groups (except secondary education candidates in science) made significant progress in the four areas of general education, the groups varied within themselves quite differently in relation to change.

These twleve hypotheses were tested to determine whether or not there had been a significant change in the level of general education over a two-year period of time for teacher education candidates in the College of Education. The group mean for each area of the STEP pre-test was tested against the group mean of the post-test in the same area. With the exception of science, students in the College of Education made a significant change in the level of general education development during their freshman and sophomore years.

Comparison of Elementary and Secondary in GED

It is intended in this section to present the data comparing elementary teacher education candidates and secondary

teacher education candidates in terms of change in the four areas of general education -- writing, mathematics, social studies, and science.

The group mean differences were compared by a t-ratio to test for a significant difference between elementary and secondary at the .05 and .01 levels of significance. Hypotheses ID1 through ID4 were tested from these findings, and Table XXIII was constructed to simplify the discussion of the results.

TABLE XXIII

DIFFERENCES IN GROWTH IN FOUR AREAS OF GENERAL EDUCATION OF ELEMENTARY AND SECONDARY TEACHER EDUCATION CANDIDATES

	Mean of Elementary	Mean of Secondary	Mean Difference	Std. Error Mean Difference	t-ratio
Writing	4.81	6.55	1.74	2.49	.70
Mathematics	5.10	6.73	1.63	2.80	.58
Social Studies	7.00	6.18	.82	2.05	.40
Science	3.55	3.18	.37	2.53	.15

(N = 85)

The t-ratio between secondary and elementary writing was .70; between secondary and elementary mathematics, .58; between secondary and elementary social studies, .40; and between secondary and elementary science it was .15. All of the above figures failed to be significant.

The four hypotheses ID1 through ID4, which predicted no difference between secondary teacher education candidates' and elementary teacher education candidates' growth in the four areas of general education, were not rejected. Thus, the change in the level of general education development of students enrolled in secondary education is not significantly different from those enrolled in elementary education.

Comparison of Four Areas in General Education

As hypotheses were stated concerning the amount of change made in one area of general education as compared to another area of general education, this section proposes to make some general statements about the data as related to this subject. However, it must be kept in mind that comparing changes in different areas of general education is not completely acceptable, and that a similar raw or standard score change in one area does not necessarily represent the same amount of change in another area. Comparisons should be viewed here as a mathematical relationship of how one area of general education changed in relationship to itself as compared to how another area of general education changed in relationship to itself.

Each of the four areas of general education was tested to see if any one area made a growth that was significantly greater than any other area over a two-year period of time. As there were four areas of general education, this made a combination of four things taken two at a time or six combinations to be tested. The group mean differences between

the pre-test and post-test in each area of general education were tested with the t-test against the other area of general education and the results summarized in Table XXIV.

TABLE XXIV

DIFFERENCES IN GROWTH BETWEEN WRITING, MATHEMATICS SOCIAL STUDIES, AND SCIENCE

	Mean 1	Mean 2	Mean Differ-ence	Std. Error Mean Difference	t-ratio
Writing (1) & Mathematics (2)	5.48	5.69	.21	1.85	.11
Writing (1) & Social Studies (2)	5.48	6.68	1.20	1.59	.75
Writing (1) & Science (2)	5.48	3.41	2.07	1.72	1.20
Mathematics (1) & Social Studies (2)	5.69	6.68	.99	1.62	.61
Mathematics (1) & Science (2)	5.69	3.41	2.28	1.75	1.30
Social Studies (1) & Science (2)	6.68	3.41	3.27	1.48	2.20*

(N = 85)

*Significant at the .05 level.

The t-ratios of .11 between writing and mathematics, 0.75 between writing and social studies, 1.20 between writing and science, .61 between mathematics and social studies, and 1.30 between mathematics and science were not significant. However, the t-ratio between social studies and science was 2.20 which indicated that they differed significantly at the .05 level of significance.

The six hypotheses IE through IJ predicted that growth in the areas of general education (writing, mathematics, social studies, and science) would not significantly exceed each other. These hypotheses were not rejected. The one exception was the difference between social studies and science, or hypothesis IJ, which indicated a significant difference at the .05 level of significance. Of the two, social studies had the larger mean difference.

Academic Aptitude and Reading Skills: Relationship to GED

The purpose of this section is to present and analyze the data pertaining to academic ability and reading level of teacher education candidates in the College of Education and the relationship of these measures to change or growth in general education development. Also, the thirty-six hypotheses concerned with these variables are tested.

Each of the four areas of general education -- writing, mathematics, social studies, and science -- was evaluated by using a 2 by 2 factorial analysis of the variance statistical design. The independent variables were ability to do college work as measured by the ACT composite score and reading level as measured by the SRA Reading Record total score. The dependent variable was achievement in each area of general education as measured by the STEP. Variance among the group means were tested for significance at the .05 and the .01 points of significance. Tests were also made for interaction between academic ability and reading level to determine their

relationship to level of general education development. This was done to determine whether or not they work independently or interact in their influence on change in general education.

TABLE XXV

ANALYSIS OF VARIANCE FOR COLLEGE ACADEMIC ABILITY AND READING SKILLS IN RELATION TO ACHIEVEMENT LEVEL IN WRITING

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F-ratio
Total Between	673.86	3	224.62	1.64
Between Ability	7.77	1	7.77	.06
Between Reading	26.63	1	26.63	.19
Ability X Reading	639.46	1	639.46	4.66*
Within	11,105.36	81	137.10	
Total	11,779.22	84		

(N = 85)

*Significant at the .05 point.

The results, summarized in Table XXV, in the area of writing shows an F-ratio of 1.64 when the variance of the within groups is compared with the variance of the total between groups. The variance between the ability had an F-ratio of .06 when compared with the variance within the groups, and the variance between the groups in reading had an F-ratio of .19 when compared with the variance within the groups. This indicates that academic ability and reading level are not related to level of achievement in writing. The three F-ratios

above were all non-significant figures. When the variance contributed to the interaction of ability and reading was compared with the variance within the groups, an F-ratio of 4.66 was found. This figure was significant at the .05 point of significance. This indicates that academic ability and reading level interact with each other in relation to achievement in writing.

The above data allowed the testing of Hypotheses IK1, IL1, IM1, IN1, IO1, IP1, IQ1, and IR1, which predicted no relationship between academic ability, reading skills, or any combinations of these two variables with growth in general education. The findings failed to support the rejection of these eight hypotheses. Hypothesis IS1, which predicted academic ability and reading skills not to interact in relation with level of achievement in writing, was rejected by the data.

The results for the area of mathematics were summarized in Table XXVI. The variances of the groups for total between, between ability, between reading, and interaction for both reading and ability gave F-ratios of .21, .23, .001, and .39 respectively. None of these four ratios were significant figures. This indicates that academic ability and reading level are not related to level of achievement in mathematics.

