ANALYSIS OF ACADEMIC PERFORMANCE AND

PERSISTANCE OF GED AND HIGH SCHOOL

DIPLOMA EARNERS AT A MIDWESTERN

PROPRIETARY COLLEGE
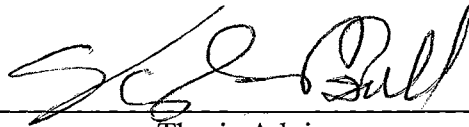
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Another selfless individual that always seems to believe in me and my work is my daughter Angela. She has graciously put up with my working intensely at the computer or absorbed in a book throughout her very important years of pre-adolescence. I thank God every day she has grown into such a wonderful human being, despite my often split attention.

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CHAPTER I

INTRODUCTION

The General Education Development Debate

The American Council on Education's testing for General Education Development, better known as GED Testing, serves more than 860,000 adults each year (Association for Career & Technical Communications, 2003). The GED is considered big business (Boesel, 1998) and an answer to socioeconomic concerns (Peterson, 2002; Rivera-Batiz, 1995; Rowley & Sherman, 2001: Schwartz, 1998). However, a great deal of research and discussion surrounds the legitimacy of the American Council on Education's assertion that a GED is equivalent to a traditional high school diploma (Houseman, 1990; Purser, 1994). Although existing research on the GED and its ability to compare with a high school diploma is vast, it provides only a faint illumination of an answer to the GED/high school diploma debate. In the past fifty-five years, more than four dozen researchers performed more than seventy separate studies in at least thirty states and Canada to determine the equivalency of a GED and a high school diploma. The accumulated conclusion of these studies is clear – to this point in time, there is no clear answer to the GED/high school diploma debate. There has been a split between

researchers that concluded the GED and high school diploma to be equivalent and researchers that found high school diploma earners perform better in college. A small number of studies even found GED recipients more successful in college than high school diploma earners. This persuasively indicates researchers are no closer to answering the GED/high school diploma debate than they were fifty-five years ago.

What solid evidence does a college administrator have in accepting or denying GED certificate holders? Denying a student with as much potential as other incoming freshmen is unethical. It is equally unethical to accept a student who has an attribute closely correlated with educational failure. Such a student, and their family, would likely end up with unnecessary debt, negative feelings toward education, reinforced failure, and lower self-esteem (Ricketts, 1996; Williams, 1990). College administrators and admission staff members do not want to provide open access in the name of equal opportunity only to destine students into an educational bankruptcy. Does having a GED certificate indicate that a student has as much potential as other incoming freshmen? Can the GED be closely correlated with educational failure, or success? Four year and public two-year college administrators have partial guidance and support from research for answers to these questions and subsequent actions to be taken.

There is evidence that a GED student at a four-year college is likely <u>not</u> to perform as well as a high school diploma student. Approximately one-third of the GED studies found in this research surveyed four-year college students, with roughly ninety percent of those studies showing GED students not performing as well as high school diploma students (for example: D'Amico & Schmidt, 1957; Ebert, 2002; Quinn & Haberman, 1986; Larsen, 1979; Osei, 2001; Roeber, 1950; Rogers, 1987).

For two-year public college administrators, there is promising evidence that a GED student at a two-year college is likely to perform as well as a high school diploma student. Approximately two-thirds of the GED studies found in this research surveyed two-year college students, with roughly seventy percent of these studies showing GED students performing as well as high school diploma students, or better (for example: Aspinwall, 1999; Ayers, 1978; Banner, 1989; Clark, 1987; Grady, 1983; Klein & Grise, 1988; Stadler, 1994; Willett, 1982; Wolf, 1983; Ziegler, 1992). Private two-year colleges were excluded from these investigations.

However, unlike four-year and public two-year college administrators, two-year private (proprietary) college administrators have only indirect and conflicting evidence to assess their own GED versus high school diploma debate. Although two-year proprietary schools are similar to four-year colleges in primarily offering terminal degrees and similar to two-year colleges in term length, many other characteristics of proprietary colleges are dissimilar to four-year and public two-year colleges (Lee, 1996; Phipps, Harrison, & Merisotis, 1999; U.S. Department of Education, 1999). For example, by offering occupational Associate degrees proprietary colleges focus solely on core subjects, leaving typical general education subjects to be taught by four-year and public two-year colleges. Furthermore, two-year proprietary colleges often have an open door enrollment policy for those with a GED, which advocates GED enrollments. The National Center for Educational Statistics (1995) has shown GED recipients are more likely to choose a proprietary college/school than traditional high school graduates. Research into GED success at a proprietary college is essential for administrators and

GED recipients to make informed decisions regarding college enrollment and support services.

