



Selected variables that predict success on the general education development test with rural manpower adult basic education students at Helena, Montana Learning Center
by Thomas Donnelly Carlin

A thesis submitted in partial fulfillment of the requirements for the degree of DOCTOR OF
EDUCATION

Montana State University

© Copyright by Thomas Donnelly Carlin (1979)

Abstract:

The purpose of this study was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education Development test, and second, to determine predictive efficiency between those selected independent variables and success on the General Education Development test (GED).

The problem was investigated by (a) a thorough review of the literature related to the problem; (b) collecting data from ninety full-time Manpower adult basic education students who entered the Helena, Montana Adult Learning Center from August 1, 1978 through April 1, 1979 and voluntarily completed the General Aptitude Test Battery (GATB), the California Test of Adult Basic Education (CTABE), the California Test of Adult Personality (CTP), the Biographical-Demographical data sheet, and subsequently wrote all five subtests of the GED examination.

The major results of the study indicated that (a) the full multiple regression model found the thirty-five independent variables able to predict success better than chance on the following GED subtests: GED English, GED Social Studies, GED Science, GED Literature, GED Math, and the GED Total Battery; (b) the restricted multiple regression model found the nine independent variables on the GATB and the four independent variables on the CTABE able to predict success better than chance on the following GED subtests: GED English, GED Social Studies, GED Science, GED Literature, GED Math, and the GED Total Battery; (c) the stepwise multiple regression model found eleven to thirteen independent variable able to predict success better than chance on the following GED subtests: GED English, GED Social Studies, GED Science, GED Literature, GED Math, and the GED Total Battery; (d) double cross-validation was employed in order to check the predic-live efficiency of the prediction equation which was based on the most significant thirteen GED Total Battery stepwise variables. The drop in R square from .6094 to .408 and from .5949 to .246 casts doubt on the predictive efficiency of the equation based on all ninety subjects. These conclusions suggest that one must be cautious in generalizing the results beyond the immediate sample involved.

The major recommendations of the study were: (a) that other adult learning centers should be made aware that a predictive model of GED success has been developed; (b) that other adult learning centers are encouraged to modify the present predictive model or develop a predictive model of GED success based on their own population and socioeconomic situation; (c) that the predictive model should be field tested at the Helena Adult Learning Center on both Manpower and non-Manpower students for one year.

© 1979

THOMAS DONNELLY CARLIN

ALL RIGHTS RESERVED

SELECTED VARIABLES THAT PREDICT SUCCESS ON THE GENERAL
EDUCATION DEVELOPMENT TEST WITH RURAL MANPOWER
ADULT BASIC EDUCATION STUDENTS AT THE HELENA,
MONTANA ADULT LEARNING CENTER

by

THOMAS DONNELLY CARLIN

A thesis submitted in partial fulfillment of
the requirements for the degree

of

DOCTOR OF EDUCATION

Approved:

Earl D Ringo
Chairperson, Graduate Committee

Eric Strohmayer
Head, Major Department

Henry L Parsons
Graduate Dean

MONTANA STATE UNIVERSITY
Bozeman, Montana

August, 1979

ACKNOWLEDGMENT

The assistance, dedication, and cooperation of many individuals made the completion of this study possible. I wish to thank all participating students, staff, and faculty members at the Helena Adult Learning Center. A personal thank you is extended to Mr. Patrick O'Leary, Director of the Helena Adult Learning Center, for his patience and contribution of time and resources which enabled this study to be completed. I wish to express sincere appreciation to my chairman, Dr. Earl Ringo; Dr. Eric Strohmeyer; and Dr. Albert Suvak for all of their counsel, time, and guidance in helping me design and complete this dissertation.

I would also express my thanks for the encouragement and support of my remaining graduate committee members; Dr. Richard Horswill, Burl Winchester, Dr. Douglas Herbster, and Dr. William Hunt.

I wish to extend special thanks for the technical and clerical assistance of Ms. Michele Stearns, Ms. Alice Ferguson, and Ms. Joan Jackson without whose contribution this project would have been extremely difficult to complete.

My son Christopher Thomas has sacrificed the most in order for his father to complete a most important and vital professional goal. My heart was with him throughout the entire process.

TABLE OF CONTENTS

	Page
LIST OF TABLES	vii
LIST OF FIGURES	xi
ABSTRACT	xii
 Chapter	
1. INTRODUCTION	1
STATEMENT OF THE PROBLEM	5
NEED FOR THE STUDY	6
GENERAL QUESTIONS TO BE ANSWERED	9
GENERAL PROCEDURES	11
LIMITATIONS AND DELIMITATIONS	13
DEFINITION OF TERMS	14
SUMMARY	17
2. REVIEW OF LITERATURE	20
HISTORY OF THE GED TEST	20
PREDICTORS OF GED SUCCESS	27
GED USED AS A PREDICTOR OF SUCCESS	38
SUMMARY	47
3. PROCEDURES AND METHODOLOGY	50
POPULATION DESCRIPTION	51
STAFFING AND STUDENT POPULATION	52
SITE DESCRIPTION	52

Chapter	Page
CATEGORIES OF INVESTIGATION	53
GATB	54
CTABE	54
CTP	54
GED	55
METHOD OF DATA COLLECTION	56
METHODS OF ORGANIZING DATA	61
STATISTICAL HYPOTHESES	62
ANALYSIS OF DATA	66
PRECAUTIONS TAKEN FOR ACCURACY	68
SUMMARY	69
4. ANALYSIS OF DATA	72
INTRODUCTION	72
METHOD OF SAMPLING AND NUMBER SAMPLED	72
DATA TABULATION	73
DOUBLE CROSS-VALIDATION	170
SUMMARY	171
5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	188
INTRODUCTION	188
SUMMARY OF STUDY	188
Statement of the Problem	188
Need for the Study	189
General Procedures	190
Literature Reviewed	192
Specific Procedures	195
Findings	197

Chapter	Page
CONCLUSIONS	210
RECOMMENDATIONS	215
BIBLIOGRAPHY	219

LIST OF TABLES

Table	Page
1. Correlation Matrix Between the Thirty-five Independent Variables and the Seven Dependent Variables	74
2. Correlation Matrix Between the Thirty-five Independent Variables and GED English	78
3. Correlation Matrix Between the Thirty-five Independent Variables and GED Social Studies	79
4. Correlation Matrix Between the Thirty-five Independent Variables and GED Science	81
5. Correlation Matrix Between the Thirty-five Independent Variables and GED Literature	83
6. Correlation Matrix Between the Thirty-five Independent Variables and GED Math	84
7. Correlation Matrix Between the Thirty-five Independent Variables and the Total GED Test Battery	86
8. Correlation Matrix Between the Thirteen GATB and CTABE Independent Variables and the Seven GED Dependent Variables	88
9. Multiple Regression Analysis--Full Model GED English: Thirty-five Independent Variables	90
10. Multiple Regression Analysis--Restricted Model GED English: GATB	94
11. Multiple Regression Analysis--Restricted Model GED English: CTABE	96
12. Multiple Regression Analysis--Restricted Model GED English: CTP	98

Table	Page
13. Multiple Regression Analysis--Restricted Model GED English: Biographical-Demographical	100
14. Stepwise Regression Analysis GED English: Thirty-five Independent Variables	103
15. Multiple Regression Analysis--Full Model GED Social Studies: Thirty-five Independent Variables	105
16. Multiple Regression Analysis--Restricted Model GED Social Studies: GATB	109
17. Multiple Regression Analysis--Restricted Model GED Social Studies: CTABE	110
18. Multiple Regression Analysis--Restricted Model GED Social Studies: CTP	112
19. Multiple Regression Analysis--Restricted Model GED Social Studies: Biographical-Demographical	114
20. Stepwise Regression Analysis GED Social Studies: Thirty-five Independent Variables	116
21. Multiple Regression Analysis--Full Model GED Science: Thirty-five Independent Variables	118
22. Multiple Regression Analysis--Restricted Model GED Science: GATB	122
23. Multiple Regression Analysis--Restricted Model GED Science: CTABE	123
24. Multiple Regression Analysis--Restricted Model GED Science: CTP	125
25. Multiple Regression Analysis--Restricted Model GED Science: Biographical-Demographical	127

Table	Page
26. Stepwise Regression Analysis GED Science: Thirty-five Independent Variables	129
27. Multiple Regression Analysis--Full Model GED Literature: Thirty-five Independent Variables	131
28. Multiple Regression Analysis--Restricted Model GED Literature: GATB	135
29. Multiple Regression Analysis--Restricted Model GED Literature: CTABE	136
30. Multiple Regression Analysis--Restricted Model GED Literature: CTP	138
31. Multiple Regression Analysis--Restricted Model GED Literature: Biographical-Demographical	140
32. Stepwise Regression Analysis GED Literature: Thirty-five Independent Variables	142
33. Multiple Regression Analysis--Full Model GED Math: Thirty-five Independent Variables	144
34. Multiple Regression Analysis--Restricted Model GED Math: GATB	148
35. Multiple Regression Analysis--Restricted Model GED Math: CTABE	149
36. Multiple Regression Analysis--Restricted Model GED Math: CTP	151
37. Multiple Regression Analysis--Restricted Model GED Math: Biographical-Demographical	153

Table	Page
38. Stepwise Regression Analysis GED Math: Thirty-five Independent Variables	155
39. Multiple Regression Analysis--Full Model GED Total: Thirty-five Independent Variables	157
40. Multiple Regression Analysis--Restricted Model GED Total: GATB	161
41. Multiple Regression Analysis--Restricted Model GED Total: CTABE	162
42. Multiple Regression Analysis--Restricted Model GED Total: CTP	164
43. Multiple Regression Analysis--Restricted Model GED Total: Biographical-Demographical	166
44. Stepwise Regression Analysis GED Total: Thirty-five Independent Variables	168
45. Correlation Matrix Between the Thirteen GATB and CTABE Independent Variables and the SEVEN GED Dependent Variables	198

LIST OF FIGURES

Figure	Page
1. Double Cross-Validation	170

ABSTRACT

The purpose of this study was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education Development test, and second, to determine predictive efficiency between those selected independent variables and success on the General Education Development test (GED).

The problem was investigated by (a) a thorough review of the literature related to the problem; (b) collecting data from ninety full-time Manpower adult basic education students who entered the Helena, Montana Adult Learning Center from August 1, 1978 through April 1, 1979 and voluntarily completed the General Aptitude Test Battery (GATB), the California Test of Adult Basic Education (CTABE), the California Test of Adult Personality (CTP), the Biographical-Demographical data sheet, and subsequently wrote all five subtests of the GED examination.

The major results of the study indicated that (a) the full multiple regression model found the thirty-five independent variables able to predict success better than chance on the following GED subtests: GED English, GED Social Studies, GED Science, GED Literature, GED Math, and the GED Total Battery; (b) the restricted multiple regression model found the nine independent variables on the GATB and the four independent variables on the CTABE able to predict success better than chance on the following GED subtests: GED English, GED Social Studies, GED Science, GED Literature, GED Math, and the GED Total Battery; (c) the stepwise multiple regression model found eleven to thirteen independent variable able to predict success better than chance on the following GED subtests: GED English, GED Social Studies, GED Science, GED Literature, GED Math, and the GED Total Battery; (d) double cross-validation was employed in order to check the predictive efficiency of the prediction equation which was based on the most significant thirteen GED Total Battery stepwise variables. The drop in R square from .6094 to .408 and from .5949 to .246 casts doubt on the predictive efficiency of the equation based on all ninety subjects. These conclusions suggest that one must be cautious in generalizing the results beyond the immediate sample involved.

The major recommendations of the study were: (a) that other adult learning centers should be made aware that a predictive model of GED success has been developed; (b) that other adult learning centers are encouraged to modify the present predictive model or develop a predictive model of GED success based on their own population and socioeconomic situation; (c) that the predictive model should be field tested at the Helena Adult Learning Center on both Manpower and non-Manpower students for one year.

Chapter 1

INTRODUCTION

Many individuals perceive adult education as a fairly new or contemporary educational phenomenon. Education for adults has been generally thought of as college, university, or vocational-technical in nature. Neither assumption is totally true nor accurate. Adult education has been practiced in this country since colonial times. A vast number of adult people will enroll in colleges, universities and vocational-technical centers this year. However, over 8 percent of the adult population will enter adult education courses or programs during this same time period (Knowles, 1962:250). In terms of a 1978 census, this will mean that over twelve million people will pursue some aspect of adult education.

Historically, adult education has emerged in response to adult needs. Adult education has tried to address questions and problems that prevent adults from achieving their goals. Elementary schools, high schools, junior colleges, technical institutions, and colleges and universities have all emerged under the broad concept of general education which predicts a continuing process of learning. The programs for the education of adults have emerged without a grand design or master plan.

The number of needs met in this country by adult education has been monumental. Examples of "need meeting" have been agrarian

problems, industrial difficulties, assimilation of ethnic groups, and the problems of coping with change in our society. The adult education profession must be expansive and flexible in order to meet these needs. A more rigid system would have difficulty adjusting to change as characterized in present-day American society. Thus, the adult education field has in itself become a social system rather than an institution, since social systems are meant to exist for people. Therefore, adult education is a very personal field striving to meet the interests and desires of individuals (Knowles, 1962:249-57).

The Research Committee of the National Advisory Council on Adult Education found from careful study of the 1970 Census that 54 1/3 million adults in the United States who are sixteen years of age and older and not enrolled in school, have not completed their high school education or its equivalency. This population of adult students who have not finished high school or its equivalency are known as adult basic education students. This differentiation is necessary in order to discern between those individuals who enter adult education to work towards their General Education Development test (GED) credential and those entering adult education for post secondary or enrichment programs (National Advisory Council on Adult Education, 1974).

Approximately four million students with less than a high school diploma entered adult basic education (ABE) classes between 1970-74. This figure was well below the fifty-four million adults in

need of basic education and subsequent GED certificate. What appeared equally ominous was the fact that close to 900,000 young people were leaving school before completing their formal educations. It was apparent that enrollments in ABE programs barely kept up with those leaving high school. The problem has become a national concern with fifty-four million adult citizens striving to function in a society that is changing continuously (National Advisory Council on Adult Education, 1974:52-53).

Assuredly, not all of the fifty-four million adults with less than a high school diploma are in desperate need of ABE or the GED credential. Many individuals in this particular population are extremely competent, self taught and successful in their life's work. They are not recognizeable and the majority of those people who are degreed assume the non-high school graduate does and has possessed a high school diploma all along. This investigator has worked with numerous citizens in the Helena ABE program who were highly successful and who desired the GED for personal and psychological reasons only. Many ABE students wished their identities to be kept confidential, as their particular businesses or occupations could be threatened if certain members of the community learned that they did not possess a college degree as many assumed. However, there still remains a large percentage of the non-high school adult population that is in great need of ABE instruction and the GED certificate. Rauch (1972:1-25)

stated that people with below norm (high school) educations could experience limitations on their ability to realize their full potential as individuals from both a social and economic standpoint. The National Advisory Council on Adult Education went on to state that non-high school graduates lagged far behind in every facet of the labor market. The rate at which they participated in the labor force was significantly below the rest of the population. Their unemployment rates were much higher, and they did not hold as many full-time jobs. Presently, non-high school graduates are the last to be hired and the first to be fired. Their jobs are more hazardous with fewer fringe benefits. As many as 3½ million people not enrolled in ABE and without a high school diploma have been receiving welfare assistance. Each year fewer work positions are available in the unskilled and semi-skilled job market, a fact which renders individuals without ABE and the GED certificate increasingly handicapped (National Advisory Council on Adult Education, 1974:11). The global picture for non-high school graduates not participating in ABE appears discouraging for the future.

ABE has been a major component of adult education for many years. However, not until the 1940's was there an instrument available to determine if a student possessed sufficient academic skills to certify his or her competency equal to a high school graduate. The General Education Development test (GED) was produced for the Veteran's Testing Service for use with armed service veterans readjusting to

civilian life during and after World War II. In 1947, the GED tests were administered to non-veterans for the first time. By 1959, the number of non-veteran adults exceeded the number of veterans and armed service personnel being tested (General Education Development Testing Services of the American Council on Education, 1971:1). In 1976, (latest figures available) 346,490 individuals successfully completed the GED examination (General Education Development Testing Service of the American Council on Education, 1976:4). Since 1966, over two million people have passed the GED test at a level sufficient to earn a high school diploma or equivalency certificate (Miller, 1976:1). The GED has become a universally accepted and validated instrument allowing adults who have not completed high school the opportunity to earn an equivalent credential according to Gustav Froehlich (Buros, 1953, 4th section, 4-26).

STATEMENT OF THE PROBLEM

The problem of this study was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education Development test, and second, to determine predictive efficiency between those selected independent variables and success on the General Education Development test. The independent variables were standardized tests and biographical-demographical information. This study involved all Manpower

adult learning students entering the Helena Adult Learning Center from August 1, 1978 to April 1, 1979.

NEED FOR THE STUDY

The number of people completing ABE programs and successfully completing the GED examination falls far short of the population of high school age students leaving their formal educations annually both nationally and in the Helena, Montana area. Adult educators must find ways of attracting more adult basic education students into ABE programs and the eventual writing of the GED test. This investigator believes that more adults desiring basic education could be recruited and educated and could successfully complete ABE programs if those students could be evaluated at the time of their initial enrollment by having their social, achievement, aptitude, and personality needs identified. This identification process would then allow for individual remediation. Each student's remedial program would focus upon the barriers keeping that person from successfully completing the GED examination. The identified barriers may not be totally academic in nature. The ABE student may have personal, social, and family difficulties which prevent that individual from benefiting from adult basic education. The ABE student may drop out of the

educational program because of variables that have little to do with academic ability. Therefore, variables that appear significant to a student's success or failure must be identified. The total adult basic education process would then enter to serve the needs of the student. Variables that are identified as maladaptive within a particular student could be remediated through instruction, counseling or referral to the appropriate professional agency or organization. Nationally, 67.8 percent of those ABE students who took the examination in 1976 were successful. The success rate was somewhat lower than the national average for the past 20 years (General Education Development Testing, 1976:16). These statistics indicate to this investigator that 32.2 percent of the ABE population who are unsuccessful need additional evaluation and remediation. Cyril Houle (1972:297) stated that "a serious problem of adult education is its low retention rate and research on its causes . . . and the inability of students to adjust to learning." Therefore, the key issues are first to identify the needs of adult basic education students and second, to determine the predicting value of certain student variables as they relate to the GED examination.

Glenn Parker summarized his research findings on ABE needs when he stated "Perhaps the major criticism made against adult education programs is that they do not meet the needs of students" (Parker, 1972:113). Most would agree that research must be an integral part

of any profession, including adult basic education. Research will allow the identification of ABE student needs. The increase in the amount of research and the improvement in its quality over the last decade supports the concern of the educator with obtaining answers to questions which can be resolved through this process. One of the major problems with research at the local ABE Center level is that these centers are concerned with daily operations and find little time for research. The program may be working but the effectiveness remains a problem. As Burton Kreitlow pointed out, "Actually the question is not whether it works, but whether it works better than something else, and whether it is the most effective means of accomplishing the objective set" (Knowles, 1960:108-109).

Kreitlow goes on to ask

What particular mental, physical, and emotional needs are important to adults? What determines what the adults want from adult education agencies? Can adult education help develop adult wants so that they are closely allied to high priority adult needs? What needs of individuals are within the realm of agency concern? What do we know about adults in general? (Knowles, 1960:113).

Malcolm Knowles looked to the works of Abraham Maslow in identifying and understanding man's needs. On the hierarchy of needs, Knowles concurs that man's basic biological needs must be met before the educational process can begin. As the lower needs were met, the individual would strive for gratification at the next highest level (Knowles, 1970:23-25).

The implications are clear. This research project is necessary in order to significantly correlate between selected independent variables and success on the GED and to determine predictive efficiency between those selected independent variables and success on the GED.

GENERAL QUESTIONS TO BE ANSWERED

Analysis of data gathered in this study attempts to answer the following questions:

1. To what extent will each selected independent variable correlate with success on the English test of the GED?
2. To what extent will each selected independent variable correlate with success on the social studies test of the GED?
3. To what extent will each selected independent variable correlate with success on the science test of the GED?
4. To what extent will each selected independent variable correlate with success on the literature test of the GED?
5. To what extent will each selected independent variable correlate with success on the math test of the GED?
6. Will each selected independent variable correlate with success on the total GED test battery?
7. To what extent will all selected independent variables correlate with success on the English test of the GED?

8. To what extent will all selected independent variables correlate with success on the social studies test of the GED?

9. To what extent will all selected independent variables correlate with success on the science test of the GED?

10. Will all selected independent variables correlate with success on the literature test of the GED?

11. Will all selected independent variables correlate with success on the math test of the GED?

12. Will all selected independent variables correlate with success on the total GED test battery?

13. To what extent does each independent variable contribute to the prediction of success on the GED English test?

14. To what extent does each independent variable contribute to the prediction of success on the GED social studies test?

15. To what extent does each independent variable contribute to the prediction of success on the GED science test?

16. To what extent does each independent variable contribute to the prediction of success on the GED literature test?

17. To what extent does each independent variable contribute to the prediction of success on the GED math test?

18. To what extent does each independent variable contribute to the prediction of success on the total GED test battery?

GENERAL PROCEDURES

The procedures followed in this study were:

1. A thorough survey of literature and related research was conducted by this investigator.
2. Five instruments were used; one survey and four standardized tests which included:
 - a. A biographical and demographical data profile sheet was used for the identification and classification of each GED student. Each student was asked to provide information related to their age, sex, level of education, marital status, number of children, and years of job experience.
 - b. A standardized test of aptitude, The General Aptitude Test Battery, was used to identify nine areas of individual aptitude.
 - c. A standardized test of achievement, The California Test of Adult Basic Education, was used to identify three areas of individual achievement.
 - d. A standardized test of personality, The California Test of Adult Personality, was used to identify twelve areas of individual personality.
 - e. The General Education Development Test (GED) was administered to Manpower adult basic education students who

completed their basic education studies. Five competency areas and a total GED score were derived.

3. General questions answered were formulated to address the problem of this study which was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the GED test and second, to determine the predictive efficiency between those selected independent variables and success on the GED test.

4. Hypotheses related directly to the general questions to be answered were established.

5. Permission to conduct the study was obtained from the Supervisor of Adult Basic Education, Helena Adult Learning Center, Helena, Montana.

6. With permission granted, all full-time Manpower adult basic education students who entered the Helena Adult Learning Center from August 1, 1978 until April 1, 1979, were asked to voluntarily cooperate in this research project. Procedures for confidentiality were outlined. Each student was asked to voluntarily sign a release of information document in order that test scores could be acquired.

7. Biographical data, demographical data, and standardized test data results were recorded, studied, and statistically analyzed. Conclusions and recommendations were drawn.

LIMITATIONS AND DELIMITATIONS

The following were limitations of this study:

1. This study considered only selected biographical and demographical variables that most likely would predict success on the General Education Development test.
2. This study considered only selected aptitude, achievement, and personality variables that would predict success on the General Education Development test.
3. The review of literature for this study was limited to the resources of the Montana State University Library, the Montana State Library in Helena, Montana, other libraries through inter-library loans, and extensive use of ERIC, Dissertation Abstracts, Psychological Abstracts, and Sociological Abstract sources.
4. The outcomes and generalizations of this study were limited to the students who completed the GED test at the Helena Adult Learning Center, Helena, Montana.

The following were delimitations of this study:

1. This study was conducted exclusively at the Helena Adult Learning Center, Helena, Montana.
2. This study considered only full-time Manpower adult basic education students at the Helena Adult Learning Center.

3. This study considered only those Manpower adult basic education students entering the Helena Adult Learning Center between August 1, 1978 and April 1, 1979.

4. This study incorporated only the following standardized tests: General Aptitude Test Battery, California Test of Adult Basic Education, California Test of Personality, and the General Education Development Test.

DEFINITION OF TERMS

Adult. A person who has come into that stage of life in which he has assumed responsibility for himself and usually for others and who has concomitantly accepted a functional role in his community (Good, 1973:16).

Adult Basic Education (ABE). An instructional program for the undereducated adult planned around those basic and specific skills most needed to help him function more adequately as a member of society (Good, 1973:16).

Adult Education (AE). Any process by which men and women, either alone or in groups, try to improve themselves by increasing their knowledge, skills, or attitudes, or the process by which individuals or agencies try to improve men and women in these ways (Good, 1973:16).

Adult Educator. A person with specialized training, education, and/or significant experience in the field of adult education, involved in the planning and directing of educational activities for adults (Good, 1973:17).

Adult Education Center. A physical facility designed or adapted expressly for the education use of adults, sponsored by schools, colleges, universities, communities, organizations, industries, etc.; within some of them are included residential quarters for the participants (Good, 1973:84).

Adult Education Student. One who usually attends an adult education center for serious study to improve oneself (Good, 1973, 561).

Adult Basic Education Student. One who usually attends an adult education center for serious study of basic and specific skills (Good, 1973:561).

Supervisor. The professional person responsible for the promotion, development, maintenance, and improvement of instruction in a given field (Good, 1973:574).

Counseling Psychologist. A staff member who counsels students who manifest problems of a personal and social nature, uses the results of psychological tests, and performs therapy (Good, 1973:147).

General Education Development Test (GED). A comprehensive test used primarily to appraise the educational development of adults

who have not completed their formal high school education; through achievement of satisfactory scores adults may earn a high school equivalency certificate, qualify for admission to college or to more advanced educational or employment opportunities, or meet qualifications for admission to licensing examinations for certain occupations (Good, 1973:598).

General Aptitude Test Battery (GATB): A multiple aptitude test battery developed by the United States Employment Service for use by counselors in the State Employment Service offices. This battery consists of fifteen tests yielding ten scores: intelligence, verbal, numerical, spatial, form perception, clerical perception, aiming, motor speed, finger dexterity, and manual dexterity. The GATB is suitable for use with ages sixteen and over (Hopke, 1968:154).

California Tests of Adult Basic Education (CTABE). The 1976 Edition--achievement tests in reading, mathematics, and language-basic skills required to function in a society that demands their constant use. The test items, adapted from the 1970 edition of the California Achievement Tests (CAT-70), reflect language and content appropriate for adults and measure the understanding and application of conventions and principles; they do not measure specific knowledge or recall facts. The test is designed for use in a variety of educational settings to fill a number of assessment and instructional needs (CTABE Examiner's Manual, 1976:1).

SUMMARY

Adult education has been a viable component of this country's educational system since the founding of this nation. According to present statistics, 8 percent of the adult population will enter adult education courses or programs this year. Adults have used education to solve problem areas that affected their lives. They would join together to answer questions that were bothersome or critical to society. Adult education still addresses the needs of its constituency. Millions of adults are returning to adult education programs to enrich their lives and broaden their potentialities.

Adult Basic Education has become a segment of adult education which is very pragmatic and concerned with each adult possessing basic educational skills. In order to maintain in present-day American society individuals must possess basic reading, math, and language skills. Therefore, adult basic education has become a flexible social system striving to meet the educational equivalency criteria of a rapidly advancing society.

Adult educators are well aware that over fifty-four million adult Americans possess less than a high school diploma or its equivalency. Approximately one million adult basic education students will return to school, many to work towards completion of the General Education Development test (GED). Close to 900,000 high school age students

will leave the traditional educational setting before graduating this year. The problem is apparent: each year an increasing number of adults enter competitive society without the educational tools necessary to meet their potential. As society becomes more complex, individuals without basic education skills and an equivalency certificate find themselves increasingly handicapped.

The General Education Development Test (GED) has become a universally accepted and validated instrument of general ability. More than two million people have successfully taken the GED examination since 1966. Successful GED recipients are then received by business, industry, and institutions of higher education on an equal status with high school graduates. Consequently, individuals who have been placed in the status of second class citizenship have the opportunity to become first class citizens by successfully completing the GED examination.