The findings of the data did not show enough evidence to reject Hypotheses IK2, IL2, IM2, IN2, IO2, IP2, IQ2, and IR2. These hypotheses predicted no relationship between academic ability, reading skills, or any combinations of these two

variables with growth in general education. Hypothesis IS2, which predicted academic ability and reading skills not to interact in relation with level of achievement in mathematics, was not rejected.

TABLE XXVI

ANALYSIS OF VARIANCE FOR COLLEGE ACADEMIC ABILITY AND READING SKILLS IN RELATION TO ACHIEVEMENT LEVEL IN MATHEMATICS

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F-ratio
Total Between	95.92	3	31.97	.21
Between Ability	34.36	1	34.36	.23
Between Reading	1.26	1	1.26	.001
Ability X Reading	60.30	1	60.30	.39
Within	12,368.13	81	152.69	
Total	12,464.05	84		

(N = 85)

A summary of the data for social studies in relationship to academic ability and reading skills is expressed in the analysis of variance table entitled Table XXVII. Non-significant F-ratios of .83, .01, .003, and 2.49 were found for total between groups, between ability groups, between reading groups, and for interaction between these variables in relationship to growth in general education. This indicates

that academic ability and reading level are not related to level of achievement in social studies.

TABLE XXVII

ANALYSIS OF VARIANCE FOR COLLEGE ACADEMIC ABILITY AND READING SKILLS IN RELATION TO ACHIEVEMENT LEVEL IN SOCIAL STUDIES

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F-ratio
Total Between	187.82	3	62.61	.83
Between Ability	.91	1	.91	.01
Between Reading	.26	1	.26	.003
Ability X Reading	186.65	1	186.65	2.49
Within	6,078.60	81	75.04	
Total	6,266.42	84		

(N = 85)

Hypotheses IK3, IL3, IM3, IN3, IO3, IP3, IQ3, and IR3 predicted academic ability and reading skills or any combinations of these two variables not to be related to level of achievement in social studies. Hypothesis IS3 predicted no interaction of these two variables in relationship to growth in social studies. None of the above hypotheses were rejected.

Table XXVIII was constructed to summarize the findings in the area of science. The variances of the groups for total between, between ability, between reading, and interaction for both reading and ability gave F-ratios of .52, .45, 1.18, and 0.00 respectively. All four of these F-ratios were

non-significant figures. This indicates that academic ability and reading ability are not related to level of achievement in science.

TABLE XXVIII

ANALYSIS OF VARIANCE FOR COLLEGE ACADEMIC ABILITY AND READING SKILLS IN RELATION TO ACHIEVEMENT LEVEL IN SCIENCE

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F-ratio
Total Between	176.09	3	58.70	.52
Between Ability	51.78	1	51.78	.45
Between Reading	133.68	1	133.68	1.18
Ability X Reading	0.00	1	0.00	0.00
Within	9,218.50	81	113.81	
Total	9,394.59	84		

(N = 85)

Hypotheses IK4, IL4, IM4, IN4, IO4, IP4, IQ4, and IR4 predicted no relationship between science and academic ability, reading skills, or any combinations of these two variables. Hypothesis IS4 predicted no interaction of these two variables in relation to growth in the area of science. None of the above hypotheses were rejected.

The analysis of variance was used to test hypotheses IK1 through IS4. These were predicative statements about college academic aptitude and reading skills and their relationships to college success. The division of these thirty-six

hypotheses into subgroups simplified the discussion of them. It was found that change in the level of general education development for students enrolled in the College of Education is not significantly related to level of academic ability or level of achievement in reading skills. The one exception to this is in the area of writing where these two variables operating together interact in relation to change in general education; that is, the relationship that one variable has with the level of achievement in writing is dependent on the level of the other variable also.

Relationships Between Eight Variables

This section has as its purpose the presentation of the data of eight variables and their interrelationships with each other. The intercorrelating of these variables, using the Pearson product-moment correlation coefficient, allows the testing of hypotheses IIA through VF, the last twenty hypotheses of the study. Four of the variables are the measurements made in the four areas of general education using the STEP battery as a pre-test and a post-test. These areas are writing, mathematics, social studies, and science. The fifth variable is high school grade point average. Variable six consists of the college grade point average for the freshman and sophomore years. Ability to do college work as measured by the ACT tests is the seventh variable. Variable eight is reading level as measured by the SRA Reading Record.

The data for the eight variables were coded and punched on cards for electronic computing machines. Then the data were processed in the Computing Center of Oklahoma State University. This was done to expedite the process of computing twenty-eight correlation coefficients. The twenty-eight correlation coefficients were then grouped into an intercorrelation matrix and entitled Table XXIX.

TABLE XXIX

CORRELATION MATRIX OF EDUCATIONAL GROWTH (STEP), HIGH SCHOOL GPA, COLLEGE GPA, ACT COMPOSITE SCORES, AND TOTAL SRA READING RECORD SCORES

	1	2	3	4	5	6	7	8
1-Writing	...	-.09	.07	-.05	-.07	-.02	.06	.11
2-Mathematics		...	-.13	-.05	-.04	.14	.07	.01
3-Social Studies			...	.00	.02	.01	.11	.10
4-Science				...	-.06	-.15	-.11	-.05
5-High School (GPA)					...	.56**	.50**	.54**
6-College (GPA)						...	.50**	.35**
7-ACT Composite							...	.70**
8-SRA Total								...

(N = 85)

*Significant at the .05 level.
**Significant at the .01 level.

The correlation coefficients between the four areas of general education were computed to see if the students, when measured for change in general education, tended to keep the same rank order in each area of general education in terms of

growth; that is, did the students that made the most growth in one area tend to make the most growth in the other areas? Did the students who made the least growth tend to make the least growth in other areas? This was continued for other students at different levels of growth in general education.

The correlation coefficients between the areas of general education ranged from -.13 to .07, and none of these were significant results. Thus, the six hypotheses IIA through IIF, which predicted that growth in one area of general education would be related to the growth in any of the other areas of general education, were not rejected.

As was pointed out in Chapter II, high school grade point average is one of the better predictors of success in college. Therefore, correlation coefficients between high school grade point average and college achievement, as measured by a pre-test and a post-test, were computed. This was done to see if a relationship still existed when college success was evaluated by an achievement test rather than college grades.

Correlation coefficients between high school grade point average and growth in the four areas of general education were -.07 for writing, -.04 for mathematics, .02 for social studies, and -.06 for science. As none of these were significant figures, hypotheses IIIA, IIIB, IIIC, and IIID, which predicted that there would be no significant relationship between high school grade point average and change in general education, were not rejected.