The Role of Proprietary Colleges

Private, for-profit colleges are often referred to as proprietary, career or private career schools/colleges and as the silent partners in postsecondary education (Clowes & Hawthorne, 1995). Since the 1980's between five and ten percent of all postsecondary education students have been served by proprietary schools each year (U.S. Department of Education, 2000). According to the Career College Association, private career colleges comprise nearly half of all postsecondary educational institutions in the United States (Glakas, 2003). Despite their noteworthy presence in higher education, research on proprietary colleges has been negligible. This overlooked importance of proprietary colleges in research is severely limiting. Even further weight is given to the importance of proprietary colleges when government funds (our tax dollars) are examined. Thirty-eight percent of institutions participating in government Title IV programs are for-profit career colleges (Career Training Foundation, 2003). Furthermore, enrollment in degree-granting proprietary institutions increased 52% from 1995 to 2000 (U.S. Department of Education, 2000).

It appears government statistics and multiple researchers point toward the proprietary college industry as not only a silent partner in the postsecondary industry, but a potential sleeping giant. Davis and Botkin (1994) warned community college leaders, "Over the next few decades the private sector will eclipse the public sector and become

the major institution responsible for learning." Whether Davis and Botkin are accurate, or not, proprietary colleges are too important to ignore in higher education research. Research within the proprietary college realm is essential.

Oklahoma and Arkansas

Calculations from U.S. Department of Education National Center for Education Statistics designate Arkansas and Oklahoma as having the highest ratios of GED completers to total high school completers among all states in the year 2000. This two state area (Oklahoma and Arkansas share a common state line) is located near the center of the United States. Both states also have among the highest ratios of low socioeconomic populations. Therefore, a study of GED recipient's success rates at a proprietary college would be especially noteworthy in this geographic area. Findings from the National Evaluation of Welfare-to-Work Strategies show that earning a college degree, at any level, increases the likelihood of financial self-sufficiency and significant employment earnings for the low socioeconomic populace (Peterson, 2002). Combined, Oklahoma and Arkansas have seven two-year, degree granting, proprietary colleges that are fully accredited and participant in Title IV funding. All seven are in the major cities of the region: two in Tulsa, three in Oklahoma City, and two in Little Rock.

Related Issues

Studies outside of GED research suggest age has a significant affect on student success in higher education (Brookfield, 1992; Cross, 1981; Knowles, 1978; Lynch, 1994; Tennant & Pogson, 1995; Zemke & Zemke, 1984). Age has become a very critical issue throughout higher education. The U.S. Education Department National Center for Education Statistics has estimates indicating adults above the age of 24 comprise about 40 percent of higher education enrollments (U.S. Department of Education, 2000). Researchers (Rogers, 1987; Spillar, 1982; Wilson, Davis, & Davis, 1981) have found GED recipients in college are significantly older than traditional high school diploma holders that attend the same college.

GED studies have analyzed age as a predictor variable that interacts with GED attainment for predicting college success (Baird, 1960; Banner, 1989; Bigby, 1989; Fugate, 1972; Hannah, 1972; Kroll & Baldwin, 1994; Owens, 1989; Sharon, 1972; Wolf, 1983). Overall, the studies were mixed in their determination of age predicting success. When separating the studies involving only two-year or four-year colleges the results are still divided almost equally. Therefore, although general education literature has suggested age is an important variable in predicting student success, conflicting evidence exists for using age as a variable to improve the predictability of student success when combined with GED attainment. None of the studies examining age were completed at a two-year, proprietary college.

Gender is usually a convenient variable to study since it is often, or easily, captured. This is the case within the GED literature. Numerous GED studies (Aspinwall,

1999; Bigby, 1989; Eldridge, 2000; Fugate, 1972; George-Bowden, 1990; Henry, 1999; Nicholas, 1976; Osei, 2001; Owens, 1989; Quinn & Haberman, 1986; Sharon, 1972; Spillar, 1982; White, 1996; Wolf, 1983; Ziegler, 1992) included gender as a possible interacting predictor variable. Like the age variable, results among studies were mixed. Inquiries that reported gender as not an interacting factor with GED for predicting student success almost equaled those who did find gender to be relevant.

Ethnicity has been included in the GED research as a control variable. A few studies researched the effect of ethnicity colluding with GED attainment as a predictor of academic success. Predominantly, they found no significant affect by including ethnicity (Aspinwall, 1999; Bigby, 1989; Moore, 1973; Osei, 2001). However, non-GED focused ethnicity studies have found ethnic students to perform significantly different academically from non-ethnic students, depending on the type of institution they attend. The GED and ethnic study findings appear to be somewhat contradictory.