It appears that adult basic education will be called upon to take on the responsibility of providing increased educational services to those in need of basic skills and the GED certificate. There is a need for an improved means of evaluating and assessing student aptitude, achievement, personality, and social capabilities. If adult educators were aware of variables that efficiently predict success on the GED Test, they could lessen training time and develop more effective means of remediation. Authorities in the field of adult education

and adult basic education have called for research which will address the needs of adult students returning to the classroom. This study attempted to deal with those needs.

All Manpower adult basic education students entering the Helena Adult Learning Center between August 1, 1978 and April 1, 1979, who were willing to participate in this research study were asked to provide selected biographical and demographical information. They were also asked to complete the GATB, CTABE, and the CTP. These instruments were used as independent variables which were correlated with the dependent variable, the GED test. When significant correlations were found, those variables were then studied for predictive efficiency.

Adult basic education instructors and counselors will use the findings of this study to determine where their students' chances are in relation to successful completion of the GED test. Therefore, a shorter more definitive battery of evaluation tools will facilitate the work of the adult educator.

Chapter 2

REVIEW OF LITERATURE

Chapter 2 consists of three main areas of review. The first area lends itself to an historical approach dealing with the inception of the General Education Development Test (GED) program in 1942 to its present form and universal usage. The second part of Chapter 2 deals with specific related literature that is relevant to specific study, observation, and research on prediction of success on the GED test itself. The second part addresses the main purpose of this dissertation. The third and final section of Chapter 2 focuses attention on the ultimate use of the GED as a predictor of success on advanced educational and vocational endeavors commenced after completion of the high school equivalency requirements.

HISTORY OF THE GED TEST

The 1976 GED Statistical Report stated that close to 540,000 individuals in 1972 completed the GED examinations throughout the United States of America, its territories and Canada (GED Testing, 1976:4). The number of GED examinations taken and completed has risen dramatically since the beginning of the GED testing program for armed services veterans in 1942. In the state of Montana, 2,365 individuals completed the GED examination in 1976. Of those 2,365 people, 2,180 successfully completed all five parts of the examination and were

issued equivalency certificates (GED Testing, 1976:8). The high school level batteries of the GED were developed initially for those veterans who had not completed or graduated from high school and were in need of readjusting to civilian life. High school completion or documented equivalency was necessary in many situations for continuation of educational and vocational plans. An examination staff comprised of civilian test construction experts was commissioned by the United States Armed Forces Institute to develop the high school equivalency instrument. These endeavors were supported by the American Council on Education, the National Association of Secondary School Principals, and the Regional accrediting association (CASE, 1970:30).

The American Council on Education reports revealed that the GED program was so successful for veterans that in 1947, state departments of education and colleges began administering the GED test to civilian adults who had not completed traditional formal high school requirements. It was noted at that time that large segments of the adult non-veteran population were in need of an equivalency credential for educational and vocational purposes. In 1959, more civilian adults were taking advantage of the GED examination than were the veterans (CASE, 1970:4).

Since 1959, the GED testing program has become world wide in its availability to adults seeing an alternative means of completing

high school equivalency requirements. The GED is administered in all fifty states, the District of Columbia, American Samoa, the Canal Zone, Guam, Puerto Rico, the trust Territory of the Pacific Islands, and five Provinces of Canada: Manitoba, New Brunswick, Nova Scotia, Prince Edward Island, and Saskatchewan. Each department of education has its own policy for issuance of high school equivalence certificates.

Those adults who meet the minimum criteria regarding test scores, age, and residency requirements are issued a certificate (Sharon, 1972:1).

The GED test battery contains five separate tests of academic ability. The five tests are: Test 1: Correctness and Effectiveness of Expression; Test 2: Interpretation of Reading Materials in the Social Studies; Test 3: Interpretation of Reading Materials in the Natural Sciences; Test 4: Interpretation of Literary Materials; Test 5: General Mathematics Ability (General Education Development Testing Services of the American Council on Education, 1971:6-7).

Even though this majority of individuals who complete the GED examination do so for personal, vocational and/or educational reasons, the fundamental purpose of the GED test is to appraise the academic or educational development of adults who left formal high school environments before graduating. The GED test is constructed differently than the well known standardized achievement tests.

Traditional achievement tests measure specific and immediate academic knowledge. The GED strives to measure not only traditional academic knowledge but also calls upon first-hand information, observations, personal experiences, and life-long learning through adaption and maturation. Therefore, the GED is much broader in scope and intent. The test looks for individuals' abilities to handle the basic skills of education, as well as to comprehend and synthesize materials which would allow them to make logical conclusions (GED Testing, 1971:1).

In 1976, there were 540,000 individuals who attempted the GED examination. The average age of the GED candidates was 25.4 years with an average grade completion of formal schooling at the tenth grade level. Approximately 67 percent of the 540,000 individuals successfully completed the examination. Thirty-nine percent of the 1976 GED population indicated that the examination was being taken for entrance into additional educational or training programs. The remainder stated personal reasons, qualifications for better employment or promotion, and completing something that they had not finished as the other major reasons for completing the GED examination (GED Testing, 1976:5-6).

It should be mentioned at this time that the GED equivalency certificates or diplomas issued by the sixty departments of education are considered official documents and are meant to be acceptable as

high school diplomas. It has been found that colleges, universities, business and industry, civil service commissions, apprenticeship training programs, and licensing boards widely acknowledge GED certificates as the equivalent of a high school diploma. Many employers and institutions find successful GED candidates more up to date and academically competent because of adult basic education preparation programs utilized by the candidates before writing the examination (GED Testing, 1971:1). A Commission on Accreditation of Service Experiences survey of approximately 2,200 colleges, revealed that over 1,600 facilities of higher education accept satisfactory GED test scores as sufficient proof of ability to undertake college work (CASE, 1970:3).

Statistical research work performed by Jerry Miller and the staff of the American Council on Education in 1974, found that 5,691,000 adults age eighteen through twenty-four in the United States had less than a high school education and resultant diploma. It is estimated that there are close to forty-five million Americans twenty-five years of age and older who do not possess a high school diploma or its equivalency. This same research found that approximately 25 percent of the high school age population left school before graduation. This percentage increased the number of individuals in the adult population who were under educated and found personal, vocational, and educational goals unattainable. These goals appeared unattainable because business,

industry, and institutions of higher learning had set standard requirements which many have discriminated against those individuals who were capable but who did not possess the proper credentials (Miller, 1976:6).

For over thirty years the GED test has helped millions of individuals advance in their pursuits from a personal, vocational, and educational standpoint. In the past ten years 2.2 million civilians and thousands of armed service personnel have passed the GED at a sufficient level of achievement to earn the high school diploma or equivalency certificate. These figures on a yearly basis equal approximately 10 percent of all high school diplomas issued. Therefore, it can be assumed that the GED has strength as an accepted and reliable program. The test is available in English, French, Spanish, and a form for visually impaired in order that most all people have an opportunity to attempt the examination. The GED tests are nationally normed on high school seniors, thereby allowing a comparison of one's ability on the GED to be measured against those graduating from a formal high school program. The evaluation of learning and competency has its strengths and weaknesses whether it be in high school or GED (Miller, 1976:1-6).

It is of interest to note that the General Educational Development Testing Service is exploring the possibility of developing an employment certificate that measures functional or basic skills for

job requirements that would be at a level lower than the present GED test. The present GED examination is at a level where 20 percent of the high school seniors would not be able to perform at a passing level. The present passing level (dependent upon the particular state) is at approximately the tenth-eleventh grade level of achievement. The lower 20 percent of the population, it is believed, is in need of a test to measure basic skills commensurate with many employment possibilities. Without some form of credential, employers are reluctant to assess a particular person's capability of performing job functions (Miller, 1967:9). Several states, including Montana, have state GED requirements that are low enough [all individual scaled scores above thirty-five (7%) with a scaled score average of thirty-five (7%)] to partially fulfill this need for an employment credential. Typical scores required on the GED in the majority of states are above those required in Montana.

Carlin and O'Leary (1974) established that approximately 35 percent of the adult population in the state of Montana had less than a high school diploma or its equivalency. The average yearly drop-out rate among high school students in the state of Montana was 15 percent. Historically, the number attempting and successfully completing the GED examination has fallen far below the number of citizens presently eligible to take the test plus those high school students who have left school and are now eligible to write the GED. The Helena Adult

Learning Center averages two hundred successful completions of the GED test yearly and has done so since 1971. Between three hundred and four hundred students leave the Helena public schools annually and typically do not return to finish their formal education. The findings by Carlin and O'Leary corresponded with the research findings of Miller (1976) and the Council on Education, in that large numbers of individuals were in need of an equivalency certificate and were not taking advantage of this educational service.

PREDICTORS OF GED SUCCESS

An extensive review of related literature revealed several significant studies identifying variables that predict success on the General Education Development test (GED). This investigator found that each study was fairly specific in those variables they sought to investigate, with the exception of the Carbuhn study (1969) performed with job corpsmen in Utah. Those variables studied for significant prediction were aptitude, achievement, age, years of schooling, reading skill, ethnic group, socio-economic standing, and personality. Several studies found variables that had predictive validity by chance as a result of information derived from the original purpose of the research. There appeared to be several general themes of why studies of prediction were important to research and investigation. The first theme brought forth the need to know what academic preparation was

necessary for a particular GED student, in order that he or she may eventually successfully pass the GED examination. The second theme addressed the problem of time and money: specifically, how long will it take this particular basic education student to become sufficiently academically prepared and how much training time and money will be needed before the person can reasonably expect to be successful in the GED test. The third theme attempted to answer the question of why adult basic education students leave GED studies before finishing their course work and/or writing the GED examination.

The review of literature found the General Aptitudes Test Battery (GATB) to be the most researched and utilized variable of prediction called upon to determine success on the GED test. Studies by Carbuhn (1969) and the United States Employment Service (1977) appeared to be the most significant and worthy of extended discussion. The first six subtests of the GATB (i.e., General, Verbal, Numerical, Spatial, Form Perception, and Clerical Perception) were investigated by Carbuhn (1969:23) in order that they could be included in a selected battery of predictors. These predictors would then be administered to each job corpsman considering basic academic studies and the eventual writing of the GED test. Carbuhn (1969:59-60) found that GATB subtests of Numerical, Spatial, Form Perception, and Clerical Perception were not significantly related to the GED. General and Verbal subtests were found to be highly significant predictors of GED

success with correlations with all five criteria subtests in the .50 to .70 range. Carbuhn (1969:61) used expectancy tables and multiple cut-off scores to determine at what minimal level a person with GATB General and Verbal scores could successfully pass the GED. He found that 90 percent of the corpsmen could complete the GED with General and Verbal scores of eighty or above. GATB scores of less than seventy produced no successful GED candidates. Verbal and General scores of 110 or above insured almost 100 percent successful completion if all other variables and contingencies were equal and positive.

Similar findings were contributed by the United States Employment Service Study (USES). General and Verbal aptitude scores of 110 or above again found almost no GED failures with the four populations investigated (USES, 1977:4). The Employment Service perceived the GED as an instrument to measure whether individuals who had not had or exercised their opportunity to graduate from high school had a sufficient level of education to allow them to compete in the competitive labor market. These non-high school graduates would be directly competing with high school graduates. The USES perceived the GED test to have considerable verbal loading. Employment Service research has found the GATB to correlate highly with the tests which measure the same aptitudes and intelligence. Their conclusion was that those GATB subtests which measured "cognitive aptitudes" were a firm predictor of GED performance (USES, 1977:2).

Four separate statewide populations were studied. The Missouri Study, which had the highest GED scaled score criteria for passing, found that a General score of 108 plus or a Verbal score of 104 plus indicated an excellent chance of success on the GED. Aptitude scores on the General test and Verbal test below ninety showed a high rate of GED failure unless extensive adult basic education was acquired by the particular student (USES, 1977:2). The Wisconsin Study found significant correlation between GED and GATB subtests of General, Verbal, Numerical, and Spatial ability. The highest correlation was with the General and Verbal aptitudes. Those individuals with General and/or Verbal scores of eighty-five to eighty-nine had a 50 percent chance of successfully passing the GED under the Wisconsin criteria of all GED subtests with a scaled score of thirty-five or above, using a scaled score average of forty-five (USES, 1977:3). The Nevada Study population of ninety-two individuals used only the general aptitude as a predictor of success. Results between populations were similar in that a general score of ninety was required for successful completion without adult basic education, while a score of 110 assured virtual success where the GED passing criteria were exactly as those in the Wisconsin group (USES, 1977:3). The Minnesota Study was the most comprehensive of the four Employment Service populations with 186 individuals participating, including an excellent cross section of minorities. GATB aptitudes, general through motor coordination, were

used with the five GED tests. Again, General and Verbal aptitudes held the highest degree of relationships with GED scores. All individuals with General and Verbal scores of 110 or above passed. Minimum scores of ninety plus on General and Verbal aptitudes indicated an 80 percent chance of success (USES, 1977:4).

Continued review of the literature found standardized tests of achievement with emphasis on reading skills to be the second most significant predictor of success in relation to the GED. Educators have known for an extended length of time that reading skill and achievement is the basic ingredient in academic endeavors. Joan Fisher (1973) found that the GED tests required three types of reading skills. She classified these reading skills as literal, inferential, and critical. Social studies, science, and literature called upon these three classifications of reading skills in differing amounts or percentages. The Fisher study found that all three GED subtests could be successfully completed with a scaled score of forty-five with literal reading skills. To obtain a higher scaled score, the student would have to rely on inferential and critical reading performance. For example, Fisher found that the social studies test required 41.5 percent literal reading, 30.8 percent inferential reading, and 6.7 percent critical reading skills (Fisher, 1973:3). Therefore, a general understanding of the content area coupled with tenth grade reading skills, as measured by the California Test of Adult Basic Education, would enable

the student to pass the GED test (Fisher, 1973:5-6). Dowling and Lash (1972), through their work with two hundred successful GED students, found the SRA Reading Test to correlate and predict social studies, science, literature, as well as arithmetic reasoning and computation (Dowling and Lash, 1972:74-85). Carbuhn (1969) stated that the four subtest areas of the Gates Reading Test were statistically significant with the GED with the exception of reading vocabulary and GED math.

A minimum grade equivalent of 7.0 is minimum for English; a vocabulary grade equivalent of 7.0 is minimum for math; a comprehensive grade equivalent of 7.0 is minimum for science, and a vocabulary grade equivalent of 6.5 is minimum for social studies (Carbuhn, 1969:56).

In conjunction with formal and informal means of assessing a student's reading skills, standardized tests of achievement have measured academic readiness for those writing the GED examination. The California Test of Adult Basic Education, the Stanford Achievement Test, and the Adult Basic Learning Examination (ABLE) were the three instruments most widely used. The ABLE test, which is a similar instrument to the CTABE, was used by Waggener (1974) in a multiple regression statistical study designed to predict success on the GED. Correlations ranged from .668 to .748 depending on which GED test was employed. If scores on the ABLE test were known, simply plugging those scores into the appropriate regression formula would produce a highly reliable prediction of performance on the GED (Waggener,

1974:4-8). Anne Anastasi (1969:410) stated that correlations between ABLE tests and the most nearly comparable GED tests ranged from the high .50's to the .70's. Multiple correlations for predicting each GED test score from ABLE tests ranged from .67 to .75.

The Stanford Achievement Test was used by Shegog, Dowling and Lash, and Carbuhn in their studies of GED predictions. Over half of the participants in the Quitman Adult Basic Education Center were found to be between the sixth and eighth grade on the Stanford Achievement Test. Those below the eighth grade level in spelling, arithmetic, reading and vocabulary had extreme difficulty passing the GED. Those individuals scoring above eighth grade academic ability progressively enhanced their percentage of successful GED completion (Shegog, 1972:17). There appeared to be a positive correlation between GED scores and grade level obtained on the Stanford Achievement Test. Dowling and Lash obtained significant correlations between GED and Stanford Achievement scores. As grade level increased, so did the level of GED scores. Frequency distributions indicated most successful GED candidates to be at the tenth grade level or above on the Stanford Achievement Test (Dowling and Lash, 1972:86). Carbuhn, in his Utah study with job corpsmen, found a significant relationship between the advanced level of the Stanford Achievement Test and the GED. The SAT appeared to be highly predictive of GED success, with correlations between the majority of SAT variables and the GED reaching

well above significance at both the .05 and .01 level. Carbuhn was surprised to find such a high interrelationship between SAT variables and GED criteria. He believed this phenomena to be attributable to reading ability and/or general intelligence. Significant findings found in the Utah Job Corpsmen study include an $r = .57$ relationship between SAT language and GED English, an $r = .57$ relationship between SAT Paragraph Meaning and GED Literature, an $r = .69$ relationship between SAT Arithmetic Concepts and GED Math, an $r = .69$ relationship between SAT Science and GED Science and an $r = .65$ relationship between SAT Social Studies and GED Social Studies. In conclusion, Carbuhn's achievement test findings clearly state that the SAT can validly be used as a GED predictor. A SAT grade level of 6.5 is required in all SAT subtests with the exception of SAT English which requires a grade level of 5.5. These grade levels are minimal predictors with 90 percent of the population possessing that grade level or above. There would be a very small percentage of individuals passing the GED with SAT grade equivalents below the stated levels (Carbuhn, 1969:56-69, 82).

Chronological age of GED students was initially perceived by most research investigators to be a significant variable of prediction. Research findings vary depending on the population studied. Several prediction studies found age significant while other research populations found age difference insignificant in relation

to success on the GED test. The United States Employment Service Minnesota Study found that the GED pass group were two and one-half years older than the non-pass GED group (USES, 1977:4). Dowling and Lash (1972:70-72) hypothesized that GED scores would be affected inversely with age; the older the GED student, the lower the GED score. The results of their study found no significant difference between those students of different chronological age. Research conducted at the Quitman Adult Learning Center revealed that the younger students were the predominant students to leave the GED program. Therefore, a greater percentage of older students were left to complete their basic education and take the GED examination (Shegog, 1972:7). Carbuhn (1969:81) concluded that age was not a significant factor in passing the GED test, except for the fact that younger job corpsmen lost interest in the program and left the center before completing basic education and attempting their GED examinations.

In the majority of studies found in the review of literature, years of formal education was not considered significant predictors of success on the GED test. Within reason, individuals who had attended formal high school obtained higher scores on the GED test. However, once an individual had attended high school, there did not appear to be any direct correlation predicting increased success on the GED examination. Carbuhn's Utah study found the highest grade completed in school was not a reliable indicator of academic achievement and

increased GED success (Carbuhn, 1969:82). Those students at the Mattoon Area Adult Learning Center who completed basic education studies and passed the GED test revealed overall GED scores that were on the average, similar, no matter what grade they had completed in high school (Dowling and Lash, 1972:64-65). The United States Employment Service Minnesota Study found that the pass group on the GED test had .4 years more formal education than the non-pass group (USES, 1977:4).

The literature reviewed was devoid of any studies that indicated ethnic group as a significant predictor of success on the GED test. Ethnic group classification was important but not directly related to GED performance (Carbuhn, 1969:81). A person's race or cultural background became significant because of socio-economic reasons. Sister Rosemary Meyer, SSCM (1974:28), states that

Minorities, poor people and the so-called rejects of our society, have problems surviving. Their life is one of constant change as outside forces continuously affect them. Their patterns are irregular because much of their life is irregular. They need time and patience. Many justifiable reasons keep them from attending (GED studies) even though they would desire to continue.

An adult basic education dropout study at the Dr. Martin L. King, Junior Educational Center attempted to find out why only 38 percent of its one thousand adult basic education students completed their studies and earned a GED diploma. Almost all reasons for leaving GED studies at the King Center were socio-economic in nature. Personal

and family illness, crowded living quarters, employment problems, lack of transportation, and family responsibilities were major causes of students dropping out of GED studies (Meyer, 1974:28). Shegog (1972:46) found at the Quitman County Center for Learning and Educational Development that dependents, job experience, welfare assistance and poverty level incomes had little significance in relation to passing the GED examination. Reasons were not stated for those individuals who left the Quitman Center before completing basic education studies and attempting the GED test.

Psychological and personality variables were inferred in several different studies. These inferences were subjective in nature with most researchers stating their observations and impressions. This investigator found no study where an objective or standardized instrument was used to measure how individuals believed themselves to be from a personal or emotional frame of reference. Individuals who had specific goals, needs, and motivations appeared to do significantly better on the GED examination than individuals who were not sure of their purpose (Meyer, 1974:3). Those individuals who were considered in the "captive audience" category did significantly poorer work in their classes and on the GED examination. The term "captive audience" refers to those people who had to be in a particular GED program because of court referral, institutionalization, mandatory welfare (WIN) program, or employer mandate (USES, 1977:4).

Miscellaneous literature findings related to prediction indicated that the particular GED instructor and the adult learning center itself made a significant difference on student retention and subsequent GED performance (Shegog, 1972:8, 31). The Minnesota Study inferred that adult basic education centers where testing, instruction and counseling can be obtained produce more satisfied students with higher GED achievement (USES, 1977:4).

GED USED AS A PREDICTOR OF SUCCESS

This investigator, through reviewing the related literature, found numerous research studies involving the GED as a predictor of success on advanced vocational, occupational, and educational endeavors. The main question was twofold: first, was the individual who successfully completed the GED equal in academic ability to an individual who graduated from the traditional high school diploma program, and second, did the majority of GED graduates take the examination for entry level job positions. Once the GED examination was successfully passed, student desires and new-found goals emerged. In many cases successful completion of the GED appeared to instill confidence which allowed individuals to pursue advanced educational, occupational, and vocational positions formerly closed to people without the high school equivalency certificate (Miller, 1976:9).

Twelve junior colleges and twenty-eight colleges and universities cooperated with the Educational Testing Service and the American Council on Education to determine the success rate of non-high school graduates in college programs. Thirteen hundred sixty-seven students participated in the study. The students and institutions of higher learning were representative of schools and pupils throughout the United States. The average age of the non-high school graduate was twenty-eight years of age with 67 percent of the population male and 33 percent of the sample group female. The results of the study found the GED graduates more conservative and traditional than the average high school graduate. The GED group was older than the non-GED graduate which may account for less liberal thinking. Successful performance on the GED was found to be the primary reason why the non-high school graduate entered college. Apparently, college was not the primary reason for advanced education before the GED test was attempted. Students who entered college upon successful completion of the GED tended to major in business, social sciences, health disciplines, and education. Grade point averages of GED students were only slightly but insignificantly lower than regular high school graduates. It was interesting to find that the GED correlated as well as the Scholastic Aptitude Test (SAT) where grade point averages were concerned. It was found that female GED college students do somewhat better academically than do their male counterparts. Age was a

significant factor in that the older the GED college student, the higher was the grade point average. Seventy-two percent of the non-high school graduates remained in college on a regular basis even though many had families and employment responsibilities (Sharon, 1972:4-12).

A follow-up study of one thousand successful GED students who graduated from McLennan Community College GED programs, Waco, Texas, indicated that GED recipients were comparable to the typical high school graduate. The GED eliminated one of the barriers to higher education in that a credential inferred a minimal or better command of basic academic skills. GED students with a total scaled score average of forty-five or better had equal ability to high school graduates on an average (Nelson, 1975:9-10).

The McLennan Community College study further indicated that the GED predicted or influenced the choice of college, major field of study and career to a significant degree (Nelson, 1975:9). Approximately 58 percent of the successful GED recipients pursued a college education while 17 percent engaged in vocational technical training with 11 percent continuing adult education courses. These percentages of advanced educational endeavors were considerably higher than the initial indications of why people desired the GED credential. Nelson's findings were very similar to those of Sharon regarding the primary reason for taking the GED test and what actually happened to the

individual after the test was successfully completed. A significant number of successful GED students found that possession of the GED certificate increased their income, formed a better outlook on life, caused advancement in their professions, or allowed them to seek more rewarding jobs. Successful completion of the GED not only instilled greater personal confidence but the certificate also opened avenues for further growth and advancement (Nelson, 1975:18-19).

Proof exists that the GED opens previously closed doors, allowing further individual personal development. Over 1,600 colleges and universities are accepting satisfactory GED test scores as evidence of individual ability to undertake college work. Institutions of higher education have realized that not all people who left traditional high schools and grade schools did so because they lacked intellectual and academic ability. Research has proven that the majority of people who leave school do so because of family problems, financial problems, marriage, children, emotional and psychological problems, boredom, and lack of interest (Sharon, 1971:7). Previous reports stated that adults took the GED for two main reasons: job security and additional employment opportunities upon the successful completion of the test. However, Sharon found that 50 percent of the people who took the GED test were taking the examinations for higher educational purposes, a figure considerably higher than previously reported percentages. This phenomenon appears to indicate a new

trend: possession of the GED is still important to entering the labor market, but a large percentage of the GED population is also looking toward other personal, educational, and avocational goals.

After successfully completing the GED, two-thirds of the adult students stated that the test influenced their plans for the future (Sharon, 1971:5). Adult educators therefore needed to be cognizant and ready to follow up on the needs of these new found goals and desires that successful GED students were presenting. It is no longer sufficient to merely prepare adult basic education students for the GED examination, administer the test, and wish them success in the future. Graduates of the GED examination are calling upon adult educators to counsel them in the direction of increased opportunity.

A question that has frequently arisen is whether or not students possessing the GED certificate have more difficulty performing college work than high school graduates. Both Sharon (1971) and Byrd (1973) found that there was no significant difference in academic college performance between GED graduates and those that had completed the traditional high school program. Most GED college students possessed grade point averages between a "C" and a "B." Fifty percent of the GED college population met the mean grade point average at their respective colleges. Sharon reported that better than half of the GED college students had jobs, families, and extended responsibilities not typically found in the general college population.

Additional responsibilities did not appear to adversely affect college performance in the GED graduates (Sharon, 1971:6). A research study performed at the Wilkes Community College in North Carolina by Fay Byrd and associates hypothesized that there was no significant difference in grade point average in beginning college English, math, and reading courses between GED recipients and students with high school diplomas. Statistical findings indicated that there was, in fact, no significant difference between those two populations (Byrd, 1973:2-4). Lack of high school exposure to scientific and laboratory courses appeared to present the greatest difficulty to older GED students (Sharon, 1971:7).

Generally, students who successfully complete the GED examination are somewhat older and have more responsibilities than high school graduates who go on to college within a short period of time after high school. Because of these obligations, many GED graduates have counseled with this investigator, seeking a shorter less expensive way of obtaining college credits, certificates, or degrees. The College Level Proficiency Test (CLEP) has become a valuable tool for many GED college bound students. Adults with years of work experience or particular proficiencies can indicate their abilities by attempting the CLEP tests. If a person passes a CLEP section, he or she can go on to higher level courses without taking the basic or introductory course work.

At this point, it should be remembered that not all adult basic education students need or require the exact same type and amount of academic training before attempting the GED examination. Many GED students left high school with very little time remaining before graduation. It can therefore be assumed that many GED graduates who go on for higher education possess skills, course work, and academic exposure comparable to the average high school graduate who goes on to a vocational-technical center, college, or university. Those adult basic education students who enter GED studies with minimal high school training and exposure to specific course work in the sciences and mathematics, which are not available in most adult learning centers, should probably forego the CLEP test and concentrate on the basic introductory college courses.

Research found in the review of literature has been very helpful in providing counseling information regarding who would benefit by taking the CLEP examinations. A study performed in 1971, at the City College of Chicago by Henry Houghamian, determined that successful GED graduates should take the Scholastic Aptitude Test (SAT) or the American College Test (ACT) before spending time and money on the CLEP examination. He found that there was a significant correlation ($r = .73$) between CLEP performance and ACT achievement. A correlation coefficient of $r = .73$ squared would predict the probability of how well a person would be expected to perform on the CLEP test if ACT

scores were known (Houghamian, 1971:8). Gillmore (1974) and Abraham (1975) determined that previous educational background significantly contributed to CLEP performance. Those individuals who had done well academically in high school achieved higher scores and more CLEP credits than individuals who performed adequately or marginally. The type of courses taken in high school also appeared to correlate with their ability to obtain CLEP credits. Specific course work in mathematics, science, English, and the behavioral sciences appeared to be extremely helpful towards successful CLEP completion (Gillmore, 1974:1 and Abraham, 1975:10).