College grades are probably the most common method of measuring success of students in academic work. Yet, many times a question arises about grades received in course work and their validity for measuring amount of content and understanding acquired. For this reason, correlation coefficients were computed between college grade point average and change in the areas of writing, mathematics, social studies, and science.

The correlation coefficients of -.02 for writing, .14 for mathematics, .01 for social studies, and -.15 for science with college grade point average were all non-significant figures. Therefore, hypotheses IVA, IVB, IVC, and IVD, which predicted that there would be no significant relationship between college grade point average and change in general education, were not rejected.

Intercorrelations were computed for high school grade point average, college grade point average, the ACT composite score, and the SRA Reading Record total score. This was done to see if the data were consistent with the findings of Chapter II where the literature was reviewed and also to find the relationship between different variables used in the study.

Results in the study were consistent with the information found in reviewing the literature. The correlation coefficient between high school grade point average and college grade point average was .56. This agreed with the research in Chapter II and is the median correlation

coefficient for a summary of thirty-one studies by Garrett. The correlation coefficient of .50 between the ACT score and college grade point average is consistent with the literature, since the median correlation coefficients ranged from .40 to .50 for college grade point averages when they were correlated with achievement test grades, intelligence test grades, and aptitude test grades. The literature in Chapter II had a mean correlation coefficient of .39 for studies that correlated grades in reading skills with college success. The correlation between college grade point average in the study and the SRA Reading Record score was .35. Again, these data are consistent with the literature.

The correlation of both the ACT composite score and the SRA Reading Record score with growth in the four areas of general education showed no significant relationship between them. The correlation coefficients ranged from -.11 to .11 for the ACT score and -.05 to .11 for the SRA Reading Record score.

The intercorrelation of the four variables -- high school grade point average, college grade point average, ACT composite score, SRA Reading Record total score -- are all significant at the .01 level of significance. Thus, hypotheses VA, VB, VC, VD, VE, and VF, which predicted no relationship between the four variables, were not confirmed.

The correlation coefficient cluster of .56, .50, and .50 that was found when high school grade point average, college grade point average, and ACT composite score were used as

variables infers to some degree that they are measuring the same factor.

High school grade point average correlated .54 with SRA Reading Record total score, while college grade point average correlated .35 with the same test. This infers that a reading factor could be related more to high school success than it is to success in college. However, a better explanation could be that a college population is less variable than a high school population and as a group becomes less variable, since they tend to correlate lower with the criterion.

The correlation coefficient of .70 between the ACT composite score and the SRA Reading Record total score indicates that the ACT has a high reading factor in it. This could mean that the ACT serves to measure reading skills similar to what the SRA Reading Record measures as well as measuring ability to do college academic work.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

One of the purposes of this chapter is to briefly review the objectives of this study. Another is to summarize the findings in Chapter V and make brief concluding statements about them. Recommendations are made for further research and suggestions are made concerning the use which might be made of the findings.

Review of Objectives

The present study proposed to study the general education development of teacher education candidates enrolled in the College of Education at Oklahoma State University. This was to be done by measuring the difference in the general education level of achievement over a two-year period of time and by analyzing variables in relation to this growth.

Five questions were pertinent: (1) Does a significant change in general education take place during the two-year period of time as measured by achievement tests? (2) If there is a change, is there a significant difference in this change between students enrolled in secondary teacher education and those enrolled in elementary teacher education? (3) Do

the four areas of general education change the same amount, or do some areas change significantly more than others? (4) If there is a change, how are aptitude for college work and reading skills related to achievement in general education? (5) How is the change, as measured by achievement tests, related to other predictors or measures of college success, such as high school grade point average and college grade point average? Also, in this study, how is high school grade point average, college grade point average, ACT composite score, and SRA total reading score related?

Summary of Results

Seventy-eight specific hypotheses were tested in this study. For simplification of the analysis and discussion of the data, the seventy-eight hypotheses were grouped into three categories, which were determined by the three different statistical designs used in testing the hypotheses. Those which stated hypotheses about significant differences between group means and were tested by the t-test composed one group. A second group consisted of those hypotheses which made predictions about academic ability and reading skills in relationship to growth in general education; these were analyzed by the analysis of variance. Those hypotheses which predicted relationships between variables in terms of rank within the groups and were also tested by correlation methods determined the third group.

The twenty-two hypotheses employing the t-test were concerned with testing elementary and secondary teacher education candidates for significant changes in level of general education development in the areas of writing, mathematics, social studies, and science over a two-year period of time, comparing elementary and secondary teachers in growth in general education, and comparing the growth of each area of general education against the growth of each of the other areas of general education.

With the exception of the area of science for secondary education candidates, the tests showed significant growth for all teacher education candidates in the four areas of general education. When secondary teacher education candidates were compared with elementary candidates for growth in general education, the tests did not show them to differ significantly from one another in growth for any of the four areas of general education. The only two areas of general education that showed a significant difference from one another in growth was science and social studies. When these two areas were compared, social studies was significantly higher than science.

The analysis of variance was used to test the thirty-six hypotheses that were concerned with academic ability and reading skills in relation to growth in writing, mathematics, social studies, and science.

Academic ability and reading skills were not found to be significantly related to growth in the four areas of

general education. Different combinations of levels of academic ability and reading skills were not found to be significantly related to growth in the four areas of general education. When tests were made for interaction of academic ability and reading skills in relationship to growth in general education, writing was the only area that showed a significant figure to indicate this interaction.

The intercorrelation of the eight variables used in this study was made to test the last twenty hypotheses of the study. The variables were growth in writing, growth in mathematics, growth in social studies, growth in science, high school grade point average, college grade point average, ACT composite score, and SRA Reading Record total score. The Pearson product-moment was used to compute the correlation coefficients between the eight variables.

The correlation coefficients showed no relationships to exist between the growth in the four areas of general education. Growth in the four areas of general education showed no relationship to high school grade point average, college grade point average, ACT composite score, SRA Reading Record total score. However, the four variables -- high school grade point average, ACT composite score, and SRA Reading Record total score -- were found to be significantly related to each other.

Conclusions

Conclusions reached on basis of the evidence of this study are made with considerable caution when the evaluation techniques, specific population, and sample size are considered. However, some concluding statements about the results of the study seem justifiable where the statistical data is supportive.

A. Students in the College of Education made a significant change in the level of general education development in the areas of writing, mathematics, social studies, and science during their freshman and sophomore years; the one exception to this was in the area of science for students enrolled in secondary teacher education. This indicates that perhaps the general education program for students in the College of Education is, except for the area of science for secondary education students, effective in producing a change in the level of general education during the first two years of college work. However, the purpose of this study is not to answer whether or not there is a sufficient change in general education for prospective teachers; nor is it an attempt to determine whether or not students have obtained an ideal level of achievement in general education for them to become effective teachers.