Although most GED reports do not emphasize course-of-study as an analyzed variable, those studies that explore only one type, or cluster, of courses are inherently reviewing by course of study. GED students tend to perform better in technical and trade programs than traditional academic programs (Shepard, 1992). However, like age and gender variables, results have been mixed and cannot be declared conclusive.

Numerous non-GED studies have studied and found placement test scores are typically useful in predicting success in college (Goldman & Slaughter, 1976; Krol, 1993; Nielson, 1986; Spencer, 1996). Various GED studies looked specifically at college placement test scores as the determinant of GED (versus traditional high school) success. Although mixed, results slightly favored high school diploma recipients for placement

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test scores. A few GED studies expanded the view to investigate placement test scores as a potential predictor of college persistence for GED recipients. Primarily, high placement test scores were found to be positively associated with college persistence for GED recipients (Koethenbeutel, 1993; Rogers, 1987; Smith & Goetz, 1988).

Although student education funding (e.g.: Title IV, agency, private, etc.) is a critical topic for adults with children and a hot button for state and national governments, research on persistence and success by funding source was not found within the GED literature. Outside the GED literature a number of studies have suggested a relationship exists between multiple financial aid variables and college persistence (Cofer & Somers, 2001; Lachman, 2002; Powell, 2002; St. John, 1992).

None of the studies reviewed for gender, ethnicity, course of study, placement tests, or funding source were performed at a two-year proprietary college.

Purpose of the Study

The purpose of this study is to determine if persistence, academic performance and postgraduate performance differ between GED graduates and traditional high school graduates who enrolled at a two-year proprietary college in the Oklahoma/Arkansas region. To achieve this purpose, this study specifically addresses the following statistical null hypotheses.

HO₁: There is no significant difference in accumulative grade point averages between GED and high school diploma earners graduating from a two-year proprietary college.

HO2: There is no significant difference in placement exam scores between GED recipients and high school graduates attending a two-year proprietary college.

HO3: There is no significant difference in graduation rates during the standard allotted time between GED recipients and high school graduates attending a two-year proprietary college.

HO4: There is no significant difference in attrition rates between GED recipients and high school graduates attending a two-year proprietary college.

HO5: There is no significant difference in graduating during the extended allotted time between GED recipients and high school graduates attending a two-year proprietary college.

HO6: There is no significant difference in the rates of GED recipients and traditional high school graduates that graduate from a two-year proprietary college and then continue their education or become employed in the field of study.

HO7: There is no significant difference in accumulative grade point averages, placement exam scores, graduation rates, or attrition rates between GED recipients and high school graduates attending a two-year proprietary college when age, gender, ethnicity, course of study, and/or funding source are/is included as a predictor(s).

As a means to aid in the research and analysis of this study, a comprehensive listing of GED studies was compiled and categorized. Subsequently, an important secondary purpose of this study is to provide the most comprehensive listing and categorization of GED studies provided by a known source to date.

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Significance of the Study

A GED diploma is the most utilized secondary education alternative to a high school diploma. Based on figures from The American Council on Education, an estimated 17 million people have used the GED Testing Program to serve as a potential bridge to further education and employment opportunities. In one year (2001) alone, over one million people took one or more of the GED tests (Association for Career & Technical Communications, 2003). The GED market has and will continue to be a significant basis of students for postsecondary education. The American Council on Education's President, David Ward, proclaimed GED candidates recognize the value of education in today's society, as two out of every three candidates who took the GED tests last year indicated they planned to pursue further education and training (Hassen, 2002). Yet, even after dozens of studies, college administrators still do not have an answer to the thorny question, "Is the GED a legitimate alternative to a high school diploma?" It appears that type of institution may significantly influence the success of a GED student. While research has provided four-year and public two-year colleges with such clues, these same clues may be miscues for proprietary colleges, since they are a distinct type of higher education institution.