Houghamian's research findings found that age and sex were significantly independent variables reflected in CLEP performance. It was interesting to find that the younger students generally did better than older students on the CLEP examination. Apparently, recent academic exposure is important to test success. Women were two times more successful than men in English and humanities but men were more successful in natural sciences and social science, particularly history (Houghamian, 1971:2-3).

This investigator has learned by experience that successful GED students who go on to college have definite goals and are seeking a definite skill, certification, or degree. Houghamian states

The higher the aspiration the higher the success rate. Those not having an aspiration have a significantly low success rate on the CLEP. Three out of four students taking the CLEP examination

have an aspiration, the attainment of a bachelor's degree or higher degree (Houghamian, 1971:6).

Authorities in the field of Adult Education have continually stated that subject matter interest is a prime criterion in retaining adult students. GED students who have entered higher education and possess the educational background and ability, found the CLEP test a viable means of keeping interest in schooling at a peak. CLEP test success allowed students to enter higher level and more challenging course work in their respective curriculums. Grade point average remained high, and in many situations was above the mean grade level (Abraham, 1975:10). Gillmore also found that CLEP students took fewer "100" (freshman) courses and more "300" (senior) courses than the average college student. In many cases, CLEP students graduated with more credits than were necessary for graduation because they could spend more time in their area of interest. However, it was determined by Gillmore that a person could graduate from college with one less semester of work. This savings was considered to be substantial in time and money, especially among older adult students with established life styles (Gillmore, 1974:8).

Therefore, research has provided adult educators and counselors of adults with additional educational tools to assist them in stimulating their students towards higher educational goals. The CLEP examination has made it possible for mature and capable GED students

to pursue college or university degrees without taking all of the course work and spending the usual time and money typically required. Research has found that in comparison to the general college student, GED graduates who pass selected areas of the CLEP test maintain higher grade point averages and are generally more motivated, interested, and diligent in pursuing their degrees.

SUMMARY

The review of literature related to variables predicting success on the General Education Development Test (GED) logically placed available information into three areas. The three areas were: historical information related to the GED, predictors of success on the GED, and the GED as a predictor of success on vocational, occupational, and educational endeavors after completion of GED studies.

The historical information area followed the inception and rationale of the GED as a standardized test designed to measure academic knowledge and achievement with individuals who had not graduated with a high school diploma. The GED test was initially used by the United States Armed Forces with veterans from World War II about to readjust to civilian life. The GED test concept became so successful that it was administered to civilian adults who had not completed formal high school. Close to 540,000 individuals write the GED

examination throughout the United States, United States Territories, and Canada annually. Three hundred forty-six thousand five hundred individuals successfully completed the GED examination and received their high school-equivalency certificate in 1976. The GED certificate program is a well established means of validating one's basic educational skills. Business, industry, and the majority of institutions of higher learning accept the GED certificate in equal standing to the high school diploma.

Several significant studies have been done regarding variables predicting success on the GED. Only one study would be considered comprehensive in studying several variables of prediction. Most studies looked at one or two factors which appeared to be relevant to GED success. Results were sometimes different depending on the population surveyed. However, the majority of independent studies found identical or similar predictive findings. The general aptitude and the verbal aptitude subtests of the GATB were significant variables that predicted success on the GED test. The SAT, CTABE, and ABLE achievement tests were significant in predicting success on the GED examination. No study used an objective standardized test to measure the psychological and emotional variables that appeared to effect GED test performance. Observations and impressions by adult educators indicated that psychological variables were important to adult students who remained in adult basic education and subsequently wrote the GED

examination. Age, years of high school grade completion, ethnic group, and family status were not significant to passing the GED test. However, one's level of success (higher GED scores) did appear to be affected by age, family status, and work experience. Socio-economic factors were clearly significant in causing or affecting a student's participation in basic education studies and his eventual writing of the GED examination.

Numerous studies have been completed in the past eight years in regard to using the GED as a predictor of success occupationally, vocationally, and educationally. The majority of findings have indicated that individuals who have successfully completed the GED test with scores of 45 or better did nearly as well as high school graduates in college or university work. Those students who attended college or university with GED certificates were typically older and were more conservative with more family and business responsibilities. Research findings indicated that business and industry viewed the GED as a competency test which assured them that GED graduates did possess basic educational skills in the areas of reading, math, and language.

In summation, the GED is a valuable educational, occupational, and sociological tool enabling individuals to verify their academic abilities. Successful GED recipients can utilize the credential by engaging in higher levels of personal fulfillment.

Chapter 3

PROCEDURES AND METHODOLOGY

The problem of this study was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education Development Test, and second, to determine predictive efficiency between those selected independent variables and success on the General Education Development Test. This study involved 180 Manpower adult basic education students entering the Helena Adult Learning Center from August 1, 1978 through April 1, 1979. Standardized tests of aptitude, achievement, personality, and general ability were used to collect data. A biographical and demographical data sheet accompanied the standardized tests and was completed by each student.

This chapter presents the procedures used in the study. The population and investigation categories will be defined. The method of collecting data, the means of organizing data, the statistical hypotheses and their alternatives plus the method of data analysis will also be presented. Precautions taken for accuracy and a chapter summary will be provided.

The procedures followed in this study included a thorough study of literature and related research. The review of literature included an examination of the Educational Research Information Center

(ERIC), Doctoral Dissertations, Psychological Abstracts, and Sociological Abstracts through 1978.

POPULATION DESCRIPTION

The population of this study consisted of 180 full time Manpower adult basic education students who completed the two week World of Work Orientation and Assessment class at the Helena Adult Learning Center in Helena, Montana, from August 1, 1978 through April 1, 1979. These Manpower adult basic education students were seventeen years of age and older and have not completed a high school diploma program or gained a General Education Development (GED) certificate. Part-time and/or non-Manpower adult basic education students were not included in the study population.

Manpower students are those individuals who qualify for federal and state assistance to overcome employment handicaps. The majority of Manpower students are students who are under educated, possessing less than a high school diploma or GED certificate, and unskilled for today's competitive labor market. Typically, they have been unemployed or underemployed for sixteen weeks or longer. Manpower students are sponsored by the Department of Labor through the Montana State Employment Service and enter the Helena Adult Learning Center through three separate programs: The Concentrated Employment Program (CEP), the Work Incentive National Program (WIN),

and the Comprehensive Education and Training Act Program (CETA), each of which is designed to deal with individual employment handicaps. Manpower students are referred to the Helena Adult Learning Center for basic education which will in turn enable the student to eventually write the GED examination. After completing the GED test, the majority of Manpower students receive further skill training and/or job placement.

STAFFING AND STUDENT POPULATION

The Helena Adult Learning Center employs ten full-time, professional adult educators who serve approximately six hundred adult education and adult basic education students each year. Since 1970, an average of two hundred individuals have successfully completed their GED examinations at the Helena Center annually.

SITE DESCRIPTION

Helena, the fourth largest city in Montana, is the state capitol with a population of close to forty thousand individuals. The Helena Adult Learning Center is considered a rural Manpower Center because the population of the Helena community is less than one hundred thousand people. The labor market in the Helena area is basically professional and service oriented with a light to moderate amount of

manufacturing and industry. Farming, ranching, and lumbering employ most unskilled and semi-skilled workers.

CATEGORIES OF INVESTIGATION

All full-time Manpower adult basic education students, seventeen years of age or older, who were attending a mandatory two-week orientation and assessment "World of Work" class between August 1, 1978 through April 1, 1979, were asked to voluntarily respond to identical biographical and demographical data sheets and four standardized tests. The biographical and demographical data sheet and four standardized evaluation instruments were taken by each student on an independent basis in a group setting. Three students declined to participate in the study.

Manpower adult basic education students were asked to respond on the following categories of the Biographical and Demographical Data Sheet: name, address, phone number, sex, age, marital status, number of children, years of schooling, last school grade completed, ethnic group, years of job experience, date last employed, type of work at last employment, major work history, present medical problems, previous basic education experience, and self-perceived educational needs.

Nine biographical and demographical variables were tested for predictive efficiency in relation to success on the GED test. These

variables are: age, sex, number of children, last grade completed, years of job experience, married, single, divorced, and separated.

GATB

The General Aptitude Test Battery (GATB) was given to each participating Manpower adult basic education student. All nine subtests or categories of the GATB were administered. The nine subtests of the GATB are: General aptitude, Verbal aptitude, Numerical aptitude, Spatial aptitude, Form perception, Clerical perception, Motor coordination, Finger (fine motor) dexterity, and Manual dexterity.

CTABE

All three skill tests of the California Test of Adult Basic Education (CTABE) were administered to each participating Manpower adult basic education student. The three areas of the CTABE are: Reading, Mathematics, and Language skills.

CTP

The California Test of Personality (CTP) for adults contains twelve subtest categories. All Manpower adult basic education students completed the twelve subtests of the CTP. The twelve subtests are: self-reliance, sense of personal worth, sense of personal freedom, feeling of belonging, withdrawing tendencies, nervous symptoms,

social standards, social skills, anti-social tendencies, family relations, and community relations.

GED

Each participating Manpower adult basic education student who completed adult basic education wrote the General Education Development Test (GED). All five parts of the GED were administered. The five parts of the GED battery are: English expression, social studies, science, literature, and mathematics.

To provide necessary controls of irrelevant and contaminating variables, the following precautions were taken:

1. All biographical and demographical data sheets were answered by participating Manpower adult basic education students in the presence of this investigator.
2. This investigator administered or supervised all standardized tests.
3. All standardized tests were scored by this investigator or by computer.
4. All biographical and demographical data and standardized test scores of participating Manpower adult basic education students were transferred to individual profile sheets by this investigator.

5. All participating Manpower adult basic education students were given a clear statement of confidentiality and were asked to sign a release of information document.

6. All questions, concerns, or comments made by participating Manpower adult basic education students were addressed by this investigator.

METHOD OF DATA COLLECTION

This investigator met with each successive two week World of Work Orientation and Assessment class beginning with the August 1, 1978 class and ending with the April 1, 1979 class. The research project was explained to each Manpower adult basic education student within the orientation class setting. Voluntary participants were solicited at that time with the understanding that they were required to fill out a biographical and demographical data sheet plus complete four standardized tests which together contained the thirty-five independent variables. Procedures dealing with confidentiality and the signing of the release of information document was explained.

During the first morning of each two week World of Work Orientation and Assessment class, the participating Manpower adult basic education students were asked to fill out the Biographical and Demographical Data Sheets. The variables on the data sheets were those concurrently suggested and deemed appropriate by this

investigator's doctoral committee at Montana State University during the 1977-78 academic year.

The afternoon of the first day of each World of Work Orientation and Assessment class was set aside for group testing with the General Aptitude Test Battery (GATB). All of the nine GATB subtests were administered. The bibliography section of the GATB Technical Manual (1967) lists several hundred references where the GATB has been used in prediction studies of general ability and academic achievement. General aptitudes, verbal aptitudes, numerical aptitude, and spatial aptitude were generally accepted as the best indicators of academic success (USES, 1977:4). Lee Cronbach stated that the GATB correlated with twelfth grade achievement from an $r = .64$ to an $r = .84$. He also indicated that the GATB was a highly efficient aptitude test (Cronbach, 1960:274-75). Bechtoldt further stipulated that the GATB tests were fairly well constructed. The empirical data was as complete as any other available test battery and the results were as predictive as any existing test battery. The coefficients of reliability were .80 to .90. The GATB came closer than any other multi-factor test battery in meeting the requirements of validity for success in a variety of occupations (Bechtoldt, 1965:771).

The California Test of Adult Basic Education (CTABE) was administered by this investigator to the participating Manpower adult basic education students on the morning of the second day of each

World of Work Orientation and Assessment class. The total CTABE battery included tests of reading, math, and language skill development. The California Test Bureau of the McGraw-Hill Publishing Company stated that the CTABE 1976 edition had test items adapted from the 1970 edition of the California Achievement Test (CAT-70), which reflected language and content appropriate for adults (CTABE Examiner's Manual, 1976:1). The validity and reliability was assumed to be as high for the CTABE as the 1970 edition of the California Achievement Test. Fewer ethnic and racial questions which could appear prejudicial were included in the new 1976 version. Alan Cohen believed that the CTABE with all of its inadequacies could prove to be a useful tool for adult educators, especially in a test market that has little else to offer the adult population. Cohen stated that

Level D of the CTABE may be appropriate for adults moving into traditional community college curriculums. Many test items may be used clinically if not statistically. These test items may help pin-point specific difficulties on which to build prescriptive educational programs. The test is very helpful (Cohen, 1969:349).

A. N. Hieronymus added that "the usefulness of the tests in adult programs must be determined through experience at the local level" (Hieronymus, 1969:350). Carlin and O'Leary found in their 1974 study at the Helena Adult Learning Center that 95 percent of all students scoring above the 11.5 grade level on the CTABE successfully

wrote the GED examination after completing at least one month of adult basic education (Carlin and O'Leary, 1974:15).

During the last morning of the two week World of Work Orientation and Assessment class, the California Test of Personality was administered to participating Manpower adult basic education students. Previous researchers have indicated that personality variables appeared to be extremely important and significant in predicting success on the GED test. However, as was stated in Chapter 2, there has been no attempt to systematically find, through objective standardized tests, whether personality traits do or do not affect GED results. The authors of the California Test of Personality have found that the Kuder-Richardson reliability coefficients extended from an $r = .70$ to an $r = .95$. The authors of the CTP believed that validity of the CTP was acceptable for the purposes for which it was designed. The CTP was developed for three major purposes: to understand the total functioning personality, to understand personal problems and improve their adjustment, and to serve as an instrument of research (CTP-Manual, 1953:2-8). Laurance Shaffer found the reliabilities of the total scores on the CTP to range from an $r = .918$ to an $r = .933$ based on the split half method correlated by the Spearman-Brown formula. The reliabilities of the principal component of Self Adjustment range from an $r = .888$ to an $r = .904$, while those of social adjustment

range from an $r = .867$ to an $r = .908$. The validity is at $.60$, which corresponds favorably to most projective techniques. The CTP is deemed a projective technique, even though it is a survey instrument. The results should be studied from an individual clinical perspective. Shaffer believed that the CTP test was non-threatening and easy to administer with good responsiveness from adults (Shaffer, 1949).

The General Education Development test (GED) was given to each individual Manpower adult basic education student when they or their ABE instructors believed them to be academically prepared. The GED test is usually given by the Helena Adult Learning Center on a group basis once a month. The GED test can be given on an individual basis if personally requested and if staff time is available. Robert Solomon stated that

The GED examination represents a workmanlike job of test construction. The test items reflect a degree of experience and sophistication which is not yet found in many present day published tests. The items are remarkably free of ambiguities or tricks demanding that the examinee read the examiner's mind (Solomon, 1959:83-85).

Solomon found that the reliability coefficients within the five subtests were $r = .80$ or above (Solomon, 1959). Gustav I. Froehlich found the GED test measures concepts, ideas, and generalizations rather than the memorization of facts. Validity continues to be in terms of content or face validity in that the GED

test does provide a procedure for assigning high school and college credit. GED graduates have done as well as high school graduates in occupations, vocations, and most forms of higher education. The GED test itself has been received by education, business, and industry. The GED test has been professionally prepared by painstaking methods of test construction (Froehlich, 1965).

All data sheets were checked for complete responses by this investigator. The four standardized tests were corrected by hand or by computer by this investigator.

METHODS OF ORGANIZING DATA

The nine selected variables from the biographical and demographical data sheets plus the results of the four standardized tests were placed on individual profile sheets. All pertinent independent and dependent variables from the individual profile sheets were transcribed onto IBM FORTRAN coding form sheets for key punching onto separate individual computer cards. The statistical package for social science at Montana State University was used to process the data. Analysis of data followed with appropriate tables constructed to allow for clear visual representation of the correlation between independent and dependent variables.

STATISTICAL HYPOTHESES

To suit the purpose of this study and to answer the general questions involved, the following eighteen null hypotheses and their alternatives were tested.

1. H_0 There is no significant correlation between each independent variable and the dependent variable of English on the GED test.

H_1 There is a significant correlation between each independent variable and the dependent variable of English on the GED test.

2. H_0 There is no significant correlation between each independent variable and the dependent variable of social studies on the GED test.

H_1 There is a significant correlation between each independent variable and the dependent variable of social studies on the GED test.

3. H_0 There is no significant correlation between each independent variable and the dependent variable of science on the GED test.

H_1 There is a significant correlation between each independent variable and the dependent variable of science on the GED test.

4. H_0 There is no significant correlation between each independent variable and the dependent variable of literature on the GED test.

H_1 There is a significant correlation between each independent variable and the dependent variable of literature on the GED test.

5. H_0 There is no significant correlation between each independent variable and the dependent variable of math on the GED test.

H_1 There is a significant correlation between each independent variable and the dependent variable of math on the GED test.

6. H_0 There is no significant correlation between each independent variable and the dependent variable of the total GED test battery.

H_1 There is a significant correlation between each independent variable and the dependent variable of the total GED test battery.

7. H_0 The correlation between GED English and all independent variables is equal to 0.

H_1 The correlation between GED English and all independent variables is not equal to 0.

8. H_0 The regression coefficients associated with each independent variable (when correlated with the GED English test) equals 0.

H_1 The regression coefficients associated with each independent variable (when correlated with the GED English test) does not equal 0.

9. H_0 The correlation between GED social studies and all independent variables is equal to 0.

H_1 The correlation between GED social studies and all independent variables is not equal to 0.

10. H_0 The regression coefficients associated with each independent variable (when correlated with the GED social studies test) equals 0.

H_1 The regression coefficients associated with each independent variable (when correlated with the GED social studies test) does not equal 0.

11. H_0 The correlation between GED science and all independent variables is equal to 0.

H_1 The correlation between GED science and all independent variables is not equal to 0.

12. H_0 The regression coefficients associated with each independent variable (when correlated with the GED science test) equals 0.

H_1 The regression coefficients associated with each independent variable (when correlated with the GED science test) does not equal 0.

13. H_0 The correlation between GED literature and all independent variables is equal to 0.

H_1 The correlation between GED literature and all independent variables is not equal to 0.

14. H_0 The regression coefficients associated with each independent variable (when correlated with the GED literature test) equals 0.

H_1 The regression coefficients associated with each independent variable (when correlated with the GED literature test) does not equal 0.

15. H_0 The correlation between GED math and all independent variables is equal to 0.

H_1 The correlation between GED math and all independent variables is not equal to 0.

16. H_0 The regression coefficients associated with each independent variable (when correlated with the GED math test) equals 0.

H_1 The regression coefficients associated with each independent variable (when correlated with the GED math test) does not equal 0.

17. H_0 The correlation between the total GED test battery and all independent variables is equal to 0.

H_1 The correlation between the total GED test battery and all independent variables is not equal to 0.

18. H_0 The regression coefficients associated with each independent variable (when correlated with the total GED test battery) equals 0.

H_1 The regression coefficients associated with each independent variable (when correlated with the total GED test battery) does not equal 0.

ANALYSIS OF DATA

Data collected in this study was subjected to three basic statistical models of analysis at the .05 level of significance. The first six hypotheses were tested by using the Pearson Product-Moment Correlation Coefficient. Hypotheses seven through eighteen were tested by multiple regression analysis. The t distribution of statistical analysis was used with hypotheses seven through eighteen.

A correlation coefficient (r) expresses the degree of correspondence or relationship between two sets of scores. Correlations may be computed in various ways depending on the type of research data. The most common of these correlation coefficients is the Pearson Product-Moment Correlation Coefficient. This particular

coefficient takes into account the individual's position in the group and also his or her deviation above or below the group mean (Anastasi, 1969:73-75). The Pearson Product-Moment Correlation Coefficient determines to what extent the independent variables correspond with one another.

As a general rule, one wishes, in multiple regression, a set of independent variables that are highly correlated with the dependent variable but not correlated between each other. As the correlation between the two variables increases, it becomes more difficult to separate out the independent contributions of the variables (Bolch and Huang, 1974:157).

Multiple regression analysis was used because it is the most widely known method of multivariant analysis. The purpose of multiple regression is to examine the relationship between a criterion or dependent variable and two or more predictors or independent variables. Multiple regression provides an equation for predicting the unknown criterion score of a new subject from his or her known set of predictor scores (Cooley and Lohnes, 1962:4 and 31). Kerlinger and Pedhazur also found multiple regression analysis a suitable statistic in predicting student criterion from known independent variables. They went on to state that, "multiple regression analysis is nicely suited to studying the influence of several independent variables, including experimental (manipulated) variables, on a dependent variable" (Kerlinger and Pedhazur, 1973:4).

The t test is applicable to many sampling problems. The t distribution was used in this study to help calculate the probability associated with null hypotheses seven through eighteen. Rejection or acceptance of the null hypotheses was facilitated by calculating the t statistic at the .05 level of significance (Nie, 1975:268). Double cross-validation was used to determine the predictive validity of the GED total model (Mosier, 1951:5-12).

Data from this investigation was tested at the .05 level of significance. Ferguson stated that, "It is a common convention to adopt levels of significance at either .05 or .01" (1976:162). To adequately guard against the rejection of a true null hypothesis, Type I error, a level of .05 is preferred to .01. To commit a Type I error and to reject a true null hypothesis would be less serious than to commit a Type II error and to retain a false null hypothesis (Ferguson, 1976:162).

PRECAUTIONS TAKEN FOR ACCURACY

Sampled data derived from this investigation was double checked by this investigator. A scientific model table calculator was used to compute basic mathematical equations and statistical formulas. The Sigma 7 Computer at Montana State University was used to calculate the Pearson Product-Moment Correlation coefficients, multiple

regression analysis, and t distribution equations. To insure accuracy, this investigator checked data placed into the computer for statistical test analysis by reviewing the computer readout. This investigator called upon the expertise of an objective statistical authority to correct errors in statistical analysis and interpretation.

SUMMARY

The problem of this study was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education Development Test, and second, to determine predictive efficiency between those selected independent variables and success on the General Education Development Test. One Biographical and Demographical Data Sheet and three standardized tests of aptitude, achievement, and personality constituted the predictor or independent variables. The General Education Development Test was used as the criterion or dependent variable.

The population of this study consisted of 180 full-time Manpower adult basic education students, seventeen years of age or older, who completed the two week World of Work Orientation and Assessment class at the Helena Adult Learning Center in Helena, Montana from August 1, 1978 through April 1, 1979 inclusive.

Biographical and Demographical Data Sheets along with the nine subtests of the General Aptitude Test Battery, the three subtests

of the California Test of Adult Achievement, and the twelve categories of the California Test of Personality were administered to participating Manpower adult basic education students during their first two weeks of attendance at the Helena Adult Learning Center. The General Education Development Test was given to individual students who completed their basic education training.

This investigator administered all standardized testing and supervised the completion of the data sheets in order to control for irrelevant and contaminating variables. The purpose and need for this study was explained to each participating student. Each student was asked to sign a release of information document. This investigator provided the participating students with a statement of confidentiality and answered all student questions regarding the research project.

All data sheets were checked for complete responses and the four standardized tests were corrected by hand or by computer by this investigator. All selected independent and dependent variables derived from the data sheet and four standardized tests were placed on individual profile sheets. When all students completed the study, the information was transcribed onto IBM FORTRAN coding form sheets. The data on the IBM FORTRAN coding form sheets was key punched onto separate individual computer cards. The computer cards were used with the Sigma 7 computer statistical package for the social sciences

at Montana State University. Analysis of data followed with appropriate tables constructed.

The eighteen null hypotheses and their alternatives were subjected to three basic statistical models of analysis at the .05 level of significance. The first six hypotheses were analyzed by using the Pearson Product-Moment Correlation Coefficient. Hypotheses seven through eighteen used multiple regression analysis. The t distribution of statistical analysis was used with hypotheses seven through eighteen. The double cross-validation statistic was used to determine the predictive reliability of the GED total model. To insure accuracy, this investigator checked data placed into the computer for statistical test analysis by reviewing the computer readout.

Chapter 4

ANALYSIS OF DATA

INTRODUCTION

The purpose of this study was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education Development Test, and second, to determine predictive efficiency between those selected independent variables and success on the General Education Development Test (GED).

METHOD OF SAMPLING AND NUMBER SAMPLED

The population of this study consisted of 180 full-time manpower adult basic education students who completed the two week World of Work Orientation and Assessment class at the Helena Adult Learning Center in Helena, Montana and were subsequently referred to classes for GED preparation from August 1, 1978 through April 1, 1979. These manpower adult basic education students were seventeen years of age and older and had not completed a high school diploma or GED Certificate. Part-time and/or non-manpower adult basic education students were not included in the study population.

In this chapter, the results of the General Aptitude Test Battery (GATB), the California Test of Adult Basic Education (CTABE),

the California Test of Personality (CTP), the Biographical and Demographical data, and the General Education Development Test (GED) completed by the manpower adult basic education students were presented, analyzed, and interpreted. It should be noted at this time that not all participating Manpower adult basic education students referred to GED studies completed the GED examination. Sixty Manpower adult basic education students left the Helena Adult Learning Center before completing their course of GED Preparation. Consequently, those sixty individuals did not attempt the GED test. Of the remaining 120 adult students who attempted the GED, 30 profiles were incomplete in that vital information or test scores were unavailable. Therefore ninety complete profiles were used for analysis and interpretation of data.

DATA TABULATION

Hypotheses one through six are presented one at a time with appropriate tables, discussions, and interpretations. Table 1 is presented before the first hypothesis in order to give an overview of the correlation between the thirty-five independent variables and the seven dependent variables. All correlations are tested at the .05 level for a two-tailed test.

Table 1

Correlation Matrix Between the Thirty-five Independent Variables
and the Seven Dependent Variables

	GED Pass- Fail	GED English	GED Social Studies	GED Science	GED Litera- ture	GED Math	GED Total
General-GATB	.20	.29*	.30*	.27*	.31*	.23*	.29*
Verbal-GATB	.29*	.35*	.38*	.39*	.37*	.37*	.38*
Numerical-GATB	.29*	.33*	.37*	.39*	.35*	.40*	.37*
Spatial-GATB	.17	.13	.18	.22*	.17	.23*	.18
Perception-GATB	.25*	.18	.21*	.26*	.21*	.27*	.23*
Clerical-GATB	.18	.18	.18	.22*	.18	.21*	.20
Coordination-GATB	.18	.13	.17	.21*	.18	.21*	.18
Fine Motor-GATB	.09	.05	.07	.11	.08	.12	.09
Manual-GATB	.02	.06	.09	.12	.10	.14	.10
Reading-CTABE	.23*	.31*	.33*	.34*	.31*	.33*	.33*
Math-CTABE	.28*	.38*	.39*	.41*	.36*	.44*	.40*
Language-CTABE	.25*	.38*	.37*	.37*	.36*	.38*	.37*
Total-CTABE	.33*	.48*	.48*	.48*	.46*	.48*	.48*
Self-Reliance-CTP	.19	.14	.17	.14	.14	.10	.14
Personal Worth-CTP	.11	.17	.15	.12	.17	.07	.14
Personal Freedom-CTP	.03	-.02	-.02	-.03	-.04	-.03	-.03

Table 1 (continued)

	GED Pass- Fail	GED English	GED Social Studies	GED Science	GED Litera- ture	GED Math	GED Total
Belonging-CTP	.19	.17	.16	.18	.16	.18	.17
Withdrawing-CTP	.13	.02	.05	.04	.00	.02	.03
Nervous Symptoms-CTP	.07	-.00	.02	.02	-.00	.02	.01
Social Standards-CTP	.17	.12	.12	.12	.08	.12	.11
Social Skills-CTP	.17	.11	.10	.11	.09	.11	.11
Anti-Social-CTP	.08	.11	.12	.11	.10	.10	.11
Family Relations-CTP	-.06	-.04	-.03	-.03	-.05	-.01	-.03
Community Relations-CTP	.03	-.02	-.01	.00	-.03	.01	-.01
Occupational Relations-CTP	-.07	-.06	-.04	-.04	-.05	-.02	-.05
Total-CTP	.10	.05	.06	.06	.03	.06	.05
Years of Schooling	.14	.09	.10	.13	.10	.15	.11
Sex	.09	.15	.08	.08	.10	.06	.09
Age	-.17	-.07	-.09	-.15	-.13	-.16	-.12
Job Experience	-.05	.02	.01	-.04	-.05	-.05	-.02
Married	-.04	-.01	.00	.02	.01	.01	.01

Table 1 (continued)

	GED Pass- Fail	GED English	GED Social Studies	GED Science	GED Litera- ture	GED Math	GED Total
Single	-.16	-.11	-.16	-.19	-.15	-.18	-.16
Divorced	.16	.10	.13	.16	.14	.14	.14
Separated	.14	.08	.12	.10	.07	.12	.10
Children	-.18	-.07	-.12	-.14	-.12	-.15	-.12

*Indicates significance at .05 level of significance on a two-tailed test.
Critical Value of $r = .205$

From the data depicted in Table 1, it can be concluded that the GATB and CTABE were the only independent variables to significantly correlate with the GED test.