B. The change in the level of general education development of students enrolled in elementary education is not significantly different from that of secondary education students. The findings indicate that even though the general education program for secondary and elementary teacher education candidates differ in content, growth in the four areas of general education is similar for the first two years.

C. Generally, students do not change more in any one area of general education (writing, mathematics, social studies, and science) than they do in any other area. One exception to this is social studies compared to science with social studies showing the most change. Even though a different number of hours are required in the four areas of general education, one area of general education does not show a significant amount of growth over any other area (with the exception of social studies compared to science).

D. In most cases, the amount of change in the level of general education development for students enrolled in the College of Education is not related to the level of scholastic aptitude or level of reading skills. An exception is in the area of writing, where these two variables operating together appear to be related to change in level of

general education development. The findings suggest that in the area of writing, academic ability or reading skills operating alone are not related to growth in general education, but both operating together interact to produce an effect that is related to growth in general education.

E. When college success in general education is measured by an achievement pre-test and post-test, the four areas of general education (writing, mathematics, social studies, and science) are not related to each other, high school grade point average, college grade point average, ACT composite score, or SRA Reading Record total score. However, the four predictors of college success -- high school grade point average, college grade point average, ACT composite score, SRA Reading Record total score -- are significantly interrelated.

Recommendations

The approach to measuring college success with achievement tests in a longitudinal method is rare for experimental studies. The criterion for college success is usually college grade point average or one measurement made by an achievement-type test.

One recommendation is that much more research be done in this area, especially where large sample sizes and more diverse populations can be obtained. Also, the use of a control group

would be very desirable for studies in this area. This would provide a way to measure the growth in general education of people who did not receive formal instruction and allow a more definitive way of measuring change contributed to the general education program.

Another recommendation for further research would be that of follow-up studies of the students used in this problem. A study of the change made in level of general education for the last two years of college work in relationship to the first two years would be helpful. A study of the relationship between general education and success in teaching could also prove fruitful.

The findings of this study should be viewed with caution until further research is done in this area, and generalizations should be confined to those populations appropriate to the study.

BIBLIOGRAPHY

ACT: A Message to College Presidents. The American College Testing Program, Inc., Iowa: 1960.

ACT: Student's Booklet. The American College Testing Program, Inc., Iowa: 1960-61.

ACT: The American College Testing Program. Technical Report 1960-61 Edition. Chicago: Science Research Associates, Inc., 1960.

Anastasi, Anne. Differential Psychology. New York: MacMillan Company, 1958.

Angoff, William H. SCAT-STEP Supplement 1962. Princeton, New Jersey: Educational Testing Service.

Bloom, Benjamin S. and Frank R. Peters. The Use of Academic Prediction Scales for Counseling and Selecting College Entrants. Glencoe, Illinois: The Free Press, 1961.

Bowers, Royal H. "The Selection of the Optimal Predictors of Success in the First Semester of the Engineering Program of the Oklahoma Institute of Technology." Unpublished Doctoral Thesis. Stillwater, Oklahoma: Oklahoma State University, 1956.

Burns, Richard Leo. "An Investigation of the Value of the American College Testing Program, the Scholastic Aptitude Test and the Purdue Placement Tests in Predictions of Academic Success of Purdue University Freshmen." Unpublished Doctoral Thesis. Purdue University, 1963: Abstract: Dissertation Abstracts 24:1477.

Buswell, Guy T. Manual for the SRA Reading Record. Chicago Science Research Associates, Inc., 1959.

Butts, Freeman. The College Charts Its Course. New York: McGraw-Hill Company, 1939.

Callis, Robert and C. Gilbert Wrenn. "The GED Tests as Predictors of Scholastic Success." Educational and Psychological Measurement, VII (Spring, 1947), 93-100.

Crawford, A. B. and P. S. Burnham. "Trial at Yale University of the Armed Forces Institute General Development (College Level)." Educational and Psychological Measurement, V (Winter, 1945), 261-270.

Cuff, N. B. "Prognosis of Diagnosis of Success in College." Journal of Applied Psychology, XIV (December, 1930), 612-619.

Curry, Guy. "An Analysis of the Program of the Oklahoma Commission on Teacher Education and Certification." Unpublished Doctoral Thesis. Stillwater, Oklahoma: Oklahoma State University, 1950.

Davis, Charlotte Croon. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1959, 360-361.

Drake, William E. The American School in Transition. New York: Prentice-Hall, 1955.

Dressel, Paul L. Evaluation in the Basic College. New York: Harper and Brothers, 1958.

----------. "General Education." Encyclopedia of Educational Research. Ed. Chester W. Harris. New York: MacMillan Company, 1960.

Dressel, Paul L., Lewis B. Mayhew, and Earl J. McGrath. The Liberal Arts as Viewed by Faculty in Professional Schools. New York: Bureau of Publications, Teachers College, Columbia University, 1959.

Dressel, Paul L. and Margaret F. Lorimer. Attitudes of Liberal Arts Faculty Members Toward Liberal and Professional Education. New York: Bureau of Publications, Teachers College, Columbia University, 1960.

Dressel, Paul L. and John Schmid. An Evaluation of the Tests of General Educational Development. Washington, D. C.: American Council on Education, 1951.

Dryer, Henry S. "Evidence in Validity of the Armed Forces Institute Tests of General Educational Development (College Level)." Educational and Psychological Measurement, (Winter, 1945), 321.333.

Durflinger, G. W. "The Prediction of College Success." Journal of the American Association of College Registrars, XIX (June, 1943), 68-78.

Fifer, Gordon. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1959, 571-572.

Garrett, Harley F. "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Sciences and Teachers Colleges." Journal of Experimental Education, XVLLL (February, 1949), 100.

Garrett, Henry E. Statistics in Psychology and Education. New York: Longmans, Green, and Company, 1961.

Goldfield, Edwin D. Statistical Abstract of the United States. Washington, D. C.: U. S. Government Printing Office, 1961.

Gross, Richard E. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1959, 845-846.

Guilford, J. P. Fundamental Statistics in Psychology and Education. New York: McGraw-Hill Company, 1956.

Heist, Paul and Harold Webster. "Differential Characteristics of Student Bodies -- Implications for Selection and Study of Undergraduates." Selection and Educational Differentiation. Ed. T. R. McConnell. Berkeley: University of California, 1959.

Higher Education for American Democracy: A Report of the President's Commission on Higher Education. New York: Harper and Brothers, 1948.

Hill, Walker H. and Paul Dressel. "Evaluation in the Basic College of Michigan State College." Evaluation in General Education. Dubuque, Iowa: Wm. C. Brown Company, 1954, 293.

Holland, John L. "The Prediction of College Grades from the California Psychological Inventory and the Scholastic Aptitude Test." The Journal of Educational Psychology, L (August, 1959), 135-142.

Horst, Paul. "Differential Prediction of Academic Success." Selection and Educational Differentiation. Ed. T. R. McConnell. Berkeley: University of California, 1959, 33-34.

Hoyt, Donald P. "The Educational Engineering of College Success." An address delivered to the Oklahoma Inter-College Conference: Stillwater, Oklahoma, 1963. (mimeo.)

Jespon, V. C. "Scholastic Proficiency and Vocational Success." Educational and Psychological Measurements, XI (Winter, 1951), 616-628.

Johnson, B. Lamar. General Education in Action. Washington D. C.: American Council on Education, 1952.

Johnston, Henry P. "A Predictive Study of Chemistry Grades in Relation to ACT Scores." Unpublished paper. Stillwater, Oklahoma: Oklahoma State University, 1961. (mimeo.)

Lamke, Tom A. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1953, 572-574.

Levine, Richard S. SCAT-STEP Supplement 1958. Princeton New Jersey: Educational Testing Service, 1958.

Learned, William S. and Ben D. Wood. The Student and His Knowledge. New York: The Carnegie Foundation for the Advancement of Teaching, 1938.

Lindquist, E. F. ACT: Research Service to Individual Colleges. Chicago: Science Research Associates, Inc., 1961.

Lloyd-Jones, Esther. "Personal Work and General Education." The Fifty-First Yearbook of the National Society for the Study of Education. Ed. Nelson B. Henry. Chicago: Part I, 1952, 226-227.

Lofthouse, Yvonne. "Selection and Counseling: Avenues to Quality Control." The Outlook in Student Teaching: Forty-First Yearbook. Ed. Aleyne C. Haines. Dubuque, Iowa: 1962, 140.

Long, John M. "The Prediction of College Success from a Battery of Tests and from High School Achievement." Unpublished Doctoral Thesis. University of Virginia, 1960: Abstracts: Dissertation Abstracts 21:1100-1101.

Love, L. I. and L. E. Love. "Performance of Veterans." The Journal of Higher Education, XVII (February, 1947), 195-99.

McConnell, T. R. "Introduction." Selection and Educational Differentiation. Ed. T. R. McConnell. Berkeley: University of California, 1959.

McQueen, Robert. "Diagnostic Reading Scores and College Achievement." Psychological Report, III, 1957, 627-29.

Mayhew, Lewis B. General Education: An Account and Appraisal. New York: Harper Brothers, 1960.

Murphy, Lois B. and Esther Raushenbush, eds. Achievement in the College Years. New York: Harper and Brothers, 1960.

Nelson, M. J. "Study in the Value of Entrance Requirements for Iowa State Teachers College." School and Society, XXXVII (February, 1933), 262-64.

Nunnally, Jum C., Jr. Test and Measurements: Assessment and Prediction. New York: McGraw-Hill, 1959.

Oklahoma Agriculture and Mechanical College Catalog. Stillwater, Oklahoma: 1908-1909, 16.

Pace, C. R. "University Wide Studies in Evaluation of General Education at Syracuse." Evaluation in General Education. Ed. P. L. Dressell. Dubuque, Iowa: W. C. Brown, 1954, 23.

----------. They Went to College. Minneapolis: The University of Minnesota, 1941.

Patterson, Dale O. "The Relationship Between Certain Factors and Scholastic Success in the University of Minnesota College of Education." Bulletin of the American Association of Collegiate Registrars, XII (April, 1937), 191-201.

Putnam, Phil H. "Scholastic Achievement of GED Students at the Vanport Extension Center." School and Society, LXVI (August, 1945), 161-63.

Rayner, S. A. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland, New Jersey: Gryphon Press, 1959, 846-47.

Read, C. R. "Prediction of Scholastic Success in a Municipal University." School and Society, XLVIII (August, 1938), 187-88.

Reinhardt, Emma. American Education: An Introduction. New York: 1960, 396-99.

Report of Teacher Education at Oklahoma State University to the National Council for Accreditation of Teacher Education. Stillwater: Oklahoma State University, 1962.

Report of the Mid-Atlantic Regional Conference: The President's Commission on Higher Education. New York: Harper and Brothers, 1948.

Report of the Annual Meeting of the Council on Teacher Education. Edmond: Central State College, 1961.

Ricks, James H., Jr. and Harold G. Seashore. "Norms Must Be Relevant." Test Service Bulletin, XXXIX (May, 1950), 16-19.

Sanford, Nevitt. "Higher Education as a Social Problem." The American College. Ed. Nevitt Sanford. New York: Wiley and Sons, Inc., 1962, 10-30.

Seashore, Harold G. "Methods of Expressing Test Scores." Test Service Bulletin, XL (January, 1955), 7-10.

Sequential Test of Educational Progress: Technical Report. Educational Testing Service, Princeton, New Jersey: 1957, 19-24.

Shadmi, Rena M. "An Investigation of the Interaction Between Selected Nonintellective Variables, Ability, and Academic Achievement of Engineering and Science Freshmen." Unpublished Doctoral Thesis. Columbia University, 1960: Abstract: Dissertation Abstracts 21:815-816.

Stalnaler, Julian C. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1959, 361-63.

Stanley, Julian C. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1959, 803-4.

STEP: Manual for Interpreting Scores. Educational Testing Service, Princeton, New Jersey: 1957.

Stone, Joics B. "Differential Prediction of Academic Success at Brigham Young University." Journal of Applied Psychology, XXXVIII (March, 1954), 109-10.

Taylor, Harold. "An Approach to Education." Achievement in the College Years. Ed. Lois B. Murphy and Esther Raushenbush. New York: Harper and Brothers, 1960, 11.

Thorndike, Robert L. and Elizabeth Hagen. Measurement and Evaluation in Psychology and Education. New York: John Wiley and Sons, Inc., 1955.

Tiggs, Francis O. Third Mental Measurements Yearbook. Ed. Oscar K. Buros. New Brunswick, New Jersey: Rutgers University, 1949, 533.

Tribilock, W. E. "Many of the Lowest Third of our Graduates are College Material." Clearing House, XII (May, 1938), 546.

Turnbull, William W. Fourth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1953, 588.

Tyler, Ralph W. Fifth Mental Measurements Yearbook. Ed. Oscar K. Buros. Highland Park, New Jersey: Gryphon Press, 1959, 847-48.

Vineyard, Edwin E. "A Longitudinal Study of the Relationship of Differential Aptitude Test Scores with College Success." Unpublished Doctoral Thesis. Stillwater, Oklahoma: Oklahoma State University, 1955.

Vineyard, Edwin E. and Robert B. Bailey. "Interrelationships of Reading Ability, Listening Skills, Intelligence, and Scholastic Achievement." Journal of Developmental Reading, III (Spring, 1960), 175-78.

Vineyard, Edwin E. and Harold W. Massey. "The Interrelationship of Certain Linguistic Skills and Their Relationship with Scholastic Achievement When Intelligence is Ruled Constant." Journal of Educational Psychology, XLVIII (May, 1957), 279-86.