Null Hypothesis 1--There is no significant correlation between each independent variable and the dependent variable of English on the GED.

Table 2 depicts the correlation analysis between the thirty-five independent variables and the GED English dependent variable.

Based on the analysis presented in Table 2, performance in GED English correlated significantly with seven of the thirty-five independent variables. General learning aptitude, verbal aptitude, and numerical aptitude were three GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the GED English examination. No other independent variables appeared to correlate significantly with GED English performance.

Null Hypothesis 2--There is no significant correlation between each independent variable and the dependent variable of Social Studies on the GED test.

Table 3 depicts the correlation analysis between the thirty-five independent variables and the GED Social Studies dependent variable.

Table 2

Correlation Matrix Between the Thirty-five
Independent Variables and GED English

	GED English		GED English
General-GATB	.29*	Social	
Verbal-GATB	.35*	Standards-CTP	.12
Numerical-GATB	.33*	Social Skills-CTP	.11
Spatial-GATB	.13	Anti-Social-CTP	.11
Perception-GATB	.18	Family	
Clerical-GATB	.18	Relations-CTP	-.04
Coordination-GATB	.13	Community	
Fine Motor-GATB	.05	Relations-CTP	-.02
Manual-GATB	.06	Occupational	
Reading-CTABE	.31*	Relations-CTP	-.06
Math-CTABE	.38*	Total-CTP	.05
Language-CTABE	.38*	Years of Schooling	.09
Total-CTABE	.48*	Sex	.15
Self-Reliance-CTP	.14	Age	-.07
Personal Worth-CTP	.17	Job Experience	.02
Personal		Married	-.01
Freedom-CTP	-.02	Single	-.11
Belonging-CTP	.17	Divorced	.10
Withdrawing-CTP	.02	Separated	.08
Nervous		Children	-.07
Symptoms-CTP	-.00		

*Indicates significance at .05 level of significance for a two-tailed test.

Critical value of $r = .205$

Table 3

Correlation Matrix Between the Thirty-five Independent Variables and GED Social Studies

	GED Social Studies		GED Social Studies
General-GATB	.30*	Social	
Verbal-GATB	.38*	Standards-CTP	.12
Numerical-GATB	.37*	Social Skills-CTP	.10
Spatial-GATB	.18	Anti-Social-CTP	.12
Perception-GATB	.21*	Family	
Clerical-GATB	.18	Relations-CTP	-.03
Coordination-GATB	.17	Community	
Fine Motor-GATB	.07	Relations-CTP	-.01
Manual-GATB	.09	Occupational	
Reading-CTABE	.33*	Relations-CTP	-.04
Math-CTABE	.39*	Total-CTP	.06
Language-CATBE	.37*	Years of Schooling	.10
Total-CTABE	.48*	Sex	.08
Self-Reliance-CTP	.17	Age	-.09
Personal Worth-CTP	.15	Job Experience	.01
Personal Freedom-CTP	-.02	Married	.00
Belonging-CTP	.16	Single	-.16
Withdrawing-CTP	.05	Divorced	.13
Nervous Symptoms-CTP	.02	Separated	.12
		Children	-.12

*Indicates significance at .05 level for a two-tailed test.
Critical value of $r = .205$

Based on the analysis presented in Table 3, performance in GED Social Studies correlated significantly with eight of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, and perceptual aptitude were four GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the GED Social Studies examination. No other independent variables appeared to correlate significantly with GED Social Studies performance.

Null Hypothesis 3--There is no significant correlation between each independent variable and the dependent variable of Science on the GED test.

Table 4 depicts the correlation analysis between the thirty-five independent variables and the GED Science dependent variable.

Based on the analysis presented in Table 4, performance in GED Science correlated significantly with eleven of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, spatial aptitude, perceptual aptitude, clerical aptitude, and coordination aptitude were seven GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the

Table 4

Correlation Matrix Between the Thirty-five
Independent Variables and GED Science

	GED Science		GED Science
General-GATB	.27*	Social	
Verbal-GATB	.39*	Standards-CTP	.12
Numerical-GATB	.39*	Social Skills-CTP	.11
Spatial-GATB	.22*	Anti-Social-CTP	.11
Perception-GATB	.26*	Family	
Clerical-GATB	.22*	Relations-CTP	-.03
Coordination-GATB	.21*	Community	
Fine Motor-GATB	.11	Relations-CTP	.00
Manual-GATB	.12	Occupational	
Reading-CTABE	.34*	Relations-CTP	-.04
Math-CTABE	.41*	Total-CTP	.06
Language-CTABE	.37*	Years of Schooling	.13
Total-CTABE	.48*	Sex	.08
Self-Reliance-CTP	.14	Age	-.15
Personal Worth-CTP	.12	Job Experience	-.04
Personal Freedom-CTP	-.03	Married	.02
Belonging-CTP	.18	Single	-.19
Withdrawing-CTP	.04	Divorced	.16
Nervous Symptoms-CTP	.02	Separated	.10
		Children	-.14

*Indicates significance at .05 level for a two-tailed test.
Critical value of $r = .205$

GED Science examination. No other independent variables appeared to correlate significantly with GED Science performance.

Null Hypothesis 4--There is no significant correlation between each independent variable and the dependent variable of Literature on the GED test.

Table 5 depicts the correlation analysis between the thirty-five independent variables and the GED Literature dependent variable.

Based on the analysis presented in Table 5, performance in GED Literature correlated significantly with eight of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, perceptual aptitude were four GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the GED Literature examination. No other independent variables appeared to correlate significantly with GED Literature performance.

Null Hypothesis 5--There is no significant correlation between each independent variable and the dependent variable of Math on the GED test.

Table 6 depicts the correlation analysis between the thirty-five independent variables and the GED Math dependent variable.

Table 5

Correlation Matrix Between the Thirty-five
Independent Variables and GED Literature

	GED Litera- ture		GED Litera- ture
General-GATB	.31*	Social	
Verbal-GATB	.37*	Standards-CTP	.08
Numerical-GATB	.35*	Social Skills-CTP	.09
Spatial-GATB	.17	Anti-Social-CTP	.10
Perception-GATB	.21*	Family	
Clerical-GATB	.18	Relations-CTP	-.05
Coordination-GATB	.18	Community	
Fine Motor-GATB	.08	Relations-CTP	-.03
Manual-GATB	.10	Occupational	
Reading-CTABE	.31*	Relations-CTP	-.05
Math-CTABE	.36*	Total-CTP	.03
Language-CTABE	.36*	Years of Schooling	.10
Total-CTABE	.46*	Sex	.10
Self-Reliance-CTP	.14	Age	-.13
Personal Worth-CTP	.17	Job Experience	-.05
Personal Freedom-CTP	-.04	Married	.01
Belonging-CTP	.16	Single	-.15
Withdrawing-CTP	.00	Divorced	.14
Nervous Symptoms-CTP	-.00	Separated	.07
		Children	-.12

*Indicates significance at .05 level for a two-tailed test.
Critical value of $r = .205$

Table 6

Correlation Matrix Between the Thirty-five
Independent Variables and GED Math

	GED Math		GED Math
General-GATB	.23*	Social	
Verbal-GATB	.37*	Standards-CTP	.12
Numerical-GATB	.40*	Social Skills-CTP	.11
Spatial-GATB	.23*	Anti-Social-CTP	.10
Perception-GATB	.27*	Family	
Clerical-GATB	.21*	Relations-CTP	-.01
Coordination-GATB	.21*	Community	
Fine Motor-GATB	.12	Relations-CTP	.01
Manual-GATB	.14	Occupational	
Reading-CTABE	.33*	Relations-CTP	-.02
Math-CTABE	.44*	Total-CTP	.06
Language-CTABE	.38*	Years of Schooling	.15
Total-CTABE	.48*	Sex	.06
Self-Reliance-CTP	.10	Age	-.16
Personal Worth-CTP	.07	Job Experience	-.05
Personal Freedom-CTP	-.03	Married	.01
Belonging-CTP	.18	Single	-.18
Withdrawing-CTP	.02	Divorced	.14
Nervous Symptoms-CTP	.02	Separated	.12
		Children	-.15

*Indicates significance at .05 level for a two-tailed test.
Critical value of $r = .205$

Based on the analysis presented in Table 6, performance in GED Math correlated significantly with eleven of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, spatial aptitude, perceptual aptitude, clerical aptitude, and coordination aptitude were seven GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the GED Math examination. No other independent variables appeared to correlate significantly with GED Math performance.

Null Hypothesis 6--There is no significant correlation between each independent variable and the dependent variable of the total GED test battery.

Table 7 depicts the correlation analysis between the thirty-five independent variables and the total GED test battery.

Based on the analysis presented in Table 7, performance in the total GED test battery correlated significantly with eight of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, and perceptual aptitude were four GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the total GED test battery. No other independent variables

Table 7

Correlation Matrix Between the Thirty-five Independent Variables and the Total GED Test Battery

	Total GED Test		Total GED Test
General-GATB	.29*	Social	
Verbal-GATB	.38*	Standards-CTP	.11
Numerical-GATB	.37*	Social Skills-CTP	.11
Spatial-GATB	.18	Anti-Social-CTP	.11
Perception-GATB	.23*	Family	
Clerical-GATB	.20	Relations-CTP	-.03
Coordination-GATB	.18	Community	
Fine Motor-GATB	.09	Relations-CTP	-.01
Manual-GATB	.10	Occupational	
Reading-CTABE	.33*	Relations-CTP	-.05
Math-CTABE	.40	Total-CTP	.05
Language-CTABE	.37	Years of Schooling	.11
Total-CTABE	.48*	Sex	.09
Self-Reliance-CTP	.14	Age	-.12
Personal Worth-CTP	.14	Job Experience	-.02
Personal Freedom-CTP	-.03	Married	.01
Belonging-CTP	.17	Single	-.16
Withdrawing-CTP	.03	Divorced	.14
Nervous Symptoms-CTP	.01	Separated	.10
		Children	-.12

*Indicates significance at .05 level for a two-tailed test.
Critical value of $r = .205$

appeared to correlate significantly with the total GED battery performance.

Table 8 gives an overview analysis of the correlation between the thirteen GATB and CTABE independent variables and the seven GED dependent variables.

Table 8 represented all independent variables that significantly correlated with the seven GED dependent variables. The GATB and the CTABE were the only subgroups of independent variables that correlated significantly with GED test performance. The CTP and the Biographical and Demographical independent variables did not correlate significantly with the seven GED dependent variables. All four CTABE independent variables accounted for a significant amount of the variability in GED test performance.

All seven GED dependent variables correlated significantly with general learning aptitude, verbal aptitude, numerical aptitude, reading achievement, math achievement, language achievement, and a total composite achievement test score. Spatial aptitude was reflected in GED Science and GED Math. Perceptual aptitude appeared significant in all GED dependent variables with the exception of GED English. Clerical aptitude and coordination aptitude were found to significantly correlate with GED Science and GED Math.

In summary, analysis of data was performed for hypothesis one through six in which it was found that certain, but not all,

Table 8

Correlation Matrix Between the Thirteen GATB and CTABE Independent Variables and the Seven GED Dependent Variables

	GED Pass-Fail	GED English	GED Social Studies	GED Science	GED Literature	GED Math	GED Total
General-GATB	.20	.29*	.30*	.27*	.31*	.23*	.29*
Verbal-GATB	.29*	.35*	.38*	.39*	.37*	.37*	.38*
Numerical-GATB	.29*	.33*	.37*	.39*	.35*	.40*	.37*
Spatial-GATB	.17	.13	.18	.22*	.17	.23*	.18
Perception-GATB	.25*	.18	.21*	.26*	.21*	.27*	.23*
Clerical-GATB	.18	.18	.18	.22*	.18	.21*	.20
Coordination-GATB	.18	.13	.17	.21*	.18	.21*	.18
Fine Motor-GATB	.09	.05	.07	.11	.08	.12	.09
Manual-GATB	.02	.06	.09	.12	.10	.14	.10
Reading-CTABE	.23*	.31*	.33*	.34*	.31*	.33*	.33*
Math-CTABE	.28*	.38*	.39*	.41*	.36*	.44*	.40*
Language-CTABE	.25*	.38*	.37*	.37*	.36*	.38*	.37*
Total-CTABE	.33*	.48*	.48*	.48*	.46*	.48*	.48*

*Indicates significance at .05 level for a two-tailed test.
Critical value of $r = .205$

independent variables significantly correlated with all seven GED dependent variables.

The next section deals with Multiple Regression Analysis presented in the following manner with each dependent variable: (1) Full Multiple Regression, (2) Restricted Regression Models, and (3) Stepwise Regression Model.

Listed with each independent variables is the raw score regression weight (b), the "t" score, and whether or not the variable provided a significant contribution to the regression model. The raw score regression weights (b) were obtained by using multiple regression analysis. This analysis determined the correlation between the independent variables and the dependent variables, with all other independent variables held constant. The t score was obtained by dividing the beta coefficient for the variable under investigation by the standard error of the beta. The level of significance was obtained by examining the critical value of the t for the appropriate degrees of freedom at the .05 level.

The t test was used to test the significance of each independent variable.

The F score is an analysis of variance comparing the variance within selected independent variable and the selected dependent variable in relationship to the variance between the independent and

dependent variables. The F score was computed and compared with the critical value of F at the .05 level.

The standard error of estimate indicates the degree of variation from the predicted score and an actual score received by members of the random sample, assuming the scores are normally distributed.

Each table is analyzed and discussed.

Full Multiple Regression--GED English

Table 9 depicts the analysis of relationship between GED English and all thirty-five independent variables.

Table 9

Multiple Regression Analysis--Full Model
GED English: Thirty-five
Independent Variables

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.3972	.78	
Verbal-GATB	.2945	.42	
Numerical-GATB	- .1273	- .22	
Spatial-GATB	- .2877	- .35	
Perception-GATB	.5307	1.51	
Clerical-GATB	- .1576	- .58	
Coordination-GATB	.1826	.74	
Fine Motor-GATB	- .7650	-2.12	.05

Table 9 (Continued)

Variables	Raw Score Regression Weight (b)	t	Significance
Manual-GATB	.0222	.23	
Reading-CTABE	.1660	.44	
Math-CTABE	.3372	.79	
Language-CTABE	.1546	.51	
Total-CTABE	- .0702	- .27	
Self-Reliance-CTP	- .0106	- .46	
Personal Worth-CTP	.0192	.01	
Personal Freedom-CTP	1.3207	.70	
Belonging-CTP	.4146	.22	
Withdrawing-CTP	-3.3063	-1.35	
Nervous Symptoms-CTP	-1.2444	- .58	
Social Standards-CTP	-2.2018	- .78	
Social Skills-CTP	2.1164	1.05	
Anti-Social-CTP	1.2061	.65	
Family Relations-CTP	-1.0252	- .47	
Community Relations-CTP	-1.2544	- .54	
Occupational Relations-CTP	-2.1950	- .94	
Total-CTP	.6280	.37	
Years of Schooling	1.7547	.67	
Sex	6.2392	.88	
Age	- .7627	-1.19	
Job Experience	2.1181	2.48	.05
Married	3.5773	.00	
Single	- .9830	- .00	

Table 9 (continued)

Variables	Raw Score Regression Weight (b)	t	Significance
Divorced	14.9886	.01	
Separated	16.5887	.01	
Children	.6218	.16	

Multiple R = .7146
 F = 1.61
 Constant = -93.2038
 R Square = .5107

St. Error Estimate = 21.2466
 Critical Value for t = 2.00 at .05
 Critical Value for F = 1.60 at .05

Null Hypothesis 7--The correlation between GED English and all independent variables is equal to 0.

Null Hypothesis 8--The regression coefficients associated with each independent variable (when correlated with the GED English test) equals 0.

Based on the analysis presented in Table 9, the critical value of F (35,64) at .05 is 1.60. Since the computed value of F is greater than 1.60, the null hypothesis of no significant relationship was rejected.

The "t" statistic of the following independent variables were found to be significant at the .05 level:

1. Fine motor aptitude on the GATB correlated significantly with GED English at the .05 level. As can be seen in Table 9, this

was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED English success increased.

2. Job experience correlated significantly with GED English at the .05 level. As represented in Table 9, this was a positive correlation. This would indicate that when all other variables were held constant, as job experience increased, GED English success increased.

From the data depicted in Table 9, it can be concluded that there was a significant relationship between GED English success and all thirty-five independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .5107, on the full multiple regression model, indicated that approximately 51 percent of the variance in English scores can be accounted for from knowledge of the thirty-five independent variables used as predictors of GED English success.

Restricted Multiple Regression--GED English

Table 10 depicts the analysis of relationships between GED English and the nine GATB independent variables.

Table 10

Multiple Regression Analysis--Restricted Model
GED English: GATB

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.1407	1.99	.05
Verbal-GATB	.6568	1.59	
Numerical-GATB	.9011	2.39	.05
Spatial-GATB	- .3214	- .57	
Perception-GATB	.2340	.83	
Clerical-GATB	- .0887	- .41	
Coordination-GATB	.1901	.93	
Fine Motor-GATB	- .4958	-1.85	
Manual-GATB	- .1006	-1.35	

Multiple R = .4674
F = 3.42
Constant = 18.4674
R Square = .2776

St. Error Estimate = 21.20936
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

Based on the analysis presented in Table 10, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is greater than 1.99, there is a significant relationship between the nine GATB independent variables and GED English.

The "t" statistic of the following GATB independent variables were found to be significant at the .05 level:

1. General learning aptitude on the GATB correlated significantly with GED English at the .05 level. As displayed in Table 10, this was a positive correlation. This would indicate that when all other variables were held constant, as general learning aptitude increased, GED English success increased.

2. Numerical aptitude on the GATB correlated significantly with GED English at the .05 level. As displayed in Table 10, this was a positive correlation. This would indicate that when all other variables were held constant, as numerical aptitude increased, GED English success increased.

From the data depicted in Table 10, it can be concluded that there was a significant relationship between GED English success and the nine GATB independent variables. Two of the delineated variables, taken individually, while holding all other variables constant, were found to be significant. An R square value of .2776 on the restricted multiple regression model would account for approximately 28 percent of the variance, using the nine GATB independent variables as predictors of GED English success. When compared to the full model, the GATB restricted model would result in a decrease in R square of .2331.

Table 11 depicts the analysis of relationships between GED English and the four CTABE independent variables.

Table 11

Multiple Regression Analysis--Restricted Model
GED ENGLISH: CTABE

Variables	Raw Score Regression Weight (b)	t	Significance
Reading-CTABE	.0057	.03	
Math-CTABE	.2587	1.32	
Language-CTABE	.2952	2.18	
Total-CTABE	.3020	2.27	.05

Multiple R = .4134
F = 5.91
Constant = - .06313
R Square = .1709

St. Error Estimate = 21.9151
Critical Value for t = 1.99 at .05
Critical Value for F = 2.48 at .05

Based on the analysis presented in Table 11, the critical value of F (4,85) at .05 is 2.48. Since the computed value of F is greater than 2.48, there is a significant relationship between the four CTABE independent variables and GED English.

The "t" statistic of one CTABE independent variable was found to be significant at the .05 level:

1. Total composite achievement score on the CTABE correlated significantly with GED English at the .05 level. As can be seen in Table 11, this was a positive correlation. This would indicate that when all other variables were held constant, as total composite achievement scores increased, GED English success increased.

From the data depicted in Table 11, it can be concluded that there was a significant relationship between GED English success and the four CTABE independent variables. One of the delineated variables, taken individually, while holding all other variables constant, was found to be significant. An R square value of .1709 on the restricted multiple regression model would account for approximately 17 percent of the variance, using the four CTABE independent variables as predictors of GED English success. When compared to the full model, the CTABE restricted model would result in a decrease in R square of .3398.

Table 12 depicts the analysis of relationships between GED English and the thirteen CTP independent variables.

Table 12

Multiple Regression Analysis--Restricted Model
GED English: CTP

Variables	Raw Score Regression Weight (b)	t	Significance
Self-Reliance	1.0961	.69	
Personal Worth	.3675	.53	
Personal Freedom	.5035	.37	
Belonging	3.464	2.40	.05
Withdrawing	- .8972	- .50	
Nervous Symptoms	1.3597	1.00	
Social Standards	2.6713	1.53	
Social Skills	2.1747	1.44	
Anti-Social	2.6454	1.96	
Family Relations	.5101	.38	
Community Relations	.8037	.49	
Occupational Relations	- .1251	- .08	
Total Battery	-1.079	-1.30	

Multiple R = .4082
F = 1.17
Constant = 13.5745
R Square = .1667

St. Error Estimate = 23.37168
Critical Value for t = 1.99 at .05
Critical Value for F = 1.82 at .05

Based on the analysis presented in Table 12, the critical value of $F(13,76)$ at .05 is 1.82. Since the computed value of F is less than 1.82, there is no significant relationship between the thirteen CTP independent variables and GED English.

The "t" statistic of one CTP independent variable was found to be significant at the .05 level:

1. Belonging--a personality characteristic on the CTP correlated significantly with GED English at the .05 level. As represented in Table 12, this was a positive correlation. This would indicate that when all other variables were held constant, as the personality characteristic of belonging increased, GED English success increased.

From the data depicted in Table 12, it can be concluded that there was no significant relationship between GED English success and the thirteen CTP independent variables. One of the delineated variables, taken individually, while holding all other variables constant, was found to be significant. An R square value of .1667, on the restricted multiple regression model, would account for approximately 17 percent of the variance using the thirteen CTP independent variables as predictors of GED English success. When compared to the full model, the CTP restricted model would result in a decrease in R square of .3440. Even though the CTP was not significant as a predictor of GED English success, it did contribute modest weight to the full multiple regression model.

Table 13 depicts the analysis of relationship between GED English and the nine Biographical-Demographical variables.

Table 13

Multiple Regression Analysis--Restricted Model
GED English: Biographical-Demographical

Variables	Raw Score Regression Weight (b)	t	Significance
Years of Schooling	1.0177	.56	
Sex of Individual	13.9033	2.40	.05
Age of Individual	- .3829	- .68	
Job Experience	.9835	1.24	
Married	-15.5918	- .00	
Single	-20.5079	- .00	
Divorced	- 5.2858	- .00	
Separated	- 4.5567	- .00	
Children	.1243	.03	

Multiple R = .3242
F = 1.04
Constant = 83.2887
R Square = .1051

St. Error Estimate = 23.6059
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

Based on the analysis presented in Table 13, the critical value of $F(9,80)$ at .05 is 1.99. Since the computed value of F is less than 1.99, there is no significant relationship between the nine Biographical-Demographical independent variables and GED English.

The "t" statistic of one Biographical-Demographical variable was found to be significant at the .05 level:

1. Job experience--a biographical characteristic correlated significantly with GED English at the .05 level. As represented in Table 13, this was a positive correlation. This would indicate that when all other variables were held constant, as the biographical variable of job experience increased, GED English success increased.

From the data depicted in Table 13, it can be concluded that there was no significant relationship between GED English success and the nine Biographical-Demographical independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1051 on the restricted multiple regression model would account for approximately 10 percent of the variance, using the nine Biographical-Demographical independent variables as predictors of GED English success. When compared to the full model the Biographical-Demographical restricted model would result in a decrease in R square of .4056. Even though the Biographical-Demographical variables were

not significant as a predictor of GED English success, they did contribute modest weight to the full multiple regression model.

Stepwise Multiple Regression--GED English

Table 14 depicts the stepwise regression analysis between GED English and all thirty-five independent variables. Only those independent variables contained in the most efficient stepwise model are presented. The thirteenth variable (social skills-CTP) was the last variable to add significantly to the model; therefore, analysis was terminated at this point. None of the remaining twenty-two steps (fourteen to thirty-five) provided a significant increase in R square.

Based on the analysis presented in Table 14, thirteen of the thirty-five independent variables appeared to contribute the most value as predictors of GED English success. Independent variables with step numbers one through thirteen had a combined R square value of .4480. This particular stepwise regression model would account for approximately 45 percent of the variance in GED English scores. Not all thirteen independent variables were found to be individually significant, even though all thirteen variables contributed to the R square value of the predictive model. Five of the thirteen independent variables were found to be significant at the .05 level.

The total composite score on the CTABE was found to be the most predictive independent variable with an R square value of .2321.

Table 14

Stepwise Regression Analysis
 GED English: Thirty-five
 Independent Variables

Step Number	Variable	Multiple R	R ²	Increase in R ²	F Value
1	Total-CTABE	.4818	.2321	.2321	26.6022*
2	Personal Worth	.5178	.2681	.0360	4.2761*
3	Verbal-GATB	.5337	.2848	.0167	2.0115
4	Fine Motor-GATB	.5444	.2964	.0115	1.3941
5	Coordination-GATB	.5750	.3306	.0342	4.2941*
6	Sex of Individual	.5858	.3432	.0126	1.5891
7	Separated	.5972	.3566	.0135	1.7150
8	Divorced	.6089	.3708	.0141	1.8200
9	Perception-GATB	.6215	.3863	.0155	2.0262
10	Job Experience	.6379	.4070	.0207	2.7508*
11	Age of Individual	.6483	.4202	.0133	1.7863
12	Extroversion-CTP	.6542	.4279	.0077	1.0384
13	Social Skills-CTP	.6694	.4480	.0201	2.7676*

*Indicates significance at .05 level.

The CTP variable of personal worth was found to be the second most significant predictive independent variable with an increased R square value of .0360. Coordination aptitude, job experience, and social skills-CTP were found significant with increases in R square of .0342, .0207, and .0201 respectively.

Verbal aptitude, fine motor aptitude, sex of individual, separated, divorced, perceptual aptitude, age of individual, and extroversion-CTP contributed increases in R square of .0167, .0115, .0126, .0135, .0141, .0155, .0133, and .0077 respectively.

In summation, adult educators administering the independent variables as identified in steps numbered one through thirteen would be using a more efficient model than they would by administering all thirty-five variables to predict GED English success. The remaining twenty-two independent variables would increase the predictive efficiency only modestly from an R square value of .4480 to .5107.

Full Multiple Regression--GED Social Studies

Table 15 depicts the analysis of relationships between GED Social Studies and all thirty-five independent variables.