Webster, Harold, Mervin Freeman, and Paul Heist. "Personality Changes in College Students." The American College. Ed. Nevitt Sanford. New York: Wiley and Sons, Inc., 1962, 816.

Wesman, Alexander G. "Reliability and Confidence." Test Service Bulletin, XVIV (May, 1952), 2-7.

West, Patricia. "Social Mobility Among College Graduates." Class, Status, and Power. Ed. R. Bendix and M. Lipset. Glencoe, Illinois: Free-Press, 1953, 465-80.

Wrenn, Gilbert C. The Counselor in a Changing World. Washington, D. C.: American Personnel and Guidance Association, 1962.

APPENDIX A

HISTORY OF TEACHER EDUCATION

Following is a brief history of the teacher education program in the College of Education at Oklahoma State University. This developmental history was written for those people desiring more background to teacher education than was given in Chapter I.

The Initiation of the Program

Very soon after statehood, the teacher education program at Oklahoma State University (then Oklahoma Agriculture and Mechanical College) was launched. The Teachers' Normal Division was organized during the school year 1908-1909, and a course of study was outlined under the leadership of President J. H. Connell and the newly appointed principal, Charles Evans. It was too late to enroll students for that year, but the following year seven people were enrolled in the sophomore, junior, and senior classes. The Summer Normal School was organized and enrolled students in 1908. A statement from a catalog during this time states:

> On the recommendation of the State Superintendent in harmony with the legislature enactments, there has been established a regular collegiate course of instruction known as the Teachers' Normal

> Course. The present demand in this state for trained teachers in technical subjects is already very great. To further supply the great demand in Oklahoma for trained teachers, the College conducts a summer normal institute for teachers.[1]

Undoubtedly, its birth was influenced by the current and prevalent educational philosophy that education was a public responsibility and recognition that educators were in need of special training to teach at either the elementary or secondary level. Institutions with special programs to perform this service were needed. To cite from the same source:

> This course is designed for those who intend to teach in the common and high schools, and especially for those who desire to become expert teachers of some one or more of the scientific industrial departments of education. Oklahoma has the most progressive school laws with reference to applied science of any state and the demand for well trained teachers is constantly growing. The "common branches" (arithmetic, history, English language, music, algebra, physics, botany, chemistry, etc.) are taught as fundamental subjects and on these the "professional subjects" (pedagogy, psychology, history of education, methods and management, etc.) and the industrial subjects (woodworking, stock judging, soils, and the domestic science), are builded for the education and training of the strong, well balanced teacher.[2]

Oklahoma State University, like many colleges, saw the need for teacher training schools to meet the demand for teachers with college preparation. In 1908, more degrees were being awarded nation-wide in teacher education than in any other field of study. In another half century,

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[1] Oklahoma Agriculture and Mechanical College Catalog, 1908-1909, p. 16.

[2] Ibid., p. 49.

education was to contribute more than one-fifth of the nation's graduates or sixty per cent more than its nearest contender, business.[3]

Another trend in America at this time was toward more coordination for public schools through some type of state system.[4] Oklahoma had just organized its state government, which provided for a state superintendent, state department of education, and a state board of education. These were to have an effect on the curricula for teacher education programs through standards imposed on certification of teachers.

One of the functions of the State Board of Education is the certification of teachers. Dr. Oliver Hodge, State Superintendent, said in a speech to the Oklahoma Council on Teacher Certification:

> As you know in this state, the Law gives the State Board of Education complete authority in the issuing of teaching certificates, the certification of our teachers. The Law is only one sentence long, certainly not more than a short paragraph, directing the State Board of Education to set up the regulations and have complete authority and responsibility.[5]

Therefore, institutions have had a tendency to design their programs to meet the state requirements. In 1908,

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[3]Edwin D. Goldfield, Statistical Abstract of the United States, U. S. Government Printing Office (Washington, 1961), p. 130.

[4]Emma Reinhardt, American Education: An Introduction (New York, 1960), pp. 396-399.

[5]Report of the Annual Meeting of the Council on Teacher Education, Central State College (Edmond, Oklahoma, 1961, p. 21.

temporary certificates could be awarded by passing examinations given by the State Board, completing programs based upon less than degree requirements, or upon completing of a degree program; and these certificates made no distinction between high school and elementary certification.

Professional Education

Professional education was provided for in the original structure of the program by adding six courses to the curriculum. They were History of Education, School Management, Methods and Management, Psychology, Practice Teaching, and Philosophy of Teaching; these being required for all teacher candidates. The Department of Pedagogy was created for offering these new courses.

The development of this area has been unusual. There has been little change in the quantitative requirements for a Bachelor of Science degree in education over the past fifty years; on the other hand, there has been a phenomenal number of courses made available in professional work.

The required courses in pedagogy in 1909 were on a quarter-hour basis and would be approximately equivalent to sixteen semester hours. Although the requirement has been as high as twenty-four hours for the old Life Certificate, it has leveled off to the present requirement of twenty-one hours for most certificates.

The professional courses are taught now in the College of Education, which is divided into the departments of

Aviation Education and Flight Training, Library Science, Philosophy, Religion, Technical Education, Trade and Industrial Education, and Industrial Arts Education. In the Department of Education alone, in 1962, there was a listing of seventy-eight courses and two-hundred-twenty-two courses in the College of Education as a whole. This large increase can be explained by the need for courses to provide work in specialization in professional work and graduate programs in education.

Specialization Education

Specialization for teachers was not taken too seriously during the early years of teacher education at Oklahoma State University. The belief that teachers needed no special education was changing to a philosophy that teachers needed a professional education to teach. Still no specialization was required to teach in 1908. People were considered to be prepared to teach any subject at either the secondary or elementary level as long as they had a degree or the aggregate number of college hours needed to qualify for a teaching certificate.

The first course of study for teachers at Oklahoma State University was patterned after the elective system; a system initiated by President Eliot at Harvard University in the late part of the nineteenth century.[6] Across the nation,

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[6]Frederick Rudolph, The American College and University (New York, 1962), pp. 290-295.

at this time, the elective system was having its full impact on the construction of higher education curricula. This system allowed elective courses in one field and design of a plan of study that would be somewhat specialized in nature.

The industrial revolution had begun to pick up momentum during the early years of the twentieth century. With this force and resultant technological development and change of mechanization and automation, specialization came into its own. It had become firmly implanted in the education of teachers at the undergraduate level and had greatly stimulated graduate work for teachers. The triumph of specialization in all education since 1900 is well recognized.[7]

Since the program started in 1908, the areas of specialization have been taught by the departments of the institutions which were equipped for and responsible for instruction in respective fields. This is spelled out early in the program:

> The Normal Division of the Agricultural and Mechanical College assumes for its field the strictly professional and technical work, and the nature of this field determines the place and value of each subject offered. The handling of every subject has the teaching purpose strictly in view, the one aim being to develop a distinctive teaching atmosphere. The literary, scientific and industrial work required of the normal students is done in those departments of the college having special facilities and equipment for teaching those branches efficiently and with great economy to the prospective teacher.[8]

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[7]William E. Drake, The American School in Transition (New York, 1955), p. 526.

[8]College Catalog, 1908-09, p. 109.

General Education

As the Liberal Arts program gave way to specialization and the latter dominated the college curricula, a conflict began to arise between the conservatives and the liberal people in education.[9] Conservative groups, in trying to return to the general tendency of liberal education, coined the new term General Education. Rudolph comments:

> The General Education movement, from its beginning at Columbia in 1919 to the celebrated Harvard Report on the subject in 1945, was an attempt to capture some of the sense of a continuing intellectual and spiritual heritage that had fallen victim to the elective system.[10]

The justification of general education on the basis that it provided for better social relations, personal adjustment, communication skills, professional advancement, vocational success, and the like, gained support throughout the second quarter of the twentieth century by many studies in its behalf. Pace, after a study of 1600 former University of Minnesota graduates, wrote:

> The implication for general education is clear. Unity must replace fragmentation. Provisions must be made for integrated and coherent educational experiences whether students remain in the university for one year, two years, or four years. It may be neither necessary nor desirable to give at college level a program of general education for all students, but as we have seen, there are areas and problems of adult life in which unity is almost entirely lacking, and general education can concentrate, at the least, on overcoming inadequacies.

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[9] Freeman Butts, The College Charts Its Course (New York, 1939), p. 425.

[10] Rudolph, p. 456.

> General education, by restoring unity to education programs and by focusing its major attention specifically and directly upon the contemporary world and the needs and problems which students are likely to face as young adults, may help to promote the dynamic kind of democracy so greatly needed today.[11]

Even at the inception of the Teachers' Normal Division at Oklahoma State University, there seemed to be a concern for the general education of its students. To help insure this, the freshman year was composed completely of required courses in the fields of English, mathematics, history, science, drawing or woodwork, and agriculture or domestic science. The sophomore year was very similar except in that electives were allowed. The junior and senior years, other than the required courses in pedagogy, music, and Oklahoma history, were entirely elected from the fields of foreign language, agriculture, mathematics, social studies, science, and music. Thus, at the junior and senior level, a student's program could be as general or as specialized as he chose it to be.

The structure of the first curriculum for the Teachers' Normal Division was affected by two forces to make a very general program for teachers. The Liberal Arts program of the nineteenth century, which was general in nature, had its effect upon the freshman and sophomore program. Yet the junior and senior years were being influenced by the elective system, which allowed students to choose any of the courses they

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[11] Robert C. Pace, They Went to College (Minneapolis, 1941), pp. 126-130.

were offered. Since teachers did not have to specialize in any field to be certified, they then could elect courses in general education for their last two years of work.

As specialization gained strength in teacher education and students were required to choose a major teaching field, more and more of the hours required for a degree were being devoted to areas of concentration. Furthermore, as the number of hours in general education were thus decreasing, there was a tendency to prescribe those courses that were felt related to a particular major program of study.

The present program of fifty hours of general education has been influenced in its development by the new interest shown by professional groups, accreditation associations, state agencies, teacher education institutions, and public organizations in general education. Although the number of hours is prescribed, there is still some selectivity of general education. They may choose from different courses within areas of general education. This is an attempt to assume common learnings and understandings, which allows the student the prerogative in his choice of specific courses within broad areas.

Teacher Education and Certification

Teacher Education at Oklahoma State University has followed closely the state minimum requirements that were current during each of its major curriculum changes. It was found through tracing changes in college catalogs from

1908-09 that adjustments were made which paralleled new requirements in the State Department of Education. The statement of its first certification program was:

> Teachers holding first and second grade certificates, not candidates for a degree, may take the professional work for this course as one year's work and will receive upon its completion Normal School Certificates of elementary state license to teach for three and two years respectively.
>
> Normal School certificates or elementary state licenses for one year may be issued to students of any course who have completed the work through the sophomore year, provided they can fulfill the requirements of the State law regarding the teaching of Agriculture, Domestic Science, Oklahoma History, Drawing and Public School Music in the public schools.
>
> State Certificates for life will be issued to graduates of the Normal Course and to graduates of other courses who have completed the professional work as outlined in this course.[12]

The first major organizational change came to the Teachers' Normal Division in 1914. Its name was changed to the School of Education with John Bowers as its dean. Professional requirements were changed to twenty hours, lacking only one hour being as much as the requirements for most present programs. Also, the first move was made toward specialization by requiring candidates to declare a major. Little change in the quantity of all work for certificates had been made, and the blanket type certificate for different subjects still prevailed.

By 1919, the School of Education was again under a new dean, Herbert Patterson. A broader curriculum of twenty-nine

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[12]College Catalog, 1908-09, p. 51.

courses was offered to support the Master's Degree in education, which was now being granted. Again, a step toward specialization was made by prescribing more specifically the course content for a teacher's degree.

There was a differentiation of high school and elementary certification in 1920. A plan of study was outlined for the State Life School Certificate, but the elementary level remained the same. The following year saw additional defining of the high school certificates with requirements outlined for the State Five-Year and State Two-Year certificate, still there was no change in elementary requirements.

The philosophy that elementary teachers need less training than high school teachers still existed in 1923. Although the Life Elementary certificate was defined and programmed that year, it still required only two years of college training with sixteen hours of professional education to be completed. That same year the requirements for the Two-Year Elementary Certificate took only one year of college preparation for completion; the same certificate for high school took two years to complete.

Accrediting agencies were a force whose impact was being felt on the formulation of policies concerning standards of teacher education. The North Central Association of Colleges and Secondary Schools' (a regional accreditation group) standards could not be ignored in teacher certification as the number of Oklahoma high schools increased in membership. One of their requirements was that teachers

in high schools be assigned to their particular field of study. Having been a member of the North Central Association since 1919, Oklahoma State University saw a need to publish in its 1925-26 catalog that its teacher education program met the standards of the North Central Association.

The Graduate School was organized in 1928, and teachers enrolled in it for post-graduate work. Graduate work had been offered in some fields since 1910, but it had been under the direction of the Committee on Courses until 1928.

The three-year period from 1929 to 1931 was unstable for certification with changes being made in both elementary and secondary curricula. In 1929, the Five-Year Elementary certificate was introduced in between the Two-Year and Life Elementary certificates. That same year a course was planned for elementary teachers pursuing a degree; however, the life certificate could still be secured with a two-year program.