Table 15

Multiple Regression Analysis--Full Model
 GED Social Studies: Thirty-five
 Independent Variables

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.3420	.65	
Verbal-GATB	.3664	.51	
Numerical - GATB	.0066	.01	
Spatial-GATB	.0129	.02	
Perception-GATB	.5094	1.40	
Clerical-GATB	-.1838	-.66	
Coordination-GATB	.3104	1.21	
Fine Motor-GATB	-.8905	-2.39	.05
Manual-GATB	.0197	.20	
Reading-CTABE	.2797	.72	
Math-CTABE	.3413	.77	
Language-CTABE	.0845	.27	
Total-CTABE	-.0804	-.30	
Self-Reliance-CTP	-.2323	-.10	
Personal Worth-CTP	.1278	.06	
Personal Freedom-CTP	1.1422	.59	
Belonging-CTP	.0025	.00	
Withdrawing-CTP	-3.2164	-1.27	
Nervous Symptoms-CTP	-1.4299	-.65	
Social Standards-CTP	-2.8129	-.97	
Social Skills-CTP	1.9013	.92	
Anti-Social-CTP	1.3517	.70	

Table 15 (continued)

Variables	Raw Score Regression Weight (b)	t	Significance
Family Relations-CTP	- .8674	- .39	
Community Relations-CTP	-1.5661	- .66	
Occupational Relations-CTP	-1.9930	- .83	
Total-CTP	.6619	.38	
Years of Schooling	1.8202	.67	
Sex	5.3812	.73	
Age	- .6700	-1.01	
Job Experience	2.2377	2.55	.05
Married	1.5675	.00	
Single	-3.5180	- .00	
Divorced	12.783	.00	
Separated	15.558	.01	
Children	.1047	.03	

Multiple R = .7199
 F = 1.66
 Constant = 85.1554
 R Square = .5183

St. Error Estimate = 21.9078
 Critical Value for t = 2.00 at .05
 Critical Value for F = 1.60 at .05

Null Hypothesis 9--The correlation between GED Social Studies and all independent variables is equal to 0.

Null hypothesis 10--The regression coefficients associated with each independent variable (when correlated with the GED Social Studies test) equals 0.

Based on the analysis presented in Table 15, the critical value of $F(35,64)$ at .05 is 1.60. Since the computed value of F is greater than 1.60, the null hypothesis of no significant relationship is rejected.

The "t" statistic of the following independent variables were found to be significant at the .05 level:

1. Fine motor aptitude on the GATB correlated significantly with GED Social Studies at the .05 level. As represented in Table 15, this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED Social Studies success increased.

2. Job experience correlated significantly with GED Social Studies at the .05 level. As represented in Table 15, this was a positive correlation. This would indicate that when all other variables were held constant, as job experience increased, GED Social Studies increased.

From the data depicted in Table 15, it can be concluded that there was a significant relationship between GED Social Studies success

and all thirty-five independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .5183, on the full multiple regression model, indicated that approximately 52 percent of the variance in Social Studies scores can be accounted for from knowledge of the thirty-five independent variables used as predictors of GED Social Studies success.

Restricted Multiple Regression--GED Social Studies

Table 16 depicts the analysis of relationships between GED Social Studies and the nine GATB independent variables.

Based on the analysis presented in Table 16, the critical value of $F(9,80)$ at .05 is 1.99. Since the computed value of F is greater than 1.99, there is a significant relationship between the nine GATB independent variables and GED Social Studies.

The "t" statistic of the following GATB independent variables were found to be significant at the .05 level:

1. Numerical aptitude on the GATB correlated significantly with GED Social Studies at the .05 level. As represented in Table 16, this was a positive correlation. This would indicate that when all other variables were held constant, as numerical aptitude increased, GED Social Studies success increased.

Table 16

Multiple Regression Analysis--Restricted Model
GED Social Studies: GATB

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.1406	1.95	
Verbal-GATB	.7141	1.69	
Numerical-GATB	.9780	2.54	.05
Spatial-GATB	.0252	.04	
Perception-GATB	.1426	.49	
Clerical-GATB	- .1385	- .63	
Coordination-GATB	.3010	1.44	
Fine Motor-GATB	- .5830	-2.13	.05
Manual-GATB	- .1034	-1.36	

Multiple R = .5504
F = 3.86
Constant = 16.49124
R Square = .3029

St. Error Estimate = 21.6530
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

2. Fine motor aptitude on the GATB correlated significantly with GED Social Studies at the .05 level. As displayed in Table 16, this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED Social Studies success increased.

From the data depicted in Table 16, it can be concluded that there was a significant relationship between GED Social Studies success and the nine GATB independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .3029 on the restricted multiple regression model would account for approximately 30 percent of the variance, using the nine GATB independent variables as predictors of GED Social Studies success. When compared to the full model, the GATB restricted model would result in a decrease in R square of .2154.

Table 17 depicts the analysis of relationship between GED Social Studies and the four CTABE independent variables.

Table 17

Multiple Regression Analysis--Restricted Model
GED Social Studies: CTABE

Variables	Raw Score Regression Weight (b)	t	Significance
Reading-CTABE	.0844	.38	
Math-CTABE	.3032	1.49	
Language-CTABE	.1945	1.04	
Total-CTABE	.2651	2.07	.05
Multiple R = .4137			
F = 5.92			
Constant = - .06033			
R Square = .1711			
		St. Error Estimate = 22.772	
		Critical Value for t = 1.99 at .05	
		Critical Value for F = 2.48 at .05	

Based on the analysis presented in Table 17, the critical value of $F(4,85)$ at .05 is 2.48. Since the computed value of F is greater than 2.48, there is a significant relationship between the four CTABE independent variables and GED Social Studies.

The "t" statistic of one CTABE independent variable was found to be significant at the .05 level:

1. Total composite achievement score on the CTABE correlated significantly with GED Social Studies at the .05 level. As represented in Table 17, this was a positive correlation. This would indicate that when all other variables were held constant, as total composite achievement scores increased, GED Social Studies success increased.

From the data depicted in Table 17, it can be concluded that there was a significant relationship between GED Social Studies success and the four CTABE independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1711 on the restricted multiple regression model would account for approximately 17 percent of the variance, using the four CTABE independent variables as predictors of GED Social Studies success. When compared to the full model, the CTABE restricted model would result in a decrease in R square of .3472.

Table 18 depicts the analysis of relationship between GED Social Studies and the thirteen CTP independent variables.

Table 18

Multiple Regression Analysis--Restricted Model
GED Social Studies: CTP

Variables	Raw Score Regression Weight (b)	t	Significance
Self-Reliance-CTP	1.9511	1.16	
Personal Worth-CTP	- .0147	- .02	
Personal Freedom-CTP	.1210	.09	
Belonging-CTP	3.2750	2.16	.05
Withdrawing-CTP	- .7383	- .39	
Nervous Symptoms-CTP	1.2950	.90	
Social Standards-CTP	2.537	1.38	
Social Skills-CTP	1.6420	1.03	
Anti-Social-CTP	2.700	1.91	
Family Relations-CTP	.3925	.28	
Community Relations-CTP	.6813	.39	
Occupational Relations-CTP	.0641	.04	
Total Battery-CTP	-1.0157	-1.17	

Multiple R = .3819
F = 1.00
Constant = 14.6185
R Square = .1458

St. Error Estimate = 24.5914
Critical Value for t = 1.99 at .05
Critical Value for F = 1.88 at .05

Based on the analysis presented in Table 18, the critical value of $F(13,76)$ at .05 is 1.82. Since the computed value of F is less than 1.82, there is no significant relationship between the thirteen CTP independent variables and GED Social Studies.

The "t" statistic of one CTP independent variable was found to be significant at the .05 level:

1. Belonging personality characteristic subtest on the CTP correlated significantly with GED Social Studies at the .05 level. As represented in Table 18, this was a positive correlation. This would indicate that when all other variables were held constant, as the belonging personality characteristic subtest increased, GED Social Studies success increased.

From the data depicted in Table 18, it can be concluded that there was no significant relationship between GED Social Studies success and the thirteen CTP independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1458, on the restricted multiple regression model, would account for approximately 15 percent of the variance using the thirteen CTP independent variables as predictors of GED Social Studies success. When compared to the full model, the CTP restricted model would result in a decrease in R square of .3725. Even though the CTP was not

significant as a predictor of GED Social Studies success, it did contribute modest weight to the full multiple regression model.

Table 19 depicts the analysis of relationships between GED Social Studies and the nine Biographical-Demographical independent variables.

Table 19

Multiple Regression Analysis--Restricted Model
GED Social Studies: Biographical-Demographical

Variables	Raw Score Regression Weight (b)	t	Significance
Years of Schooling	1.2312	.65	
Sex of Individual	11.9366	1.98	
Age of Individual	- .3344	- .57	
Job Experience	1.0077	1.22	
Married	-20.9348	- .00	
Single	-26.4673	- .00	
Divorced	- 9.9566	- .00	
Separated	- 8.2818	- .00	
Children	- .5970	- .16	

Multiple R = .3213
F = 1.02
Constant = 118.7590
R Square = .1032

St. Error Estimate = 24.5592
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

Based on the analysis presented in Table 19, the critical value of $F(9,80)$ at .05 is 1.99. Since the computed value of F is less than 1.99, there is no significant relationship between the nine Biographical-Demographical independent variables and GED Social Studies.

The "t" statistic was not found significant at the .05 level for any of the nine independent variables. However, sex of the individual came close to significance with a "t" value of 1.98. A 1.99 was the critical value of "t" needed for significance.

From the data depicted in Table 19, it can be concluded that there was no significant relationship between GED Social Studies success and the nine Biographical-Demographical independent variables. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .1032, on the restricted multiple regression model, would account for approximately 10 percent of the variance using the nine Biographical-Demographical independent variables as predictors of GED Social Studies success. When compared to the full model, the Biographical-Demographical restricted model would result in a decrease in R square of .4151.

Stepwise Multiple Regression--GED Social Studies

Table 20 depicts the stepwise regression analysis between GED Social Studies and all thirty-five independent variables. Only those

independent variables contained in the most efficient stepwise models are presented. The twelfth variable (extroversion-CTP) was the last variable to add significantly to the model; therefore, analysis was terminated at this point. None of the remaining twenty-four steps (twelve to thirty-five) provided a significant increase in R square.

Table 20

Stepwise Regression Analysis
GED Social Studies: Thirty-five
Independent Variables

Step Number	Variable	Multiple R	R ²	Increase in R ²	F Value
1	Total-CTABE	.4806	.2310	.2310	26.4314*
2	Self-Reliance-CTP	.5195	.2699	.0389	4.6383*
3	Divorced	.5385	.2900	.0201	2.4372
4	Separated	.5529	.3057	.0157	1.9237
5	Verbal-GATB	.5657	.3200	.0142	1.7599
6	Sex of Individual	.5793	.3356	.0156	1.9541
7	Job Experience	.5909	.3492	.0136	1.7090
8	Perception-GATB	.6041	.3650	.0158	2.0159
9	Fine Motor-GATB	.6295	.3962	.0312	4.1385*
10	Coordination-GATB	.6432	.4137	.0175	2.3564*
11	Extroversion-CTP	.6559	.4302	.0165	2.2540*

*Indicates significance at .05 level.

Based on the analysis presented in Table 20, eleven of the thirty-five independent variables appeared to contribute the most value as predictors of GED Social Studies success. Independent variables with step numbers one through eleven had a combined R square value of .4302. This particular stepwise regression model would account for approximately 43 percent of the variance in GED Social Studies scores. Not all eleven independent variables were found to be individually significant, even though all eleven variables contributed to the R square value of the predictive model. Five of the eleven independent variables were found to be significant at the .05 level.

The total composite score on the CTABE was found to be the most predictive independent variable with an R square value of .2286. The CTP variable of self-reliance was found to be the second most significant predictive independent variable with an increased R square value of .0389. Fine motor aptitude, coordination aptitude, and extroversion-CTP were found significant with increases in R square of .0312, .0175, and .0165 respectively.

Divorce, separation, verbal aptitude, sex of individual, job experience, and perceptual aptitude contributed increases in R square of .0201, .0157, .0142, .0156, .0136, and .0158 respectively.

In summation, adult educators administering the independent variables as identified in steps numbered one through eleven would be

using a more efficient model than they would by administering all thirty-five variables to predict GED Social Studies success. The remaining twenty-four independent variables would increase the predictive efficiency only modestly from an R square value of .4302 to .5183.

Full Multiple Regression--GED Social Studies

Table 21 depicts the analysis of relationship between GED Science and all thirty-five independent variables.

Table 21

Multiple Regression Analysis--Full Model
GED Science: Thirty-five
Independent Variables

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.1744	.34	
Verbal-GATB	.4111	.59	
Numerical-GATB	.0150	.03	
Spatial-GATB	.2350	.28	
Perception-GATB	.5674	1.61	
Clerical-GATB	- .1315	- .49	
Coordination-GATB	.2861	1.15	
Fine Motor-GATB	- .9108	-2.53	.05
Manual-GATB	.0051	.05	
Reading-CTABE	.2263	.60	
Math-CTABE	.3422	.80	

Table 21 (continued)

Variables	Raw Scores Regression Weight. (b)	t	Significance
Language-CTABE	.1159	.39	
Total-CTABE	- .0731	- .28	
Self-Reliance-CTP	.1789	.08	
Personal Worth-CTP	.6260	.32	
Personal Freedom-CTP	1.4962	.79	
Belonging-CTP	.8406	.45	
Withdrawing-CTP	-2.7245	-1.11	
Nervous Symptoms-CTP	- .8707	- .41	
Social Standards-CTP	-1.9911	- .70	
Social Skills-CTP	2.5323	1.26	
Anti-Social-CTP	1.8287	.98	
Family Relations-CTP	- .2538	- .12	
Community Relations-CTP	- .8703	- .38	
Occupational Relations-CTP	-1.5261	- .65	
Total-CTP	.0827	.05	
Years of Schooling	1.8639	.71	
Sex	3.9458	.55	
Age	- .7040	-1.09	
Job Experience	1.9900	2.33	.05
Married	14.4864	.01	
Single	9.0998	.00	
Divorced	28.8017	.01	
Separated	25.7828	.01	
Children	.7757	.20	

Multiple R = .7274
F = 1.73
Constant = -170.4594
R Square = .5290

St. Error Estimate = 21.2854
Critical Value for t = 2.00 at .05
Critical Value for F = 1.60 at .05

Null Hypothesis 11--The correlations between GED Science and all independent variables is equal to 0.

Null Hypothesis 12--The regression coefficients associated with each independent variable (when correlated with the GED Science test) equals 0.

Based on the analysis presented in Table 21, the critical value of F (35,64) at .05 is 1.60. Since the computed value of F is greater than 1.60, the null hypothesis of no significant relationship is rejected.

The "t" statistic of the following independent variables were found to be significant at the .05 level:

1. Fine motor aptitude on the GATB correlated significantly with GED Science at the .05 level. As represented in Table 21, this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED Science success increased.

2. Job experience correlated significantly with GED Science at the .05 level. As represented in Table 21, this was a positive correlation. This would indicate that when all other variables were

held constant, as job experience increased, GED Science success increased.

From the data depicted in Table 21, it can be concluded that there was a significant relationship between GED Science success and all thirty-five independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .5290, on the full multiple regression model, indicated that approximately 53 percent of the variance in the GED Science score can be accounted for from knowledge of the thirty-five independent variables used as predictors of GED Science success.

Restricted Multiple Regression--GED Science

Table 22 depicts the analysis of relationship between GED Science and the nine GATB independent variables.

Based on the analysis presented in Table 22, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is greater than 1.99, there is a significant relationship between the nine GATB independent variables and GED Science.

The "t" statistic of the following GATB independent variables were found to be significant at the .05 level:

1. Numerical aptitude on the GATB correlated significantly with GED Science at the .05 level. As represented in Table 22, this was a positive correlation. This would indicate that when all other

Table 22

Multiple Regression Analysis--Restricted Model
GED Science: GATB

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.1184	1.68	
Verbal-GATB	.6396	1.55	
Numerical-GATB	.9818	2.61	.05
Spatial-GATB	.0384	.07	
Perception-GATB	.2312	.82	
Clerical-GATB	- .1324	- .61	
Coordination-GATB	.2995	1.47	
Fine Motor-GATB	- .5989	-2.24	.05
Manual-GATB	- .1048	-1.41	

Multiple R = .5569
F = 4.00
Constant = 14.2845
R Square = .3102

St. Error Estimate = 21.1648
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

variables were held constant, as numerical aptitude increased, GED Science success increased.

2. Fine motor aptitude on the GATB correlated significantly with GED Science at the .05 level. As represented in Table 22, this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED Science success increased.

From the data depicted in Table 22, it can be concluded that there was a significant relationship between GED Science success and the nine GATB independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .3102 on the restricted multiple regression model would account for approximately 31 percent of the variance using the nine GATB independent variables as predictors of GED Science success. When compared to the full model, the GATB restricted model would result in a decrease in R square of .2188.

Table 23 depicts the analysis of relationship between GED Science and the four CTABE independent variables.

Table 23

Multiple Regression Analysis--Restricted Model
GED Science: CTABE

Variables	Raw Score Regression Weight (b)	t	Significance
Reading-CTABE	.0716	.33	
Math-CTABE	.3275	1.65	
Language-CTABE	.1825	1.03	
Total-CTABE	.2834	2.11	.05
Multiple R = .4240			
F = 6.28		St. Error Estimate = 22.2591	
Constant = -.06037		Critical Value for t = 1.99 at .05	
R Square = .1798		Critical Value for F = 2.48 at .05	

Based on the analysis presented in Table 23, the critical value of $F(4,85)$ at .05 is 2.48. Since the computed value of F is greater than 2.48, there is a significant relationship between the four CTABE independent variables and GED Science.

The "t" statistic of one CTABE independent variable was found to be significant at the .05 level:

1. Total composite achievement score on the CTABE correlated significantly with GED Science at the .05 level. As represented in Table 23, this was a positive correlation. This would indicate that when all other variables were held constant, as total composite achievement scores increased, GED Science success increased.

From the data depicted in Table 23, it can be concluded that there was a significant relationship between GED Science success and the four CTABE independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1798 on the restricted multiple regression model would account for approximately 18 percent of the variance using the four CTABE independent variables as predictors of GED Science success. When compared to the full model, the CTABE restricted model would result in a decrease in R square of .3292.

Table 24 depicts the analysis of relationship between GED Science and the thirteen CTP independent variables.

Table 24

Multiple Regression Analysis--Restricted Model
GED Science: CTP

Variables	Raw Score Regression Weight (b)	t	Significance
Self-Reliance	1.7193	1.05	
Personal Worth	- .0904	- .13	
Personal Freedom	- .0416	- .03	
Belonging	3.5228	2.37	.05
Withdrawing	- .9263	- .50	
Nervous Symptoms	1.2791	.91	
Social Standards	2.4603	1.37	
Social Skills	1.8140	1.16	
Anti-Social	2.5642	1.85	
Family Relations	.3585	.26	
Community Relations	.8077	.48	
Occupational Relations	- .0757	- .05	
Total Battery	- .9884	-1.16	

Multiple R = .3898

F = 1.05

Constant = 16.1475

R Square = .1520

St. Error Estimate = 24.0763

Critical Value for t = 1.99 at .05

Critical Value for F = 1.82 at .05

Based on the analysis presented in Table 24, the critical value of F (13,76) at .05 is 1.82. Since the computed value of F is less than 1.82, there is no significant relationship between the thirteen CTP independent variables and GED Science.

The "t" statistic of one CTP independent variable was found to be significant at the .05 level:

1. Belonging--A personality characteristic on the CTP correlated significantly with GED Science at the .05 level. As displayed in Table 24, this was a positive correlation. This would indicate that when all other variables were held constant, as the personality characteristic of belonging increased, GED Science success increased.

From the data depicted in Table 24, it can be concluded that there was no significant relationship between GED Science success and the thirteen CTP independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1520, on the restricted multiple regression model, would account for approximately 15 percent of the variance using the thirteen CTP independent variables as predictors of GED Science success. When compared to the full model, the CTP restricted model would result in a decrease in R square of .3770.

Table 25 depicts the analysis of relationship between GED Science and the nine Biographical-Demographical variables.

Table 25

Multiple Regression Analysis--Restricted Model
GED Science: Biographical-Demographical

Variables	Raw Score Regression Weight (b)	t	Significance
Years of Schooling	1.48065	.80	
Sex of Individual	11.2277	1.91	
Age of Individual	- .4432	- .78	
Job Experience	.8769	1.09	
Married	- .00146	- .00	
Single	- .02074	- .00	
Divorced	- .0210	- .00	
Separated	- .03816	- .00	
Children	.3735	.10	

Multiple R = .3373
F = 1.14
Constant = 76.9310
R Square = .1138

St. Error Estimate = 23.9891
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

Based on the analysis presented in Table 25, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is less than 1.99, there is no significant relationship between the nine Biographical-Demographical independent variables and GED Science.

There was no Biographical-Demographical variable found to be significant at the .05 level.

From the data depicted in Table 25, it can be concluded that there was no significant relationship between GED Science success and the nine Biographical-Demographical independent variables. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .1138 on the restricted multiple regression model would account for approximately 11 percent of the variance using the nine Biographical-Demographical independent variables as predictors of GED Science success. When compared to the full model, the Biographical-Demographical restricted model would result in a decrease in R square of .4152. Even though the Biographical-Demographical variables were not significant as a predictor of GED Science success, they did contribute modest weight to the full multiple regression model.

Stepwise Multiple Regression--GED Science

Table 26 depicts the stepwise regression analysis between GED Science and all thirty-five independent variables. Only those independent variables contained in the most efficient stepwise model are presented. The thirteenth variable (anti-social-CTP) was the last variable to add significantly to the model; therefore, analysis was terminated at this point. None of the remaining twenty-two steps (fourteen to thirty-five) provided a significant increase in R square.

Table 26

Stepwise Regression Analysis
GED Science: Thirty-five
Independent Variables

Step Number	Variable	Multiple R	R ²	Increase in R ²	F Value
1	Total-CTABE	.4781	.2286	.2286	26.0796*
2	Divorced	.5190	.2694	.0408	4.8590*
3	Perception-GATB	.5392	.2907	.0213	2.5794
4	Fine Motor-GATB	.5835	.3404	.0498	6.9118*
5	General Learning-GATB	.5970	.3564	.0159	2.0765
6	Coordination-GATB	.6097	.3718	.0154	2.0378
7	Social Skills-CTP	.6212	.3859	.0141	1.8842
8	Job Experience	.6333	.4011	.0152	2.0621
9	Age of Individual	.6508	.4235	.0224	3.1110*
10	Withdrawing-CTP	.6580	.4329	.0094	1.3071
11	Belonging-CTP	.6654	.4427	.0098	1.3701
12	Occupational-CTP	.6736	.4537	.0110	1.5483
13	Anti-Social-CTP	.6890	.4747	.0210	3.0337*

*Indicates significance at .05 level.

Based on the analysis presented in Table 26, thirteen of the thirty-five independent variables appeared to contribute the most value as predictors of GED Science success. Independent variables with step numbers one through thirteen had a combined R square value of .4747. This particular stepwise regression model would account

for approximately 47 percent of the variance in GED Science scores. Not all thirteen independent variables were found to be individually significant even though all thirteen variables contributed to the R square value of the predictive model. Five of the thirteen independent variables were found to be significant at the .05 level.

The total composite score on the CTABE was found to be the most predictive independent variable with an R square value of .2286. The Biographical-Demographical variable of divorce was found to be the second most significant predictive independent variable with an increased R square value of .0408. Fine motor aptitude, age of individual, and anti-social tendencies-CTP were found significant with increases in R square of .0498, .0224, and .0210, respectively.

Perceptual aptitude, general learning aptitude, coordination aptitude, social skills-CTP, job experience, withdrawing-CTP, belonging-CTP, and occupational relationships-CTP contributed increases in R square of .0213, .0159, .0154, .0141, .0152, .0094, .0098, and .0110 respectively.

In summation, adult educators administering the independent variables as identified in steps numbered one through thirteen would be using a more efficient model than they would by administering all thirty-five variables to predict GED Science success. The remaining twenty-two independent variables would increase the predictive efficiency only modestly from an R square value of .4747 to .5291.

Full Multiple Regression--GED Literature

Table 27 depicts the analysis of relationship between GED Literature and all thirty-five independent variables.

Table 27

Multiple Regression Analysis--Full Model
GED Literature: Thirty-five
Independent Variables

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.2365	.44	
Verbal-GATB	.5269	.71	
Numerical-GATB	-.0279	-.05	
Spatial-GATB	.0637	.07	
Perception-GATB	.5448	1.45	
Clerical-GATB	-.2017	-.70	
Coordination-GATB	.3048	1.15	
Fine Motor-GATB	-.9169	-2.38	.05
Manual-GATB	.0099	.10	
Reading-CTABE	.2968	.74	
Math-CTABE	.2917	.64	
Language-CTABE	.1048	.33	
Total-CTABE	-.0898	-.32	
Self-Reliance-CTP	-.5367	-.22	
Personal Worth-CTP	.9202	.44	
Personal Freedom-CTP	1.4809	.74	
Belonging-CTP	.9922	.50	
Withdrawing-CTP	-3.2584	-1.25	

Table 27 (continued)

Variables	Raw Score Regression Weight (b)	t	Significance
Nervous Symptoms-CTP	- .7074	- .31	
Social Standards-CTP	-2.5432	.85	
Social Skills-CTP	2.7773	1.30	
Anti-Social-CTP	2.1829	1.10	
Family Relations-CTP	- .3192	- .14	
Community Relations-CTP	-1.2609	- .51	
Occupational Relations-CTP	-1.7447	- .70	
Total-CTP	.1535	.08	
Years of Schooling	2.7074	.97	
Sex	4.0524	.53	
Age	- .7036	-1.03	
Job Experience	1.9941	2.20	.05
Married	11.4879	.00	
Single	5.2743	.00	
Divorced	21.6924	.01	
Separated	19.8685	.01	
Children	.4620	.11	

Multiple R = .7085
 F = 1.65
 Constant = 134.5204
 R Square = .5020

St. Error Estimate = 22.6278
 Critical Value for t = 2.00 at .05
 Critical Value for F = 1.60 at .05

Null Hypothesis 13--The correlations between GED Literature and all independent variables is equal to 0.

Null Hypothesis 14--The regression coefficients associated with each independent variable (when correlated with the GED Literature test) equals 0.

Based on the analysis presented in Table 27, the critical value of $F(35,64)$ at .05 is 1.60. Since the computed value of F is greater than 1.60, the null hypothesis of no significant relationship is rejected.

The "t" statistic of the following independent variables were found to be significant at the .05 level:

1. Fine motor aptitude on the GATB correlated significantly with GED Literature at the .05 level. As represented in Table 27, this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED Literature success increased.

2. Job experience correlated significantly with GED Literature at the .05 level. As represented in Table 27, this was a positive correlation. This would indicate that when all other variables were held constant, as job experience increased, GED Literature success increased.

From the data depicted in Table 27, it can be concluded that there was a significant relationship between GED Literature success

and all thirty-five independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .5020, on the full multiple regression model indicated that approximately 50 percent of the variance in Literature scores can be accounted for from knowledge of the thirty-five independent variables used as predictors of GED Literature success.

Restricted Multiple Regression--GED Literature

Table 28 depicts the analysis of relationship between GED Literature and the nine GATB independent variables.

Based on the analysis presented in Table 28, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is greater than 1.99, there is a significant relationship between the nine GATB independent variables and GED Literature.

The "t" statistic of the following GATB independent variables were found to be significant at the .05 level:

1. General learning aptitude on the GATB correlated significantly with GED Literature at the .05 level. As represented in Table 28, this was a positive correlation. This would indicate that when all other variables were held constant, as general learning aptitude increased, GED Literature success increased.

Table 28

Multiple Regression Analysis--Restricted Model
GED Literature: GATB

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.1626	2.19	.05
Verbal-GATB	.6907	1.58	
Numerical-GATB	.8899	2.25	.05
Spatial-GATB	- .1378	- .23	
Perception-GATB	.1948	.65	
Clerical-GATB	- .1591	- .70	
Coordination-GATB	.2947	1.37	
Fine Motor-GATB	- .5270	-1.87	
Manual-GATB	- .0939	1.20	

Multiple R = .5315
F = 3.50
Constant = 14.9279
R Square = .2825

St. Error Estimate = 22.3137
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

2. Numerical aptitude on the GATB correlated significantly with GED Literature at the .05 level. As represented in Table 28, this was a positive correlation. This would indicate that when all other variables were held constant, as numerical aptitude increased, GED Literature success increased.

From the data depicted in Table 28, it can be concluded that there was a significant relationship between GED Literature Success

and the nine GATB independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .2825 on the restricted multiple regression model would account for approximately 28 percent of the variance using the nine GATB independent variables as predictors of GED Literature success. When compared to the full model, the GATB restricted model would result in a decrease in R square of .2195.

Table 29 depicts the analysis of relationship between GED Literature and the four CTABE independent variables.

Table 29

Multiple Regression Analysis--Restricted Model
GED Literature: CTABE

Variables	Raw Score Regression Weight (b)	t	Significance
Reading-CTABE	.0874	.38	
Math-CTABE	.2316	1.11	
Language-CTABE	.2396	1.29	
Total-CTABE	.3112	2.35	.05

Multiple R = .3887
F = 5.10
Constant = -.05457
R Square = .1511

St. Error Estimate = 23.4088
Critical Value for t = 1.99 at .05
Critical Value for F = 2.48 at .05

Based on the analysis presented in Table 29, the critical value of $F(4,85)$ at .05 is 2.48. Since the computed value of F is greater than 2.48, there is a significant relationship between the four CTABE independent variables and GED Literature.

The "t" statistic of one CTABE independent variable was found to be significant at the .05 level:

1. Total composite achievement score on the CTABE correlated significantly with GED Literature at the .05 level. As represented in Table 29, this was a positive correlation. This would indicate that when all other variables were held constant, as total composite achievement scores increased, GED Literature success increased.

From the data depicted in Table 29, it can be concluded that there was a significant relationship between GED Literature success and the four CTABE independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R -square value of .1511 on the restricted multiple regression model would account for approximately 15 percent of the variance, using the four CTABE independent variables as predictors of GED Literature success. When compared to the full model, the CTABE restricted model would result in a decrease in R square of .1511.

Table 30 depicts the analysis of relationship between GED Literature and the thirteen CTP independent variables.

Table 30

Multiple Regression Analysis--Restricted Model
GED Literature: CTP

Variables	Raw Score Regression Weight (b)	t	Significance
Self-Reliance	1.1843	.70	
Personal Worth	.3465	.47	
Personal Freedom	.2781	.19	
Belonging	3.6495	2.39	.05
Withdrawing	-1.3230	-.69	
Nervous Symptoms	1.5574	1.08	
Social Standards	2.1740	1.18	
Social Skills	2.2269	1.39	
Anti-Social	2.9567	2.08	.05
Family Relations	.2873	.20	
Community Relations	.6091	.35	
Occupational Relations	.0177	.01	
Total Battery	-1.0536	-1.20	

Multiple R = .4050
F = 1.15
Constant = 17.8049
R Square = .1641

St. Error Estimate = 24.7106
Critical Value for t = 1.99 at .05
Critical Value for F = 1.82 at .05

Based on the analysis presented in Table 30, the critical value of F (13,76) at .05 is 1.82. Since the computed value of F is less than 1.82, there is no significant relationship between the thirteen CTP independent variables and GED Literature.

The "t" statistic of two CTP independent variables were found to be significant at the .05 level:

1. Belonging--A personality characteristic on the CTP correlated significantly with GED Literature at the .05 level. As represented in Table 30, this was a positive correlation. This would indicate that when all other variables were held constant, as the personality characteristic of belonging increased, GED Literature success increased, GED Literature success increased.

2. Anti-social--A personality characteristic on the CTP correlated significantly with GED Literature at the .05 level. As represented in Table 30, this was a positive correlation. This would indicate that when all other variables were held constant, as the personality characteristic of extroversion increased, GED Literature success increased.

From the data depicted in Table 30, it can be concluded that there was no significant relationship between GED Literature success and the thirteen CTP independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .1644, on the restricted multiple regression model, would account for approximately 16 percent of the variance using the thirteen CTP independent variables as predictors of GED Literature success. When compared to

the full model, the CTP restricted model would result in a decrease in R square of .3379.

Table 31 depicts the analysis of relationship between GED Literature and the nine Biographical-Demographical variables.

Table 31

Multiple Regression Analysis--Restricted Model
GED Literature: Biographical-Demographical

Variables	Raw Score Regression Weight (b)	t	Significance
Years of Schooling	1.0716	.55	
Sex of Individual	11.9090	1.93	
Age of Individual	- .3900	- .65	
Job Experience	.7302	.87	
Married	- 2.5031	- .00	
Single	- 8.5243	- .00	
Divorced	8.4584	.00	
Separated	5.9093	.00	
Children	.2628	.07	

Multiple R = .2987

F = .87

Constant = 2.1287

R Square = .0892

St. Error Estimate = 25.14

Critical Value for t = 1.99 at .05

Critical Value for F = 1.99 at .05

Based on the analysis presented in Table 31, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is

less than 1.99, there is no significant relationship between the nine Biographical-Demographical independent variables and GED Literature.

There was no Biographical-Demographical variable found to be significant at the .05 level.

From the data depicted in Table 31, it can be concluded that there was no significant relationship between GED Literature success and the nine Biographical-Demographical independent variables. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .0892 on the restricted multiple regression model would account for approximately 9 percent of the variance, using the nine Biographical-Demographical independent variables as predictors of GED Literature success. When compared to the full model, the Biographical-Demographical restricted model would result in a decrease in R square of .4128. Even though the Biographical-Demographical variables were not significant as a predictor of GED Literature success, they did contribute modest weight to the full multiple regression model.

Stepwise Multiple Regression--GED Literature

Table 32 depicts the stepwise regression analysis between GED Literature and all thirty-five independent variables. Only those independent variables contained in the most efficient stepwise model

are presented. The twelfth variable (age of individual) was the last variable to add significantly to the model; therefore, analysis was terminated at this point. None of the remaining twenty-three steps (thirteen to thirty-five) provided a significant increase in R square results.

Table 32

Stepwise Regression Analysis
GED Literature: Thirty-five
Independent Variables

Step Number	Variable	Multiple R	R ²	Increase in R ²	F Value
1	Total-CTABE	.4621	.2136	.2136	23.8985*
2	General Learning-GATB	.5045	.2545	.0409	4.7728
3	Divorced	.5317	.2827	.0282	3.3835*
4	Social Skills-CTP	.5534	.3062	.0235	2.8816*
5	Withdrawing-CTP	.5617	.3155	.0093	1.1372
6	Social Standards-CTP	.5755	.3312	.0157	1.9503
7	Belonging-CTP	.5866	.3440	.0128	1.6061
8	Anti-Social-CTP	.5931	.3517	.0077	.9580
9	Coordination-GATB	.6008	.3610	.0092	1.1579
10	Fine Motor-GATB	.6228	.3879	.0269	3.4733*
11	Job Experience	.6300	.3969	.0090	1.1659
12	Age of Individual	.6497	.4221	.0252	3.3608*

*Indicates significance at .05 level.

Based on the analysis presented in Table 32, twelve of the thirty-five independent variables appeared to contribute the most value as predictors of GED Literature success. Independent variables with step numbers one through twelve had a combined R square value of .4221. This particular stepwise regression model would account for approximately 42 percent of the variance in GED Literature scores. Not all twelve independent variables were found to be individually significant, even though all twelve variables contributed to the R square value of the predictive model. Six of the twelve independent variables were found to be significant at the .05 level.

The total composite score on the CTABE was found to be the most predictive independent variable with an R square value of .2136. The general learning aptitude on the GATB was found to be the second most significant predictive independent variable with an increased R square value of .0409. Divorced marital status, social skills-CTP, fine motor aptitude-GATB, and age of individual were found significant with increases in R square of .0282, .0235, .0269, and .0252 respectively.

In summation, adult educators administering the independent variables as identified in steps numbered one through thirteen would be using a more efficient model than they would by administering all thirty-five variables to predict GED Literature success. The remaining twenty-three independent variables would increase the

predictive efficiency only modestly from an R square value of .4221 to .5020.

Full Multiple Regression--GED Math

Table 33 depicts the analysis of relationship between GED Math and all thirty-five independent variables.

Table 33

Multiple Regression Analysis--Full Model
GED-Math: Thirty-five
Independent Variables

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.1343	.27	
Verbal-GATB	.3548	.51	
Numerical-GATB	- .0356	- .06	
Spatial-GATB	.2005	.25	
Perception-GATB	.5845	1.69	
Clerical-GATB	- .1400	- .53	
Coordination-GATB	.1858	.76	
Fine Motor-GATB	- .8529	-2.40	.05
Manual-GATB	.0346	.36	
Reading-CTABE	.1030	.28	
Math-CTABE	.4792	1.14	
Language-CTABE	.1720	.58	
Total-CTABE	- .0898	- .35	
Self-Reliance-CTP	.4189	.18	
Personal Worth-CTP	.4287	.22	

Table 33 (continued)

Variables	Raw Score Regression Weight (b)	t	Significance
Personal Freedom-CTP	1.8558	1.00	
Belonging-CTP	1.1116	.61	
Withdrawing-CTP	-2.6023	-1.08	
Nervous Symptoms-CTP	-.6151	-.29	
Social Standards-CTP	-1.6536	-.60	
Social Skills-CTP	2.6453	1.34	
Anti-Social-CTP	2.0453	1.11	
Family Relations-CTP	-.1707	-.08	
Community Relations-CTP	-.6737	-.30	
Occupational Relations-CTP	-.9285	-.41	
Total-CTP	-.1390	-.08	
Years of Schooling	1.2286	.48	
Sex	2.7235	.39	
Age	-.6379	-1.01	
Job Experience	1.7550	2.10	.05
Married	1.3400	.00	
Single	-1.1551	-.00	
Divorced	17.2175	.01	
Separated	16.1523	.01	
Children	.5886	.16	

Multiple R = .7144
 F = 1.61
 Constant = -85.9283
 R Square = .5104

St. Error Estimate = 20.8798
 Critical Value for t = 2.00 at .05
 Critical Value for F = 1.60 at .05

Null Hypothesis 15--The correlation between GED Math and all independent variables is equal to 0.

Null Hypothesis 16--The regression coefficients associated with each independent variable (when correlated with the GED Math test) equals 0.

Based on the analysis presented in Table 33, the critical value of $F(35,64)$ at .05 is 1.60. Since the computed value of F is greater than 1.60, the null hypothesis of no significant relationship is rejected.

The "t" statistic of the following independent variables were found to be significant at the .05 level:

1. Fine Motor aptitude on the GATB correlated significantly with GED Math at the .05 level. As represented in Table 33, this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED Math success increased.

2. Job experience correlated significantly with GED Math at the .05 level. As represented in Table 33, this was a positive correlation. This would indicate that when all other variables were held constant, as job experience increased, GED Math success increased.

From the data depicted in Table 33, it can be concluded that there was a significant relationship between GED Math and all thirty-five independent variables. Two of the delineated variables taken

individually, while holding all other variables constant, were found to be significant. An R square value of .5104, on the full multiple regression model, indicated that approximately 51 percent of the variance in Math scores can be accounted for from knowledge of the thirty-five independent variables used as predictors of GED Math success.

Restricted Multiple Regression--GED Math

Table 34 depicts the analysis of relationship between GED Math and the nine GATB Independent variables.

Based on the analysis presented in Table 34, the critical value of $F(9,80)$ at .05 is 1.99. Since the computed value of F is greater than 1.99, there is a significant relationship between the nine GATB independent variables and GED Math.

The "t" statistic of the following GATB independent variables were found to be significant at the .05 level:

1. Numerical aptitude on the GATB correlated significantly with GED Math at the .05 level. As represented in Table 34, this was a positive correlation. This would indicate that when all other variables were held constant, as numerical aptitude increased, GED Math success increased.

2. Fine motor aptitude on the GATB correlated significantly with GED Math at the .05 level. As represented in Table 34, this was

Table 34

Multiple Regression Analysis--Restricted Model
GED Math: GATB

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.0898	1.30	
Verbal-GATB	.4671	1.15	
Numerical-GATB	1.0191	2.77	.05
Spatial-GATB	.0850	.15	
Perception-GATB	.2863	1.04	
Clerical-GATB	- .1659	- .78	
Coordination-GATB	.2180	1.09	
Fine Motor-GATB	- .5730	-2.19	.05
Manual-GATB	- .0822	-1.13	

Multiple R = .5354
F = 3.57
Constant = 13.4930
R Square = .2867

St. Error Estimate = 20.7059
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, GED Math success increased.

From the data depicted in Table 34, it can be concluded that there was a significant relationship between GED Math success and the nine GATB independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .2867 on the restricted

multiple regression model would account for approximately 29 percent of the variance, using the nine GATB independent variables as predictors of GED Math success. When compared to the full model, the GATB restricted model would result in a decrease in R square of .2237.

Table 35 depicts the analysis of relationship between GED Math and the four CTABE independent variables.

Table 35
Multiple Regression Analysis--Restricted Model
GED Math: CTABE

Variables	Raw Score Regression Weight (b)	t	Significance
Reading-CTABE	- .0168	- .08	
Math-CTABE	.4332	2.30	.05
Language-CTABE	.1468	.88	
Total-CTABE	.2785	2.09	.05

Multiple R = .4524
F = 7.38
Constant = - .05391
R Square = .2047

St. Error Estimate = 21.0870
Critical Value for t = 1.99 at .05
Critical Value for F = 2.48 at .05

Based on the analysis presented in Table 35, the critical value of F (4,85) at .05 is 2.48. Since the computed value of F is greater than 2.48, there is a significant relationship between the four CTABE independent variables and GED Math.

The "t" statistic of two CTABE independent variables were found to be significant at the .05 level:

1. Math achievement score on the CTABE correlated significantly with GED Math at the .05 level. As represented in Table 35, this was a positive correlation. This would indicate that when all other variables were held constant, as math achievement scores increased, GED Math success increased.

2. Total composite achievement score on the CTABE correlated significantly with GED Math at the .05 level. As represented in Table 35, this was a positive correlation. This would indicate that when all other variables were held constant, as total composite achievement scores increased, GED Math success increased.

From the data depicted in Table 35, it can be concluded that there was a significant relationship between GED Math success and the four CTABE independent variables. Two of the delineated variables taken individually, while holding all other variables constant were found to be significant. An R square value of .2047 on the restricted multiple regression model would account for approximately 20 percent of the variance, using the four CTABE independent variables as predictors of GED Math success. When compared to the full model, the CTABE restricted model would result in a decrease in R square of .3057.

Table 36 depicts the analysis of relationship between GED Math and the thirteen CTP independent variables.

Table 36

Multiple Regression Analysis--Restricted Model
GED Math: CTP

Variables	Raw Score Regression Weight (b)	t	Significance
Self-Reliance	1.8058	1.14	
Personal Worth	- .3031	- .44	
Personal Freedom	.1018	.08	
Belonging	3.5747	2.49	.05
Withdrawing	- .9889	- .55	
Nervous Symptoms	1.4332	1.06	
Social Standards	2.4768	1.43	
Social Skills	1.8678	1.24	
Anti-Social	2.6269	1.96	
Family Relations	.5702	.43	
Community Relations	.8369	.51	
Occupational Relations	.2927	.19	
Total Battery	-1.0827	-1.31	

Multiple R = .3788
F = .98
Constant = 16.7141
R Square = .1435

St. Error Estimate = 23.2786
Critical Value for t = 1.99 at .05
Critical Value for F = 1.82 at .05

Based on the analysis presented in Table 36, the critical value of $F(13,76)$ at .05 is 1.82. Since the computed value of F is less than 1.82, there is no significant relationship between the thirteen CTP independent variables and GED Math.

The "t" statistic of one CTP independent variable was found to be significant at the .05 level:

1. Belonging--A personality characteristic on the CTP correlated significantly with GED Math at the .05 level. As represented in Table 36, this was a positive correlation. This would indicate that when all other variables were held constant, as the personality characteristic of belonging increased, GED Math success increased.

From the data depicted in Table 36, it can be concluded that there was no significant relationship between GED Math success and the thirteen CTP independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1435, on the restricted multiple regression model, would account for approximately 14 percent of the variance using the thirteen CTP independent variables as predictors of GED Math success. When compared to the full model, the CTP restricted model would result in a decrease in R square of .3669. Even though the CTP was not significant as a predictor of GED Math success, it did contribute modest weight to the full multiple regression model.

Table 37 depicts the analysis of relationship between GED Math and the nine Biographical-Demographical variables.

Table 37

Multiple Regression Analysis--Restricted Model
GED Math: Biographical-Demographical

Variables	Raw Score Regression Weight (b)	t	Significance
Years of Schooling	1.5991	.89	
Sex of Individual	9.6146	1.69	
Age of Individual	- .4147	- .75	
Job Experience	.7776	1.00	
Married	-42.3889	1 .01	
Single	-47.0254	- .01	
Divorced	-31.9104	- .00	
Sepatated	-31.2276	- .00	
Children	.0739	.02	

Multiple R = .3211
F = 1.02
Constant = 272.1801
R Square = .1031

St. Error Estimate = 23.2180
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

Based on the analysis presented in Table 37, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is less than 1.99, there is no significant relationship between the nine Biographical-Demographical independent variables and GED Math.

There was no Biographical-Demographical variable found to be significant at the .05 level.

From the data depicted in Table 37, it can be concluded that there was no significant relationship between GED Math success and the nine Biographical-Demographical independent variables. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .1031 on the restricted multiple regression model would account for approximately 10 percent of the variance using the nine Biographical-Demographical independent variables as predictors of GED Math success. When compared to the full model, the Biographical-Demographical restricted model would result in a decrease in R square of .3989. Even though the Biographical-Demographical variables were not significant as a predictor of GED Math success, they did contribute modest weight to the full multiple regression model.

Stepwise Multiple Regression--GED Math

Table 38 depicts the stepwise regression analysis between GED Math and all thirty-five independent variables. Only those independent variables contained in the most efficient stepwise model are presented. The thirteenth variable (personal freedom-CTP) was the last variable to add significantly to the model; therefore, analysis was terminated at this point. None of the remaining twenty-two steps (fourteen to thirty-five) provided a significant increase in R square results.

Table 38

Stepwise Regression Analysis
GED Math: Thirty-five
Independent Variables

Step Number	Variable	Multiple R	R ²	Increase in R ²	F Value
1	Total-CTABE	.4847	.2349	.2349	27.0304*
2	Divorced	.5166	.2669	.0319	3.7894*
3	Perception-GATB	.5402	.2919	.0250	3.0379*
4	Fine Motor-GATB	.5851	.3423	.0505	6.5242*
5	Separated	.6009	.3611	.0188	2.4667*
6	Sex of Individual	.6129	.3757	.0146	1.9397
7	Job Experience	.6230	.3882	.0125	1.6733
8	Numerical-GATB	.6293	.3960	.0079	1.0551
9	General Learning-GATB	.6353	.4036	.0075	1.0109
10	Age of Individual	.6427	.4131	.0095	1.2757
11	Social Skills-CTP	.6500	.4225	.0094	1.2713
12	Withdrawing-CTP	.6618	.4380	.0155	2.1227*
13	Personal Freedom-CTP	.6757	.4565	.0186	2.5967*

*Indicates significance at .05 level.

Based on the analysis presented in Table 38, thirteen of the thirty-five independent variables appeared to contribute the most value as predictors of GED Math success. Independent variables with step numbers one through thirteen had a combined R square value of .4565. This particular stepwise regression model would account for

approximately 46 percent of the variance in GED Math scores. Not all thirteen independent variables were found to be individually significant, even though all thirteen variables contributed to the R square value of the predictive model. Seven of the thirteen independent variables were found to be significant at the .05 level.

The total composite score on the CTABE was found to be the most predictive independent variable with an R square value of .2349. The Biographical variable of divorce was found to be the second most significant predictive independent variable with an increased R value of .0319. Perceptual aptitude was the third most significant predictive independent variable with an increased R value of .0250. Fine motor aptitude, separation, withdrawing-CTP, and personal freedom-CTP were found significant with increases in R square of .0505, .0188, .0155, and .0186 respectively.

Sex of individual, job experience, numerical aptitude, general learning aptitude, age of individual, and social skills-CTP contributed increases in R square of .0146, .0125, .0079, .0075, .0095, and .0094 respectively.

In summation, adult educators administering the independent variables as identified in steps numbered one through thirteen would be using a more efficient model than they would by administering all thirty-five variables to predict GED Math success. The remaining

twenty-two independent variables would increase the predictive efficiency only modestly from an R square value of .4565 to .5104.

Full Multiple Regression--GED Total

Table 39 depicts the analysis of relationship between the GED Total score and all thirty-five independent variables.

Table 39

Multiple Regression Analysis--Full Model
GED Total: Thirty-five
Independent Variables

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.2512	.49	
Verbal-GATB	.4018	.57	
Numerical-GATB	- .0322	- .06	
Spatial-GATB	- .0498	.06	
Perception-GATB	.5496	1.55	
Clerical-GATB	- .1662	- .61	
Coordination	.2535	1.02	
Fine Motor-GATB	- .8699	-2.40	.05
Manual-GATB	.0183	.19	
Reading-CTABE	.2178	.58	
Math-CTABE	.3591	.84	
Language-CTABE	.1246	.41	
Total-CTABE	- .0817	- .31	
Self-Reliance-CTP	- .2379	- .10	
Personal Worth-CTP	.4523	.23	

Table 39 (continued)

Variables	Raw Score Regression Weight (b)	t	Significance
Personal Freedom-CTP	1.4457	.76	
Belonging-CTP	.7143	.38	
Withdrawing-CTP	-2.9864	-1.21	
Nervous Symptoms-CTP	- .9679	- .45	
Social Standards-CTP	-2.2249	- .79	
Social Skills-CTP	2.3843	1.18	
Anti-Social-CTP	1.7429	.93	
Family Relations-CTP	- .5084	- .23	
Community Relations-CTP	-1.1366	- .49	
Occupational Relations-CTP	1.8443	.70	
Total-CTP	.2669	.16	
Years of Schooling	1.8443	.70	
Sex	4.2995	.60	
Age	- .7026	-1.09	
Job Experience	2.0212	2.36	.05
Married	-9.3035	- .00	
Single	-14.1672	- .00	
Divorced	2.9871	.00	
Separated	2.6834	.00	
Children	.5213	.14	

Multiple R = .7181
 F = 1.64
 Constant = .97427
 R Square = .5157

St. Error Estimate = 21.3310
 Critical Value for t = 2.00 at .05
 Critical Value for F = 1.60 at .05

Null Hypothesis 17--The correlation between GED Total and all independent variables is equal to 0.

Null Hypothesis 18--The regression coefficient associated with each independent variable (when correlated with the GED Total test) equals 0.

Based on the analysis presented in Table 39, the critical value of $F(33,64)$ at .05 is 1.60. Since the computed value of F is greater than 1.60, the null hypothesis of no significant relationship is rejected.

The "t" statistic of the following independent variables were found to be significant at the .05 level:

1. Fine motor aptitude on the GATB correlated significantly with the GED Total score at the .05 level. As represented in Table 39, this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, the GED Total score increased.

2. Job experience correlated significantly with the GED Total score at the .05 level. As represented in Table 39, this was a positive correlation. This would indicate that when all other variables were held constant, as job experience increased, the GED Total score increased.

From the data depicted in Table 39, it can be concluded that there was a significant relationship between the GED Total score and

all thirty-five independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .5157, on the full multiple regression model, indicated that approximately 52 percent of the variance of the GED Total score can be accounted for from knowledge of the thirty-five independent variables used as predictors of GED Total test success.

Restricted Multiple Regression--GED Total

Table 40 depicts the analysis of relationship between the GED Total score and the nine GATB independent variables.

Based on the analysis presented in Table 40, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is greater than 1.99, there is a significant relationship between the nine GATB independent variables and the GED Total score.

The "t" statistic of the following GATB independent variables were found to be significant at the .05 level:

1. Numerical aptitude on the GATB correlated significantly with the GED Total score at the .05 level. As represented in Table 40, this was a positive correlation. This would indicate that when all other variables were held constant, as numerical aptitude increased, the GED Total score increased.

2. Fine motor aptitude on the GATB correlated significantly with the GED Total score at the .05 level. As represented in Table 40,

Table 40

Multiple Regression Analysis--Restricted Model
GED Total: GATB

Variables	Raw Score Regression Weight (b)	t	Significance
General-GATB	.1306	1.85	
Verbal-GATB	.6400	1.55	
Numerical-GATB	.9541	2.54	.05
Spatial-GATB	-.0564	-.10	
Perception-GATB	.2192	.78	
Clerical-GATB	-.1406	-.65	
Coordination-GATB	.2591	1.27	
Fine Motor-GATB	-.5550	-2.08	.05
Manual-GATB	-.0973	-1.31	

Multiple R = .5436
F = 3.73
Constant = 15.4936
R Square = .2955

St. Error Estimate = 21.1372
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

this was a negative correlation. This would indicate that when all other variables were held constant, as fine motor aptitude decreased, the GED Total score increased.

From the data depicted in Table 40, it can be concluded that there was a significant relationship between the GED Total score increase and the nine GATB independent variables. Two of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .2955 on the restricted multiple regression model would account for approximately 30 percent of the variance using the nine GATB independent

variables as predictors of the GED Total score success. When compared to the full model, the GATB restricted model would result in a decrease in R square of .2202.

Table 41 depicts the analysis of relationship between the GED Total score and the four CTABE independent variables.

Table 41
Multiple Regression Analysis--Restricted Model
GED Total: CTABE

Variables	Raw Score Regression Weight (b)	t	Significance
Reading-CTABE	.0492	.23	
Math-CTABE	.3123	1.59	
Language-CTABE	.2043	1.17	
Total-CTABE	.4895	2.05	.05

Multiple R = .4209
F = 6.17
Constant = -5.8691
R Square = .1772

St. Error Estimate = 22.0326
Critical Value for t = 1.99 at .05
Critical Value for F = 2.48 at .05

Based on the analysis presented in Table 41, the critical value of F (4,85) at .05 is 2.48. Since the computed value of F is greater than 2.48, there is a significant relationship between the four CTABE independent variables and the GED Total score.

The "t" statistic of one CTABE independent variable was found to be significant at the .05 level:

1. Total composite achievement score on the CTABE correlated significantly with the GED Total score at the .05 level. As displayed in Table 41, this was a positive correlation. This would indicate that when all other variables were held constant, as total composite achievement scores increased, the GED Total score increased.

From the data depicted in Table 41, it can be concluded that there was a significant relationship between the GED Total score success and the four CTABE independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1772 on the restricted multiple regression model would account for approximately 18 percent of the variance using the four CTABE independent variables as predictors of the GED Total score success. When compared to the full model, the CTABE restricted model would result in a decrease in R square of .3385.

Table 42 depicts the analysis of relationship between the GED Total score and the thirteen CTP independent variables.