The following year, 1930, students were required to choose two teaching fields in which to concentrate. In 1931, increases in certificate requirements were introduced: Two-Year Elementary to a forty-hour program; Five Year Elementary to a sixty-hour program; Two-Year High School to a ninety-hour program; Five-Year High School to a bachelor's degree program with sixteen hours of professional work in education. Following this period of teacher certification changes, there was little change for the next five years.

It would be difficult to proceed with a description of the evolution of teacher education at Oklahoma State University

without recognizing contributions of Herbert Patterson, who served as dean of the School of Education from 1919 to 1936. These seventeen years involved a highly transitional period when state agencies, accreditation associations, and groups with varied philosophies about teachers were all helping to rock the boat. Dean Patterson must have been a central figure in helping to guide the College of Education through such an unstable period.

The results of a depression, a change in administration, and greater pressure from accrediting agencies caused Oklahoma State University to recognize its program in teacher education in 1936.

This was an opportune time for standards and qualifications to be strengthened in Oklahoma, because unemployment during the depression years had caused an abundance of teachers. The State Board of Education changed its certificates to two types: one was a certificate for teaching in high schools and the other for teaching in the elementary schools. A one-year certificate (requiring seventy-six hours for elementary and ninety hours for high school) was issued for each type. Also, high school teachers were certified in special fields rather than the old Life Certificate which gave them a license to teach any high school subject.

Under a new head, Dean N. Conger, teacher education was designed to meet the new state requirements. There were programs written for twenty-five special high school certificates. The requirements were not changed until thirteen

years later when the State Department initiated its plan leading to a degree for all teachers. Also in 1936, the first steps were taken toward improving the quality of teacher candidates by the specifications that a 2.00 grade point average for the junior and senior years.

In 1936, the College of Education, because of its growth, divided into the Department of Psychology, Department of Educational Administration, and Department of Religious Education. It is also important to note that the school was dividied into the lower division and upper division. The former was to stress general education and the latter to concentrate on special and professional preparation.

The year of 1936 could be claimed as the first for teacher screening at Oklahoma State University. This was another attempt to improve the quality of candidates in teacher education. The plan used in the School of Science and Literature (now the College of Arts and Sciences) to screen students for upper division work was used in the College of Education. The requirements were that a candidate must have a 2.00 grade point average, be in good health, and pass a qualifying subject matter examination to be admitted.

The Doctor's Degree in Education was added to the program in 1938. The departments of Education Administration and Secondary Education were offering seventy-seven courses, while the Department of Psychology and Philosophy was offering thirty-eight courses to meet the demands for professional work.

The emerging of the professional accrediting agencies helped to initiate the move to standardize practices across the nation; one of the first was the National Council on Accreditation. Another early group which was concerned with institutions preparing teachers was the American Association of Colleges for Teacher Education. In 1946, the creation of the National Commission on Teacher Education and Professional Standards was the beginning of the "professional standards movement." Quoting Ferman Phillips, the executive secretary for the Oklahoma Education Association, from a speech given to the annual meeting of the Council on Teacher Education:

> In 1948, there came into existence the AACTE or American Association of Colleges for Teacher Education. The AACTE developed standards and applied them to colleges and universities throughout the country. July 1, 1954, AACTE turned over to a new organization the accrediting problem or the listing of approved institutions in the field of teacher education. This new organization was known as NCATE or the National Council for Accreditation of Teacher Education.
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> NCATE came into existence as the result of the realization of the leaders of the profession that professional accreditation was and is a must if professional status is to be achieved in this country. . . That the profession of teaching must participate in the development of accrediting standards through organization was realized by the profession in its struggle to achieve excellence and discharge its responsibilities to the public and to itself.[13]

The post-war years of World War II witnessed a revival of interest in teacher education and the strengthening of

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[13] Report of the Annual Meeting of the Oklahoma Council on Teacher Education, p. 30.

the certification program at the state level. Several factors were to play an important role in the development of the program adopted in 1949 by the State Department of Education for certifying teachers. This was a program designed through sequential steps to bring all teachers to a degree level of preparation.

Many substandard or emergency certificates had been issued during the critical war years and were still being used by teachers after World War II. Dr. Oliver Hodge, State Superintendent of Public Instruction, said:

> Dr. Hall mentioned that some fourteen years ago, from statistics nationally, we probably had more than our share of unqualified teachers in Oklahoma at that time. If I live to be one hundred ten years old, I'll always remember this figure: In January of 1947, I found that we had eleven hundred four teachers in this state at that time who had war emergency certificates, which meant that they had no college preparation, or practically none, at all. In addition to that, we had a number of others who had temporary certificates with slightly more college preparation.[14]

This was not only drawing criticism from the public in general but was meeting with disfavor within the profession itself.

The State Department of Education was concerned, but they had to wait for a supply of teachers to increase standards. The returning service personnel and defense workers to the profession relieved the shortage. The big relief was to come, however, from the sudden explosion in college enrollment

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[14]Ibid., p. 20.

made possible by the G. I. bill. This new source was soon to pump new life into the production of teachers. Thus, the increase in qualifications for teachers, starting four years after the war, seems appropriately timed.

The Oklahoma legislature was willing to enact new laws, if necessary, to give the State Board the authority to make the needed regulations and the power to enforce them.[15]

One of the most influential groups in Oklahoma to push for improvement in teacher standards was the Oklahoma Commission on Teacher Education and Certification. Its power seems to lie within its organizational structure. It is composed of representatives from groups of people in Oklahoma who are interested in the improvement of teacher education. The groups are administrators and teachers from both the public schools and colleges, the Oklahoma Congress of Parents and Teachers, the State Regents of Higher Education, the Oklahoma Education Association, the State School Boards' Association, and the County Superintendents. It was given power by the legislature to be advisory to the State Board of Education.[16]

The program leading toward the present standards was begun the last year of Dean Little's administration in 1949 and has been carried out successfully during Dean Holley's

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[15]Guy Curry, An Analysis of the Program of the Oklahoma Commission on Teacher Education and Certification, (unpublished Ed.D. dissertation, Oklahoma State University, 1950), p. 42.

[16]Ibid., p. 48.

and Dr. N. H. Evers' administration of teacher education. All certificates specify a degree with at least twenty-one hours in professional education, fifty hours in general education, and an area of specialization. The Life Certificate has been replaced with the Standard Certificate, which is renewable at five-year intervals.

V I T A

C J Smith

Candidate for the Degree of

Doctor of Education

Thesis: A LONGITUDINAL STUDY OF GENERAL EDUCATION DEVELOPMENT OF TEACHER EDUCATION CANDIDATES IN THE COLLEGE OF EDUCATION AT OKLAHOMA STATE UNIVERSITY

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Personal Data: Born at Hobart, Oklahoma, April 30, 1923, the son of Cyrus William and Nina Smith.

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