Table 42

Multiple Regression Analysis--Restricted Model
GED Total: CTP

Variables	Raw Score Regression Weight (b)	t	Significance
Self-Reliance	1.5446	.96	
Personal Worth	.0630	.09	
Belonging	3.5146	2.40	.05
Withdrawing	-.9542	-.52	
Nervous Symptoms	1.3697	.99	
Social Standards	2.4688	1.39	
Social Skills	1.9212	1.25	
Anti-Social	2.6883	1.96	
Family Relations	.4162	.31	
Community Relations	.7357	.44	
Occupational Relations	.0202	.01	
Total Battery	-1.0380	-1.23	

Multiple R = .3942
F = 1.08
Constant = 15.8134
R Square = .1554

St. Error Estimate = 23.7452
Critical Value for t = 1.99 at .05
Critical Value for F = 1.82 at .05

Based on the analysis presented in Table 42, the critical value of F (13,76) at .05 is 1.82. Since the computed value of F is less than 1.82, there is no significant relationship between the thirteen CTP independent variables and the GED Total score.

The "t" statistic of one CTP independent variable was found to be significant at the .05 level:

1. Belonging--A personality characteristic on the CTP correlated significantly with the GED Total score at the .05 level. As represented in Table 42, this was a positive correlation. This would indicate that when all other variables were held constant, as the personality characteristic of belonging increased, the GED Total score increased.

From the data depicted in Table 42, it can be concluded that there was no significant relationship between the GED Total score success and the thirteen CTP independent variables. One of the delineated variables taken individually, while holding all other variables constant, was found to be significant. An R square value of .1554, on the restricted multiple regression model, would account for approximately 16 percent of the variance using the thirteen CTP independent variables as predictors of the GED Total score success. When compared to the full model, the CTP restricted model would result in a decrease in R square of .3603. Even though the CTP was not significant as a predictor of the GED Total score success, it did contribute modest weight to the full multiple regression model.

Table 43 depicts the analysis of relationship between the GED Total score and the nine Biographical-Demographical variables.

Table 43

Multiple Regression Analysis--Restricted Model
GED Total: Biographical-Demographical

Variables	Raw Score Regression Weight (b)	t	Significance
Years of Schooling	1.2559	.68	
Sex of Individual	11.5698	1.98	
Age of Individual	- .3965	- .70	
Job Experience	.8766	1.09	
Married	-93.9812	- .01	
Single	-99.4783	- .01	
Divorced	-83.0593	- .01	
Separated	-83.3321	- .01	
Children	.06317	.02	

Multiple R = .3173
F = 1.00
Constant = 635.191
R Square = .1007

St. Error Estimate = 23.8820
Critical Value for t = 1.99 at .05
Critical Value for F = 1.99 at .05

Based on the analysis presented in Table 43, the critical value of F (9,80) at .05 is 1.99. Since the computed value of F is less than 1.99, there is no significant relationship between the nine Biographical-Demographical independent variables and the GED Total score.

There was no Biographical-Demographical variable found to be significant at the .05 level.

From the data depicted in Table 43, it can be concluded that there was no significant relationship between the GED Total score success and the nine Biographical-Demographical independent variables. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant. An R square value of .1007 on the restricted multiple regression model would account for approximately 10 percent of the variance using the nine Biographical-Demographical independent variables as predictors of the GED Total score success. When compared to the full model, the Biographical and Demographical restricted model would result in a decrease in R square of .4150. Even though the Biographical-Demographical variables were not significant as a predictor of the GED Total score success, they did contribute modest weight to the full multiple regression model.

Stepwise Multiple Regression--GED Total

Table 44 depicts the stepwise regression analysis between the GED Total score and all thirty-five independent variables. Only those independent variables contained in the most efficient stepwise model are presented. The thirteenth variable (separated) was the last variable to add significantly to the model; therefore, analysis was terminated at this point. None of the remaining twenty-two steps (fourteen through thirty-five) provided a significant increase in R square results.

Table 44

Stepwise Regression Analysis
 GED Total: Thirty-five
 Independent Variables

Step Number	Variable	Multiple R	R ²	Increase in R ²	F Value
1	Total-CTABE	.4827	.2330	.2330	26.7350*
2	Divorced	.5138	.2640	.0310	3.6650*
3	General Learning-GATB	.5383	.2898	.0258	3.1188*
4	Social Standards-CTP	.5641	.3182	.0284	3.5427*
5	Perception-GATB	.5751	.3308	.0126	1.5775
6	Fine Motor-GATB	.5924	.3509	.0201	2.5734*
7	Coordination-GATB	.6027	.3632	.0123	1.5886
8	Job Experience	.6123	.3749	.0117	1.5175
9	Age of Individual	.6270	.3931	.0182	2.3992*
10	Social Skills-CTP	.6407	.4105	.0173	2.3235*
11	Withdrawing-CTP	.6491	.4214	.0109	1.4686
12	Sex of Individual	.6578	.4326	.0113	1.5295
13	Separated	.6690	.4476	.0149	2.0567*

*Indicates significance at .05 level.

Based on the analysis presented in Table 44, thirteen of the thirty-five independent variables appeared to contribute the most value as predictors of the GED Total score success. Independent variables with step numbers one through thirteen had a combined R

square value of .4476. This particular stepwise regression model would account for approximately 45 percent of the variance in the GED Total score. Not all thirteen independent variables were found to be individually significant, even though all thirteen variables contributed to the R square value of the predictive model. Eight of the thirteen independent variables were found to be significant at the .05 level.

The total composite score on the CTABE was found to be the most predictive independent variable with an R square value of .2330. The Biographical variable of divorce was found to be the second most significant predictive independent variable with an increased R square value of .0310. General learning aptitude, social standards-CTP, fine motor aptitude, age of individual, social skills-CTP, and the marital status of separation were found significant with increases in R square of .0258, .0284, .0201, .0182, .0173, and .0149 respectively.

Perceptual aptitude, coordination aptitude, job experience, withdrawing-CTP, and sex of the individual contributed increases in R square of .0126, .0123, .0109, and .0113 respectively.

In summation, adult educators administering the independent variables as identified in steps numbered one through thirteen would be using a more efficient model than they would by administering all thirty-five independent variables to predict GED Total score success.

The remaining twenty-two independent variables would increase the predictive efficiency only modestly from an R square value of .4476 to .5157.

DOUBLE CROSS-VALIDATION

A full regression model was run using the thirty-five independent variables as predictors of GED Total Battery success. The R square resulting from this model was .5157. It was found that this R square was significant at the .05 level; we could predict GED Total Battery success better than chance. The following question was presented: How effective would our prediction be in a like situation? Double cross-validation attempts to answer this question. The sample population is divided into two equal groups of forty-five students. Prediction equations are developed separately on samples 1 and 2. Then to compute the predicted effectiveness, each prediction equation is applied on the other sample. The design of double cross-validation is shown in Figure 1.

Sample 1

Prediction equation
based on data from
Sample 1

Sample 2

Prediction equation
based on data from
Sample 2

Figure 1

Double Cross-Validation

In this study the ninety students were randomly divided into two groups of forty-five. An R square and prediction equation using the thirteen GED Total Battery stepwise predictor variables of value differences were found. The R square for Sample 1 was .6094 while the R square for Sample 2 equaled .5949. The value differences on the thirteen predictor variables from Sample 1 were substituted into the equation based on Sample 2. The R square between the actual and predicted scores on the GED Total Battery was found to be .408. The value differences on the thirteen predictor variables from Sample 2 were substituted into the equation based on Sample 1. The R square between the actual and predicted scores on the GED Total Battery was found to be .246. The drop in R square from .6094 to .408 and from .5949 to .246 casts doubt on the predictive efficiency of the model based on all ninety students. This model should be used with reservation in predicting student success on the GED Total Battery if administered in other institutions or settings.

SUMMARY

In this chapter, the results of the General Aptitude Test Battery (GATB), the California Test of Adult Basic Education (CTABE), the California Test of Personality (CTP), the Biographical and Demographical data, and the General Education Development test (GED) completed by ninety Manpower adult basic education students in

attendance at the Helena Adult Learning Center from August 1, 1978, through April 1, 1979, were presented, analyzed, and interpreted.

The purpose of this study was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education Development test (GED), and second, to determine predictive efficiency between those previously mentioned selected independent variables and success on the General Education Development test (GED).

Hypotheses one through six were presented one at a time with appropriate tables, discussion, and interpretation. Hypotheses seven through eighteen were presented two at a time in combination. Hypotheses seven and eight, nine and ten, eleven and twelve, thirteen and fourteen, fifteen and sixteen, and seventeen and eighteen were depicted with appropriate tables, discussions, and interpretations.

A correlation matrix between the thirty-five independent variables and the seven dependent variables was presented before the first hypothesis in order to give an overview of those relationships that were significant or insignificant. From the data depicted in this matrix, it was concluded that the GATB and the CTABE were the only independent variables to significantly correlate with the GED test. The CTP and the Biographical and Demographical independent variables did not significantly correlate with the GED test. All correlations were tested at the .05 level.

Null Hypothesis 1: There is no significant correlation between each independent variable and the dependent variable of English on the GED.

Based on the analysis, performance in GED English correlated significantly with seven of the thirty-five independent variables. General learning aptitude, verbal aptitude, and numerical aptitude were three GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the GED English examination. No other independent variables correlated significantly with GED English performance.

Null Hypothesis 2: There is no significant correlation between each independent variable and the dependent variable of Social Studies on the GED test.

Based on the analysis, performance in GED Social Studies correlated significantly with eight of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, and perceptual aptitude were four GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the GED Social Studies

examination. No other independent variables correlated significantly with GED Social Studies performance.

Null Hypothesis 3: There is no significant correlation between each independent variable and the dependent variable of Science on the GED test.

Based on the analysis, performance in GED Science correlated significantly with eleven of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, spatial aptitude, perceptual aptitude, clerical aptitude, and coordination aptitude were seven GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite achievement score on the CTABE were found to correlate significantly with performance on the GED Science examination. No other independent variables correlated significantly with GED Science performance.

Null Hypothesis 4: There is no significant correlation between each independent variable and the dependent variable of Literature on the GED test.

Based on the analysis, performance in GED Literature correlated significantly with eight of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, perceptual aptitude were four GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a

total composite achievement score on the CTABE were found to correlate significantly with performance on the GED Literature examination. No other independent variables correlated significantly with GED Literature performance.

Null Hypothesis 5: There is no significant correlation between each independent variable and the dependent variable of Math on the GED test.

Based on the analysis, performance in GED Math correlated significantly with eleven of the thirty-five independent variables. General learning aptitude, verbal aptitude, numerical aptitude, spatial aptitude, perceptual aptitude, clerical aptitude, and coordination aptitude were seven GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite academic achievement score on the CTABE were found to correlate significantly with performance on the GED Math examination. No other independent variables correlated significantly with GED Math performance.

Null Hypothesis 6: There is no significant correlation between each independent variable and the dependent variable of the total GED test battery.

Based on the analysis, performance in the total GED test battery correlated significantly with eight of the thirty-five independent variables. General learning aptitude, verbal aptitude,

numerical aptitude, and perceptual aptitude were four GATB subtests found to be significant. Reading achievement, math achievement, language achievement, and a total composite achievement score on the CTABE were found to correlate significantly with performance on the total GED test battery. No other independent variables correlated significantly with total GED test battery performance.

Null Hypothesis 7: The correlation between GED English and all independent variables is equal to 0.

Null Hypothesis 8: The regression coefficients associated with each independent variable (when correlated with the GED English test) equals 0.

Based on the analysis of relationship between GED English and all thirty-five independent variables the null hypothesis of no significant relationship was rejected. Fine motor aptitude and job experience were two independent variables on the full multiple regression model that correlated significantly with GED English.

There was a significant relationship between the nine GATB independent variables on the restricted multiple regression model and GED English. General learning aptitude and numerical aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

There was a significant relationship between the four CTABE independent variables on the restricted multiple regression model and

GED English. Total composite achievement was the only delineated variable found to be significant while holding all other variables constant.

There was no significant relationship between the thirteen CTP independent variables on the restricted multiple regression model and GED English. However, belonging, a delineated personality characteristic on the CTP, was found to be significant while holding all other variables constant.

There was no significant relationship between the nine Biographical-Demographical independent variables on the restricted multiple regression model and GED English. However, job experience, a delineated biographical characteristic, was found to be significant while holding all other variables constant.

Stepwise regression analysis found thirteen of the thirty-five independent variables to be the most predictive of GED English success. The thirteen variables were: total composite achievement, personal worth, verbal aptitude, fine motor aptitude, coordination aptitude, sex of individual, separated, divorced, perceptual aptitude, job experience, age of individual, extroversion, and social skills. Not all thirteen independent variables were found to be individually significant, even though all thirteen variables contributed to the predictive model. Total composite achievement, personal worth,

coordination aptitude, job experience, and social skills were found to be individually significant.

Null Hypothesis 9: The correlation between GED Social Studies and all independent variables is equal to 0.

Null Hypothesis 10: The regression coefficients associated with each independent variable (when correlated with the GED Social Studies test) equals 0.

Based on the analysis of relationship between GED Social Studies and all thirty-five independent variables, the null hypothesis of no significant relationship was rejected. Fine motor aptitude and job experience were two independent variables on the full multiple regression model that correlated significantly with GED Social Studies.

There was a significant relationship between the nine GATB independent variables on the restricted multiple regression model and GED Social Studies. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

There was a significant relationship between the four CTABE independent variables on the restricted multiple regression model and GED Social Studies. Total composite achievement was the only delineated variable found to be significant while holding all other variables constant.

There was no significant relationship between the thirteen CTP independent variables on the restricted multiple regression model and GED Social Studies. However, belonging, a delineated personality characteristic on the CTP, was found to be significant while holding all other variables constant.

There was no significant relationship between the nine Biographical-Demographical independent variables on the restricted multiple regression model and GED Social Studies. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

Stepwise regression analysis found eleven of the thirty-five independent variables to be the most predictive of GED Social Studies success. The eleven variables were: total composite achievement, self-reliance, divorced, separated, verbal aptitude, sex of individual, job experience, perceptual aptitude, fine motor aptitude, coordination aptitude, and extroversion. Not all eleven independent variables were found to be individually significant, even though all eleven variables contributed to the predictive model. Total composite achievement, self-reliance, fine motor aptitude, coordination aptitude, and extroversion were found to be individually significant.

Null Hypothesis 11: The correlations between GED Science and all independent variables is equal to 0.

Null Hypothesis 12: The regression coefficients associated with each independent variable (when correlated with the GED Science test) equals 0.

Based on the analysis of relationship between GED Science and all thirty-five independent variables, the null hypothesis of no significant relationship was rejected. Fine motor aptitude and job experience were two independent variables on the full multiple regression model that correlated significantly with GED Science.

There was a significant relationship between the nine GATB independent variables on the restricted multiple regression model and GED Science. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

There was a significant relationship between the four CTABE independent variables on the restricted multiple regression model and GED Science. Total composite achievement was the only delineated variable found to be significant while holding all other variables constant.

There was no significant relationship between the thirteen CTP independent variables on the restricted multiple regression model and GED Science. However, belonging, a delineated personality characteristic on the CTP, was found to be significant while holding all other variables constant.

There was no significant relationship between the nine Biographical-Demographical independent variables on the restricted multiple regression model and GED Science. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

Stepwise regression analysis found thirteen of the thirty-five independent variables to be the most predictive of GED Science success. The thirteen variables were: total composite achievement, divorced, perceptual aptitude, fine motor aptitude, general learning aptitude, coordination aptitude, social skills, job experience, age of individual, withdrawing, belonging, occupational, and anti-social. Not all thirteen independent variables were found to be individually significant, even though all thirteen variables contributed to the predictive model. Total composite achievement, divorced, fine motor aptitude, age of individual, and anti-social tendencies were found to be individually significant.

Null Hypothesis 13: The correlations between Literature and all independent variables is equal to 0.

Null Hypothesis 14: The regression coefficients associated with each independent variable (when correlated with the GED Literature test) equals 0.

Based on the analysis of relationship between GED Literature and all thirty-five independent variables, the null hypothesis of no

significant relationship was rejected. Fine motor aptitude and job experience were two independent variables on the full multiple regression model that correlated significantly with GED Literature.

There was a significant relationship between the nine GATB independent variables on the restricted multiple regression model and GED Literature. General learning aptitude and numerical aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

There was a significant relationship between the four CTABE independent variables on the restricted multiple regression model and GED Literature. Total composite achievement was the only delineated variable found to be significant while holding all other variables constant.

There was no significant relationship between the thirteen CTP independent variables on the restricted multiple regression model and GED Literature. However, belonging and anti-social tendencies were two delineated personality characteristics on the CTP found to be significant while holding all other variables constant.

There was no significant relationship between the nine Biographical-Demographical independent variables on the restricted multiple regression model and GED Literature. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

Stepwise regression analysis found twelve of the thirty-five independent variables to be the most predictive of GED Literature success. The twelve variables were: total composite achievement, general learning aptitude, divorced, social skills, withdrawing, social standards, belonging, anti-social, coordination aptitude, fine motor aptitude, job experience, and age of individual. Not all twelve independent variables were found to be individually significant, even though all twelve variables contributed to the predictive model. Total composite achievement, general learning aptitude, social skills, divorced, fine motor aptitude, and age of individual were found to be individually significant.

Null Hypothesis 15: The correlation between GED Math and all independent variables is equal to 0.

Null Hypothesis 16: The regression coefficients associated with each independent variable (when correlated with the GED Math test) equals 0.

Based on the analysis of relationship between GED Math and all thirty-five independent variables, the null hypothesis of no significant relationship was rejected. Fine motor aptitude and job experience were two independent variables on the full multiple regression model that correlated significantly with GED Math.

There was a significant relationship between the nine GATB independent variables on the restricted multiple regression model and

GED Math. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

There was a significant relationship between the four CTABE independent variables on the restricted multiple regression model and GED Math. Math achievement and total composite achievement, two of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

There was no significant relationship between the thirteen CTP independent variables on the restricted multiple regression model and GED Math. The personality characteristic of belonging was the only delineated variable found to be significant while holding all other variables constant.

There was no significant relationship between the nine Biographical-Demographical independent variables on the restricted multiple regression model and GED Math. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

Stepwise regression analysis found thirteen of the thirty-five independent variables to be the most predictive of GED Math success. The thirteen variables were: total composite achievement, divorced, perceptual aptitude, fine motor aptitude, separated, sex of individual, job experience, numerical aptitude, general learning aptitude, age of

individual, social skills, withdrawing, and personal freedom. Not all thirteen independent variables were found to be individually significant, even though all thirteen variables contributed to the predictive model. Total composite achievement, divorced, perceptual aptitude, fine motor aptitude, separated, withdrawing, and personal freedom were found to be individually significant.

Null Hypothesis 17: The correlation between GED Total and all independent variables is equal to 0.

Null Hypothesis 18: The regression coefficient associated with each independent variable (when correlated with the GED Total test) equals 0.

Based on the analysis of relationship between the GED Total and all thirty-five independent variables, the null hypothesis of no significant relationship was rejected. Fine motor aptitude and job experience were two independent variables on the full multiple regression model that correlated significantly with the GED Total.

There was a significant relationship between the nine GATB independent variables on the restricted multiple regression model and the GED Total. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

There was a significant relationship between the four CTABE independent variables on the restricted multiple regression model and

the GED Total. Total composite achievement was the only delineated variable found to be significant while holding all other variables constant.

There was no significant relationship between the thirteen CTP independent variables on the restricted multiple regression model and the GED Total. The personality characteristic of belonging was the only delineated variable found to be significant while holding all other variables constant.

There was no significant relationship between the nine Biographical-Demographical independent variables on the restricted multiple regression model and the GED Total. None of the delineated variables taken individually, while holding all other variables constant, were found to be significant.

Stepwise regression analysis found thirteen of the thirty-five independent variables to be the most predictive of GED Total success. The thirteen variables were: total composite achievement, divorced, general learning aptitude, social standards, perceptual aptitude, fine motor aptitude, coordination aptitude, job experience, age of individual, social skills, withdrawing, sex of individual, and separated. Not all thirteen independent variables were found to be individually significant, even though all thirteen variables contributed to the predictive model. Total composite achievement,

divorced, general learning aptitude, social standards, fine motor aptitude, age of individual, social skills, and separated were found to be individually significant.

Double cross-validation was the last statistical process used to analyze the data. The R square value of .5157, obtained on the full regression model, dealing with the thirty-five independent variables used as predictors of GED Total Battery success, was subjected to analysis in order to determine its predictive efficiency. The sample population was divided into two equal groups of forty-five students. Prediction equations were developed separately on Samples 1 and 2. To compute the predicted effectiveness, each prediction equation was applied on the other sample. The drop in R square from the first model to the second model and from the second model to the first model produced doubt regarding the predictive efficiency of the model based on all ninety students. Caution should be implemented in using this model as a predictor of student success on the GED Total Battery in another institution or setting.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

INTRODUCTION

Chapter 5 contains a summary of the study, conclusions of the study, and recommendations resulting from the study. The chapter is divided into the following four divisions: Introduction, Summary of Study, Conclusions, and Recommendations.

SUMMARY OF STUDY

Statement of the Problem

Over fifty-four million adult Americans possess less than a high school diploma or the General Education Development certificate (GED). Approximately one million adult basic education students annually return to school, many to work towards the completion of the GED test. The GED has become a universally accepted and validated instrument of general ability. More than two million people have successfully completed the GED examination since 1966. Successful GED recipients are then received by business, industry, and institutions of higher education on an equal status with high school graduates.

The more knowledgeable and better prepared adult educators are in teaching, counseling, and guiding adult basic education students

toward successful completion of the GED test, the greater the direct benefits to the candidate in time and effort expended in reaching that goal. Therefore, adult educators need to know which independent variables significantly relate to students' aptitude, achievement, personality, and social background in order to maximize this efficiency and effectiveness. The problem of this study was then twofold: first, to determine if there was a significant correlation between selected independent variables and success on the General Education test, and second, to determine predictive efficiency between those selected independent variables and success on the General Education Development test.

Need for the Study

Adult basic education is presently called upon to take on the responsibility of providing increased educational services to those in need of basic academic skills and the GED certificate. There is a need for an improved means of evaluating and assessing student aptitude, achievement, personality, and social capabilities. If adult educators were aware of variables that efficiently predict success on the GED test, they could lessen training time and develop more effective means of remediation. Students and authorities in the field of adult education and adult basic education have called for research which will address the needs of adult students returning to the classroom. This study attempted to deal with these needs.

General Procedures

The following general procedures were used in this study:

1. A thorough survey of literature and related research was conducted by this investigator.
2. Five instruments were used: one survey and four standardized tests which included the following procedures:
 - a. A biographical and demographical data profile sheet was used for the identification and classification of each GED student. Each student was asked to provide information related to their age, sex, level of education, marital status, number of children, and years of job experience.
 - b. A standardized test of aptitude, the General Aptitude Test Battery, was used to identify nine areas of individual aptitude.
 - c. A standardized test of achievement, the California Test of Adult Basic Education, was used to identify three areas of individual achievement.
 - d. A standardized test of personality, the California Test of Adult Personality, was used to identify twelve areas of individual personality.
 - e. The General Education Development test (GED) was administered to all Manpower adult basic education students

who completed their basic education studies. Five competency areas and a GED Total score were derived.

3. General questions to be answered were formulated to address the problem of this study which was twofold: first, to determine if there was a significant correlation between selected independent variables and success on the GED test, and second, to determine the predictive efficiency between those selected independent variables and success on the GED test.

4. Hypotheses related directly to the general questions to be answered were established.

5. Permission to conduct the study was obtained from the Supervisor of Adult Basic Education, Helena Adult Learning Center, Helena, Montana.

6. With permission granted, all full-time Manpower adult basic education students who entered the Helena Adult Learning Center from August 1, 1978 through April 1, 1979 were asked to voluntarily cooperate in this research project. Procedures for confidentiality were outlined. Each student was asked to voluntarily sign a release of information document in order that test scores could be acquired.

7. Biographical data, demographical data, and standardized test results were recorded, studied, and statistically analyzed. Conclusions and recommendations are stated in Chapter 5.

Literature Reviewed

Review of the literature, related to variables that predicted success on the General Education Development test (GED), logically placed available information into three areas: historical information related to the GED, predictors of success on the GED, and the GED as a predictor of success on vocational, occupational, and educational endeavors after completion of GED studies.

The historical information area followed the inception and rationale of the GED as a standardized test designed to measure the academic knowledge and achievement of individuals who had not graduated from high school. The GED test was initially used by the United States Armed Forces with veterans from World War II about to readjust to civilian life. The GED test concept became so successful that the test was administered to civilian adults who had not completed formal high school. Close to 540,000 individuals write the GED examination throughout the United States, United States territories, and Canada annually. Three hundred forty-six thousand five hundred individuals successfully completed the GED examination and received their high school equivalency certificate in 1976. The GED certificate program is a well established means of validating a student's basic educational skills. The GED certificate is considered by most segments of society to be in equal standing with the high school diploma.

Several significant studies have been completed regarding variables predicting success on the GED. The Carbuhn (1969) study could be considered the most comprehensive research endeavor which utilized several variables of prediction statistically analyzed for significance. Most studies, including the valuable United States Employment Service Research Report (1977), researched one or two variables which appeared to be relevant to GED success. Results were sometimes different depending on the population surveyed. However, the majority of independent studies discovered identical or similar predictive findings. The general learning aptitude and verbal aptitude subtests of the GATB were found to be significant variables that predicted success on the GED test. The Stanford Achievement Test (SAT), the California Test of Adult Basic Education (CTABE), and the Adult Basic Learning Examination (ABLE) achievement tests were significant in predicting success on the GED examination. This investigator's review of the literature did not find an objective standardized test used in any research study which measured the psychological and emotional variables that appeared to affect GED test performance. Observations and impressions by adult educators indicated that psychological variables did, in fact, affect the performance of adult students who remained in adult basic education and subsequently wrote the GED examination. The biographical-demographical variables of age, grade completion, ethnic group, and family status were not

found significant to successful completion of the GED test. However, student levels of success (higher GED scores) did appear to be affected by age, family status, and work experience. Socio-economic factors were clearly significant in causing or affecting student participation in adult basic education studies and their eventual performance on the GED examination.

Numerous research studies have been completed since 1970 in regard to using the GED as a predictor of occupational, vocational, and educational success. The majority of findings have indicated that individuals who have successfully completed the GED examination with scores of forty-five (scaled score) or above performed nearly as well as high school graduates in college or university work. Those students who attended college or a university with GED certificates were typically older and more conservative with increased family and business (financial) obligations. These obligations lessened grade point averages, but not significantly. Research findings indicated that business and industry viewed the GED as a competency test which assured them that GED graduates did possess basic educational skills in the areas of reading, math, and language. In many instances the academic proficiency level of GED recipients was equal to or well above the academic performance level of many high school graduates.

In summation, previous research has clearly indicated that the GED is a valuable educational, occupational, and sociological tool

enabling individuals to verify their academic abilities. Hundreds of thousands of successful GED recipients are utilizing this credential by engaging in high levels of personal fulfillment.

Specific Procedures

The original population of this study consisted of 180 full-time Manpower adult basic education students who completed the two week World of Work Orientation and Assessment class at the Helena Adult Learning Center in Helena, Montana, from August 1, 1978 through April 1, 1979. Manpower students are those individuals who qualify for federal and state assistance to overcome employment handicaps. The Manpower adult basic education students were seventeen years of age or older and had not completed a high school diploma program or gained a General Education Development (GED) certificate. Part time and/or non-Manpower adult basic education students were not included in the study population. Sixty Manpower adult basic education students left the GED program before they had completed their studies or had written the GED examination. Thirty of the remaining 120 individual profile sheets were incomplete because of missing biographical-demographical data and/or standardized test scores. Therefore, this research project was conducted with a sample of ninety full-time Manpower adult basic education students.

The nine selected variables from the Biographical-Demographical data sheets plus the results of the four standardized tests, GATB,

CTABE, CTP, and GED, were placed on individual profile sheets. All independent and dependent variables were transcribed onto IBM FORTRAN coding forms sheets for key punching onto separate individual computer cards. The statistical package for social science at Montana State University was used to process the data on the Sigma 7 Computer. To suit the purpose of this study and to answer the general questions involved, the eighteen null hypotheses and their alternatives were tested. Analysis of data followed with appropriate tables constructed to allow for clear visual representation of the correlation between independent and dependent variables.

Data collected in this study was subjected to three basic statistical models of analysis at the .05 level of significance. The first six hypotheses were tested by using the Pearson Product Moment Correlation Coefficient. Hypotheses seven through eighteen were tested by multiple regression analysis. The t distribution of statistical analysis was used with hypotheses seven through eighteen. A fourth statistical process utilized the double cross-validation statistic to determine the predictive reliability of the GED Total model. All data derived from this investigation was double checked by this investigator. This investigator called upon the expertise of an objective statistical authority to correct errors in statistical analysis and interpretation.

Findings

The findings of this study, as reported in Chapter 4, appear in the form of correlation coefficients, multiple regression analysis, and the t test, which measured the significance of each independent variable. General research findings are reviewed in this section. The reader is referred to Chapter 4 to review specific research findings.

Thirty-five independent variables were derived from the following: Biographical-Demographical data, General Aptitude Test Battery (GATB), California Test of Adult Basic Education (CTABE), and the California Test of Adult Personality (CTP). Seven dependent variables were derived from the following: GED Pass-fail, GED English, GED Social Studies, GED Science, GED Literature, GED Math, and the GED Total Battery.

Analysis of data was performed for hypotheses one through six in which it was found that certain, but not all, independent variables significantly correlated with all seven GED dependent variables. The GATB and the CTABE were the only subgroups of independent variables that correlated significantly with GED test performance. Table 45 presents an overview analysis of the correlation between the thirteen GATB and CTABE independent variables and the seven GED dependent variables.

Table 45

Correlation Matrix Between the Thirteen GATB and CTABE Independent Variables and the Seven GED Dependent Variables

	GED Pass-Fail	GED English	GED Social Studies	GED Science	GED Literature	GED Math	GED Total
General-GATB	.20	.29*	.30*	.27*	.31*	.23*	.29*
Verbal-GATB	.29*	.35*	.38*	.39*	.37*	.37*	.38*
Numerical-GATB	.29*	.33*	.37*	.39*	.35*	.40*	.37*
Spatial-GATB	.17	.13	.18	.22*	.17	.23*	.18
Perception-GATB	.25*	.18	.21*	.26*	.21*	.27*	.23*
Clerical-GATB	.18	.18	.18	.22*	.18	.21*	.20
Coordination-GATB	.18	.13	.17	.21*	.18	.21*	.18
Fine Motor-GATB	.09	.05	.07	.11	.08	.12	.09
Manual-GATB	.02	.06	.09	.12	.10	.14	.10
Reading-CTABE	.23*	.31*	.33*	.34*	.31*	.33*	.33*
Math-CTABE	.28*	.38*	.39*	.41*	.36*	.44*	.40*
Language-CTABE	.25*	.38*	.37*	.37*	.36*	.38*	.37*
Total-CTABE	.33*	.48*	.48*	.48*	.46*	.48*	.48*

*Indicates significance at .05 level for a two-tailed test.
Critical value of $r = .205$

All seven GED dependent variables correlated significantly with general learning aptitude, verbal aptitude, numerical aptitude, reading achievement, math achievement, language achievement, and the total composite achievement test score. Spatial aptitude was reflected in GED Science and Math. Perceptual aptitude was found significant in all GED dependent variables with the exception of GED English. Clerical aptitude and coordination aptitude were found to significantly correlate with GED Science and GED Math.

Hypotheses seven through eighteen were analyzed two at a time, in combination, with appropriate full multiple regression, restricted multiple regression, and stepwise regression findings presented.

There was a significant relationship between GED English and all thirty-five independent variables on the full multiple regression model. Therefore, null hypotheses seven and eight were rejected. Fine motor aptitude and job experience, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The full regression model reflected an R square value of .5107.

There was a significant relationship between GED English and the nine GATB independent variables on the restricted multiple regression model. General learning aptitude and numerical aptitude, two of the delineated variables taken individually, while holding all other

variables constant, were found significant. The restricted multiple regression model reflected an R square value of .2776.

There was a significant relationship between GED English and the four CTABE independent variables on the restricted multiple regression model. Total composite achievement was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1709.

There was no significant relationship between GED English and the thirteen CTP independent variables on the restricted multiple regression model. Belonging was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1667.

There was no significant relationship between GED English and the nine Biographical-Demographical variables on the restricted multiple regression model. Job experience was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1051.

Stepwise regression analysis found thirteen of the thirty-five independent variables contributing the most value as predictors of GED English success. The thirteen independent variables were: total

composite achievement, personal worth, verbal aptitude, fine motor aptitude, coordination aptitude, sex of individual, separated, divorced, perceptual aptitude, job experience, age of individual, extroversion, and social skills. Independent variables with step numbers one through thirteen had a combined R square value of .4480.

There was a significant relationship between GED Social Studies and all thirty-five independent variables on the full multiple regression model. Therefore, null hypotheses nine and ten were rejected. Fine motor aptitude and job experience, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The full regression model reflected an R square value of .5183.

There was a significant relationship between GED Social Studies and the nine GATB independent variables on the restricted multiple regression model. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The restricted multiple regression model reflected an R square value of .3029.

There was a significant relationship between GED Social Studies and the four CTABE independent variables on the restricted multiple regression model. Total composite achievement was the only delineated variable taken individually, while holding all other variables constant,

found significant. The restricted multiple regression model reflected an R square value of .1711.

There was no significant relationship between GED Social Studies and the thirteen CTP independent variables on the restricted multiple regression model. Belonging was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1458.

There was no significant relationship between GED Social Studies and the nine Biographical-Demographical variables on the restricted multiple regression model. The restricted multiple regression model reflected an R square value of .1032.

Stepwise regression analysis found eleven of the thirty-five independent variables contributing the most value as predictors of GED Social Studies success. The eleven independent variables were: total composite achievement, self-reliance, divorced, separated, verbal aptitude, sex of individual, job experience, perceptual aptitude, fine motor aptitude, coordination aptitude, and extroversion. Independent variables with step numbers one through eleven had a combined R square value of .4302.

There was a significant relationship between GED Science and all thirty-five independent variables on the full multiple regression model. Therefore, null hypotheses eleven and twelve were rejected.

Fine motor aptitude and job experience, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The full regression model reflected an R square value of .5290.

There was a significant relationship between GED Science and the nine GATB independent variables on the restricted multiple regression model. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The restricted multiple regression model reflected an R square value of .3102.

There was a significant relationship between GED Science and the four CTABE independent variables on the restricted multiple regression model. Total composite achievement was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square of .1798.

There was no significant relationship between GED Science and the thirteen CTP independent variables on the restricted multiple regression model. Belonging was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1520.

There was no significant relationship between GED Science and the nine Biographical-Demographical variables on the restricted multiple regression model. The restricted multiple regression model reflected an R square value of .1138.

Stepwise regression analysis found thirteen of the thirty-five independent variables contributing the most value as predictors of GED Science success. The thirteen independent variables were: total composite achievement, divorced, perceptual aptitude, fine motor aptitude, general learning aptitude, coordination aptitude, social skills, job experience, age of individual, withdrawing, belonging, occupational, and anti-social. Independent variables with step numbers one through thirteen had a combined R square of .4747.

There was a significant relationship between GED Literature and all thirty-five independent variables on the full multiple regression model. Therefore, null hypotheses thirteen and fourteen were rejected. Fine motor aptitude and job experience, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The full regression model reflected an R square of .5020.

There was a significant relationship between GED Literature and the nine GATB independent variables on the restricted multiple regression model. General learning aptitude and numerical aptitude, two of the delineated variables taken individually, while holding

all other variables constant, were found significant. The restricted multiple regression model reflected an R square of .2825.

There was a significant relationship between GED Literature and the four CTABE independent variables on the restricted multiple regression model. Total composite achievement was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1511.

There was no significant relationship between GED Literature and the thirteen CTP independent variables on the restricted multiple regression model. Belonging and anti-social tendencies, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The restricted multiple regression model reflected an R square value of .1644.

There was no significant relationship between GED Literature and the nine Biographical-Demographical variables on the restricted multiple regression model. The restricted multiple regression model reflected an R square value of .0892.

Stepwise regression analysis found twelve of the thirty-five independent variables contributing the most value as predictors of GED Literature success. The twelve independent variables were: total composite achievement, general learning aptitude, divorced, social skills, withdrawing, social standards, belonging, anti-social,

coordination aptitude, fine motor aptitude, job experience, and age of individual. Independent variables with step numbers one through twelve had a combined R square of .4221.

There was a significant relationship between GED Math and all thirty-five independent variables on the full multiple regression model. Therefore, null hypotheses fifteen and sixteen were rejected. Fine motor aptitude and job experience, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The full regression model reflected an R square of .5104.

There was a significant relationship between GED Math and the nine GATB independent variables on the restricted multiple regression model. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The restricted multiple regression model reflected an R square value of .2867.

There was a significant relationship between GED Math and the four CTABE independent variables on the restricted multiple regression model. Math achievement and total composite achievement, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The restricted multiple regression model reflected an R square value of .2047.

There was no significant relationship between GED Math and the thirteen CTP independent variables on the restricted multiple regression model. Belonging was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1435.

There was no significant relationship between GED Math and the nine Biographical-Demographical variables on the restricted multiple regression model. The restricted multiple regression model reflected an R square value of .1031.

Stepwise regression analysis found thirteen of the thirty-five independent variables contributing the most value as predictors of GED Math success. The thirteen independent variables were: total composite achievement, divorced, perceptual aptitude, fine motor aptitude, separated, sex of individual, job experience, numerical aptitude, general learning aptitude, age of individual, social skills, withdrawing, and personal freedom. Independent variables with step numbers one through thirteen had a combined R square value of .4565.

There was a significant relationship between GED Total and all thirty-five independent variables on the full multiple regression model. Therefore, null hypotheses seventeen and eighteen were rejected. Fine motor aptitude and job experience, two of the delineated variables taken individually, while holding all other

variables constant, were found significant. The full regression model reflected an R square value of .5157.

There was a significant relationship between the GED Total and the nine GATB independent variables on the restricted multiple regression model. Numerical aptitude and fine motor aptitude, two of the delineated variables taken individually, while holding all other variables constant, were found significant. The restricted multiple regression model reflected an R square value of .2955.

There was a significant relationship between the GED Total and the four CTABE independent variables on the restricted multiple regression model. Total composite achievement was the only delineated variable taken individually, while holding all others constant, found significant. The restricted multiple regression model reflected an R square value of .1772.

There was no significant relationship between the GED Total and the thirteen CTP independent variables on the restricted multiple regression model. Belonging was the only delineated variable taken individually, while holding all other variables constant, found significant. The restricted multiple regression model reflected an R square value of .1554.

There was no significant relationship between the GED Total and the nine Biographical-Demographical variables on the restricted

multiple regression model. The restricted multiple regression reflected an R square value of .1007.

Stepwise regression analysis found thirteen of the thirty-five independent variables contributing the most value as predictors of GED Total success. The thirteen independent variables were: total composite achievement, divorced, general learning aptitude, social standards, perceptual aptitude, fine motor aptitude, coordination aptitude, job experience, age of individual, social skills, withdrawing, sex of individual, and separated. Independent variables with step numbers one through thirteen had a combined R square value of .4476.

A double cross-validation design was developed to check the predictive efficiency of the prediction equation which was based on the thirteen GED Total Battery stepwise regression variables. The student sample was randomly divided into two groups of forty-five individuals. Prediction equations were developed separately on both samples. To compute the predicted effectiveness, each prediction equation was applied on the other sample. The R square for Sample 1 was .6094 while the R square for Sample 2 was .5949. When the value differences on the thirteen predictor variables from Sample 1 were substituted into the equation based on Sample 2, the R square between the actual and predicted criterion was found to be .408. When the value differences on the thirteen predictor variables from Sample 2 were substituted into the equation based on Sample 1, the R square

between actual and predicted criterion was found to be .246. The drop in R square from .6094 to .408 and from .5949 to .246 casts doubt on the predictive efficiency of the equation based on all ninety cases. These findings suggest that one must be cautious in generalizing the results beyond the immediate sample population involved. In actuality, one can generalize only 25 to 40 percent of the variance in GED Total Battery success to other Manpower adult basic education groups rather than the 51 percent of the variance depicted by the full multiple regression model.

CONCLUSIONS

The review of literature, Pearson Product Moment Correlation Coefficients, full multiple regression analysis, restricted multiple regression analysis, stepwise regression analysis, and double cross-validation of the data of this study, on this population of ninety Manpower adult basic education students, made possible the following conclusions:

1. The following regression models were found to be significant in predicting GED English success:

- a. The thirty-five independent variables ($R^2 = .5107$) were found to predict significantly better than chance.

- b. The nine GATB independent variables ($R^2 = .2776$) were found to predict significantly better than chance.

c. The four CTABE independent variables ($R^2 = .1709$) were found to predict significantly better than chance.

d. The following thirteen stepwise regression variables were found to predict significantly better than chance:
Total-CTABE; Personal Worth-CTP; Verbal-GATB; Fine Motor-GATB; Coordination-GATB; Sex of Individual; Separated; Divorced; Perception-GATB; Job Experience; Age of Individual; Extroversion-CTP; and Social Skills-CTP.

2. The following regression models were found to be significant in predicting GED Social Studies success:

a. The thirty-five independent variables ($R^2 = .5183$) were found to predict significantly better than chance.

b. The nine GATB independent variables ($R^2 = .3029$) were found to predict significantly better than chance.

c. The four CTABE independent variables ($R^2 = .1711$) were found to predict significantly better than chance.

d. The following eleven stepwise regression variables were found to predict significantly better than chance:
Total-CTABE; Self-Reliance-CTP; Divorced; Separated; Verbal-GATB; Sex of Individual; Job Experience; Perception-GATB; Fine Motor-GATB; Coordination-GATB; and Extroversion-CTP.

3. The following regression models were found to be significant in predicting GED Science success:

a. The thirty-five independent variables ($R^2 = .5290$) were found to predict significantly better than chance.

b. The nine GATB independent variables ($R^2 = .3102$) were found to predict significantly better than chance.

c. The four CTABE independent variables ($R^2 = .1798$) were found to predict significantly better than chance.

d. The following thirteen stepwise regression variables were found to predict significantly better than chance:

Total-CTABE; Divorced; Perception-GATB; Fine Motor-GATB;

General Learning-GATB; Coordination-GATB; Social Skills-CTP;

Job Experience; Age of Individual; Withdrawing-CTP; Belonging-

CTP; Occupational-CTP; and Anti-Social Tendencies-CTP.

4. The following regression models were found to be significant in predicting GED Literature success:

a. The thirty-five independent variables ($R^2 = .5020$) were found to predict significantly better than chance.

b. The nine GATB independent variables ($R^2 = .2825$) were found to predict significantly better than chance.

c. The four CTABE independent variables ($R^2 = .1511$) were found to predict significantly better than chance.

d. The following twelve stepwise regression variables were found to predict significantly better than chance:

Total-CTABE; General Learning-GATB; Divorced; Social Skills-CTP; Withdrawing-CTP; Social Standards-CTP; Belonging-CTP; Anti-Social-CTP; Coordination-GATB; Fine Motor-GATB; Job Experience; and Age of Individual.

5. The following regression models were found to be significant in predicting GED Math success:

a. The thirty-five independent variables ($R^2 = .5104$) were found to predict significantly better than chance.

b. The nine GATB independent variables ($R^2 = .2867$) were found to predict significantly better than chance.

c. The four CTABE independent variables ($R^2 = .2047$) were found to predict significantly better than chance.

d. The following thirteen stepwise regression variables were found to predict significantly better than chance:

Total-CTABE; Divorced; Perception-GATB; Fine Motor-GATB; Separated; Sex of Individual; Job Experience; Numerical-GATB; General Learning-GATB; Age of Individual; Social Skills-CTP; Withdrawing-CTP; and Personal Freedom-CTP.

6. The following regression models were found significant in predicting GED Total Battery success:

a. The thirty-five independent variables ($R^2 = .5157$) were found to predict significantly better than chance.

b. The nine GATB independent variables ($R^2 = .2955$) were found to predict significantly better than chance.

c. The four CTABE independent variables ($R^2 = .1772$) were found to predict significantly better than chance.

d. The following thirteen stepwise regression variables were found to predict significantly better than chance:

Total-CTABE; Divorced; General Learning-GATB; Social Standards-CTP; Perception-GATB; Fine Motor-GATB; Coordination-GATB; Job Experience; Age of Individual; Social Skills-CTP; Withdrawing-CTP; Sex of Individual; and Separated.

7. Double cross-validation results suggest that one must be extremely cautious in generalizing the predictive efficiency of the prediction equation which was based on the thirteen GED Total Battery stepwise regression variables to other adult basic education centers. The drop in R square from .6094 to .408 in group one, and from .5949 to .246 in group two, casts doubt on the predictive efficiency of the equation based on all ninety participants. Similar conclusions would be expected if the following stepwise regression models were used: GED English; GED Social Studies; GED Science; GED Literature; and GED Math.

RECOMMENDATIONS

1. Other adult learning centers should be made aware that a significant predictive study of GED Total Battery success has been conducted. The centers should be informed of the methods used to conduct the study along with the results that were found.

2. The predictive model, even though it lost significance through the analysis of double cross-validation, can predict GED Total Battery success better than chance and should be adopted or field tested in other adult learning centers taking into consideration local populations and socio-economic factors.

3. Double cross-validation indicates that other adult learning centers should be encouraged to develop a predictive model of their own, if the predictive model in this study is not adopted, to determine the strengths and weaknesses of their own adult basic education students and provide remediation where appropriate.

4. The predictive model should be field tested at the Helena Adult Learning Center for one year with a similar population of Manpower adult basic education students.

5. The predictive model should be field tested at the Helena Adult Learning Center for one year with a population of non-Manpower adult basic education students.

6. A new predictive model should be tested using a more clinically defined personality test such as the Edwards Personality Preference or the Minnesota Multiphasic Personality Inventory. This does not imply that the CTP should be discarded just because it was not found significant in this study at the .05 level. The CTP does provide a practical, efficient, and non-threatening means of assessing a student's personality profile.

7. Further study should be conducted in order to isolate Biographical-Demographical variables that were not considered in this predictive model.

8. Further study should be conducted to determine why divorced and separated adult basic education students obtained higher scores on the GED test than married or single students.

9. Further study should be conducted to determine why adult basic education students with increased years of work experience obtained higher scores on the GED test than students with a minimal amount of work experience.

10. Further study should be conducted to determine why women obtain higher scores on the GED test than men even though the percentage of pass-fail on the GED test is approximately the same.

11. Further study should be conducted to determine why younger and older adult basic education students obtain higher scores on the GED test than middle aged students.

12. Further study should be conducted to determine why younger adult basic education students leave (drop out) adult basic education classes before completing the GED examination.

13. Further study should be conducted to determine why those students who possess greater social skills (communication), as indicated by the CTP, obtain higher scores on the GED test.

14. Further study should be conducted to determine why those students who are extroverted (socially outgoing), as indicated by the CTP, obtain higher scores on the GED test.

15. Further study should be conducted to determine why those students who possess a greater sense of belonging (security), as indicated by the CTP, obtain higher scores on the GED test.

16. Further study should be conducted to determine why those students who possess higher social standards (ethics) as indicated by the CTP, obtain higher scores on the GED test.

17. Further study should be conducted to determine why those students who possess a higher sense of personal freedom, as indicated by the CTP, obtain higher scores on the GED test.

18. Further study should be conducted to determine why the highest grade completed, in the traditional school setting, is not a reliable indicator of academic achievement.

19. Further study should be conducted to determine the variables that cause adult basic education students to discontinue educational training before completing the GED examination.

20. Because the standard error of estimate does not differ significantly from the full model to the restricted models, it may be practical to predict GED passing scores by using three or four independent variables rather than all thirty-five independent variables.

BIBLIOGRAPHY

- Abraham, A. A. How Have They Gotten Along. U.S. Educational Resources Information Center, ERIC Document ED 123 966, 1975.
- Anastasi, Anne. Psychological Testing. 3rd ed. New York: The Macmillan Company, 1969.
- Bechtoldt, Harold P. "The General Aptitude Test Battery." In O. K. Buros (ed.) Sixth Mental Measurement Yearbook. Highland Park, New Jersey: Gryphon Press, 1965.
- Bolch, Ben W., and Cliff J. Huang. Multivariate Statistical Methods for Business and Economics. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1974.
- Byrd, Fay, and others. A Comparison of GED Recipients and Traditional High School Graduates in Selective Areas at Wilkes Community College (North Carolina). U.S. Educational Resources Information Center, ERIC Document ED 100 439, 1973.
- California Test of Adult Basic Education--Examiner's Manual. Los Angeles, California: California Test Corporation, 1976.
- California Test of Adult Personality--Examiner's Manual. Los Angeles, California: California Test Corporation, 1953.
- Carbuhn, Wayne McKinzie. "Job Corpsmen Selection and Prediction of Successful Completion of the General Education Development (GED) Program at Clearfield Urban Job Corps Center." Ph.D. dissertation, University of Utah, 1969.
- Carlin, Thomas D., and Patrick O'Leary. "Informal and Formal Means of Assessment with Adult Basic Education Students." Helena, Montana: Helena Adult Learning Center, 1974.
- Cohen, Alan. "Tests of Adult Basic Education." In O. K. Buros (ed.) Seventh Mental Measurement Yearbook. Highland Park, New Jersey: Gryphon Press, 1969.
- Commission on Accreditation of Service Experiences. College Accreditation Policies for Nontraditional Education. Washington, D.C., n. 11, 1970.
- Cooley, William W., and P. R. Lohnes. Multivariate Procedures for the Behavioral Sciences. New York: John Wiley and Sons, Inc., 1962.

- Cronbach, L. J. Essentials of Psychological Testing. 2nd ed. New York: Harper and Brothers, 1960.
- Dowling, E. D., and P. L. Lash. Statistical Table Analysis (200) Successful GED Students. U.S. Educational Resources Information Center, ERIC Document ED 109 335, 1972.
- Ferguson, George A. Statistical Analysis in Psychology and Education New York: McGraw-Hill Book Company, 1976.
- Fisher, Joan. Reading and the High School Equivalency Program. U.S. Educational Resources Information Center, ERIC Document, ED 079 716, May, 1973.
- Froehlich, Gustav I. "The Tests of General Education Development," In O. K. Buros (ed.) Fourth Mental Measurement Yearbook. Highland Park, New Jersey: Gryphon Press, 1965.
- General Education Development Testing Services of the American Council on Education.- Examiner's Manual for the Tests of General Educational Development, 6th ed., Washington, D.C., 1971.
- General Education Development Testing Service of the American Council on Education. The GED Statistical Report, 1976. Washington, D.C., n.n., 1976.
- Gillmore, Gerald M., and others. Student Educational Benefits for Proficiency Testing: An Empirical Study. U.S. Educational Resources Information Center, ERIC Document, ED 103 463, 1974.
- Good, Carter V. Dictionary of Education. New York: McGraw-Hill Book Company, 1973.
- Hieronimus, A. N. "Tests of Adult Basic Education." In O. K. Buros (ed.) Seventh Mental Measurement Yearbook. Highland Park, New Jersey: Gryphon Press, 1969.
- Hopke, William E. Dictionary of Personnel and Guidance Terms. Chicago: J. G. Ferguson Publishing Co., 1968.
- Houghamiam, Henry, and others. Characteristics of Students by CLEP Performance. U.S. Educational Resources Information Center, ERIC Document, 400 982, 1971.

- Houle, Cyril O. The Design of Education. London: Jossey-Bass, Inc., Publishers, 1972.
- Kerlinger, Fred N., and Elazar J. Pedhauzer. Multiple Regression in Behavioral Research. New York: Holt, Rinehart and Winston, Inc., 1973.
- Knowles, Malcolm S. The Adult Education Movement in the United States. New York: Holt, Rinehart and Winston, Inc., 1962.
- _____. The Modern Practice of Adult Education. New York: Association Press, 1970.
- Meyer, Rosemary. Survey of ABE (Adult Basic Education) Dropouts at the Doctor Martin Luther King, Jr., Education Center, Kankakee, Illinois. U.S. Educational Resources Information Center, ERIC Document ED 118 830, November, 1974.
- Miller, Jerry W. Let Them Take the GED Test. U.S. Educational Resources Information Center, ERIC Document ED 123 392, April, 1976.
- Mosier, Charles I. "Symposium: The Need and Means of Cross-Validation." Educational and Psychological Measurement, 11 (Spring, 1951), 5-12.
- National Advisory Council on Adult Education. A Target Population in Adult Education. Washington, D.C.: n.n., November, 1974.
- Nelson, Jack Jay. A Follow-up Appraisal of Selected General Educational Development Test Examinees at McLennan Community College, Waco, Texas. U.S. Educational Resources Information Center, ERIC Document ED 121 978, November, 1975.
- Nie, Norman H., and others. Statistical Package for the Social Sciences. New York: McGraw-Hill Book Company, 1975.
- Parker, Glenn M. "Getting your Adult Education Program." In David B. Rauch (ed.) Priorities in Adult Education. New York: The Macmillan Company, 1972.
- Rauch, David B. "New Priorities for Adult Education." In David B. Rauch (ed.) Priorities in Adult Education. New York: The Macmillan Company, 1972.

Shaffer, Laurance. "The California Test of Personality--Adult." In O. K. Buros (ed.) Third Mental Measurement Yearbook. Highland Park, New Jersey: Gryphon Press, 1949.

_____. "Tests and Reviews: Character and Personality." In O. K. Buros (ed.) Third Mental Measurement Yearbook. Highland Park, New Jersey: Gryphon Press, 1949.

Sharon, Amiel T. The Non-High School Graduate in College and His Success as Predicted by the Tests of General Education Development. U.S. Educational Resources Information Center, ERIC Document ED 109 168, 1972.

_____. The Use and Validity of the GED and CLEP. U.S. Educational Resources Information Center, ERIC Document ED 059 194, April, 1971.

Shegog, Bedeliah, and others. Factors Associated with Achievement in Adult Basic Education (Evaluation of Adult Basic Education in the Quitman County Center for Learning and Educational Development). U.S. Educational Resources Information Center, ERIC Document 101 061, 1972.

Solomon, Robert J. "General Education Development Test." In O. K. Buros (ed.) Fifth Mental Measurement Yearbook. Highland Park, New Jersey: Gryphon Press, 1959.

Thorpe, Louis P., and others. California Test of Personality--Adult. Monterey, California, 1953.

Tiegs, Ernest W., and Willis W. Clark. Tests of Adult Basic Education Examiner's Manual, Level D, Monterey, California, 1976.

United States Department of Labor, Manpower Administration, Bureau of Employment Security. Manual for the General Aptitude Test Battery--Section III: Development. Washington, D.C.: United States Government Printing Office, 1967.

United States Employment Service Test Research Report No. 33. Use of the General Aptitude Test Battery to Predict Success on the Tests of General Education Development. Employment and Training Administration (DL), Washington, D.C., U.S. Educational Resources Information Center, ERIC Document, ED 134 598, 1977.

Waggener, Robert, and others. Norming of a Basic Learning Exam and Its Use to Predict GED Results. A paper presented at the annual meeting of the American Personnel and Guidance Association, New Orleans, Louisiana, April, 1974.



3 1762 10005425 1

D378 Carlin, Thomas D
 C194 Selected variables
 cop.2 that predict success

DATE	ISSUED TO
SEP 28	Robert McLean 575 513#
Apr 28	Robert McLean 10-6
2 WEEKS USE	TELEGRAPHY UNIT
MAY 3 1966	Lynette Mottler
MAY 31	A Cormier 10
R	JUL 6
EX-6	M. G. K. 6601
AL 2006a 5	
DEC 1	
JAN	