GED recipients are more likely than traditional high school graduates to come from a lower socioeconomic status (Smith, 2003). Proprietary schools, even more than traditional colleges, continue as an important source for lower socioeconomic students. In the face of many studies that substantiate increased wages and promotions provided by attending college, lower socioeconomic students have traditionally not taken advantage

of obtaining college education. In this Information Age, at least some college has become very essential to prosper in the workplace. Furthermore, low levels of education are associated with poverty, crime, and unemployment (Ricketts, 1996; Smith, 2003; Williams, 1990). Although more than a quarter (26%) of private career college students have family incomes of more than $60,000, private career college students are more likely than public and private not-for-profit college students to have family incomes below $20,000 (U.S. Department of Education, 2000). In addition, undergraduates with a GED are more likely to select a private, for-profit college/school than those with high school diplomas (National Center for Educational Statistics, 1995). In at least one study, nearly one-third of all GED recipients enrolled in a non-public technical or trade college/school (Behal, 1983). Yet, proprietary higher-education institutions have been left out of GED equivalency research and this study proposes to reverse that trend.

This research attempts to reflect previous GED research, except for replacing public colleges with a two-year proprietary college. Thereby, this project endeavors to provide a guideline for two-year proprietary college administrators regarding GED applicants. In other words, this study helps to answer the question, "Is the GED a good diagnostic tool for identifying a student's probability of doing well in a two-year proprietary environment?" The current investigation's results, combined with constructively, categorized results from prior research, can be used as a guide toward recommendations for proprietary college departments, such as: admissions, financial aid, placement, and student services. This study is intended to broaden the scope of GED research, fill a void within the research, and conceivably shed light on why research results have been comprehensively contradictive.

To understand interactions between GED attainment and other potential predictor variables can further aid administrators in making enrollment, student services, and placement decisions. Age, gender, ethnicity, course of study, placement test score, and funding source, are studied for interactions with GED attainment and predictability of college success. To better identify with higher persistence and lower attrition rates among GED students may well increase one of the primary critical objectives for proprietary colleges: increase revenue base.

The results of this study may also provide critical information to GED recipients. It would be helpful for administrators, admissions representatives, and counselors to have research they can quote regarding the probability of success, or lack of success, previous GED recipients have experienced at various types of institutions. Furthermore, GED recipients should seek out and assess all categories of postsecondary education institutions. The results of this study may aid in their assessment.

A further benefit of this study could be an improved understanding of the tendencies of lower socioeconomic family members that attend college. Often these students are the first in their families to attend higher education of any kind. Almost two-thirds of career college student's parents did not attend college (Career Training Foundation, 2003).

Assumptions of the Study

The following assumptions may limit, but are not expected to compromise the goals of this study.

The focus of this study is a two-year proprietary college offering both trade and technical Associate Degrees. This college is located in the largest city within 90 miles of the Arkansas/Oklahoma state line. Therefore, it is assumed this study would adequately represent the area's GED and high school completers that attend a two-year proprietary college.

It is assumed the college database records are accurate and that all self-reported variables were truthfully provided by the students.

It is assumed that successful academic performance can be ascertained from accumulative grade point average, persistence rate, and graduation rate.

Limitations of the Study

This study looks at only one proprietary college campus; therefore, the generalizability of this study to other schools is limited.

Historical data was utilized to study only students who had significant time to graduate. Therefore, the study is limited by the historical data available.

This study looks only at the data from a correlational perspective. Causation is not identified, nor can it be implied with this analysis.

Demographic variables were limited by the population available.

It is not known if students who dropped out enrolled at another postsecondary institution.

The only courses of study available for analysis at the time of the investigation were the following: Computer Technology, Computer Programming, Electrical

Mechanic, and Heating, Air Conditioning, and Refrigeration Technology; thereby, limiting the generalizability across other programs of study offered by proprietary schools.

Definitions of Terms

This study utilizes the following terms.

Career college: Private, for profit institution of higher learning, offering certificates and/or Associate Degrees. This terminology is used interchangeably with "proprietary college."

Complete non-graduate: Student who completed course work but did not receive a degree due to not meeting minimum requirements, such as minimum attendance or grade point average.

General Educational Development (GED): General Educational Development Test administered by the GED Testing Service of the American Council on Education. Consist of a battery of five tests: Writing, Reading, Mathematics, Science, and Social Sciences. It is designed to measure skills considered to be the outcomes of graduating from high school.

GED graduate or recipient: a person who obtained a certificate issued upon the successful completion of the GED test battery.

Grade point average (GPA): Average grade across courses taken. GPA can be on a four point scale or on a 100 point scale. The college in this study used a 100 point scale with a grade in the nineties equal to an "A"; eighties equal to a "B"; etc.

High school completer: A person who earned a high school diploma through traditional or non-traditional methods, including: high school diploma, GED or other equivalency certificate.

High school graduate: A person who obtained a high school diploma after successfully completing all requirements of a traditional high school program.

Placement exam/test: An exam used by colleges to make recommendations to applicants regarding course placement, remediation needs, etc. The placement exam used by the proprietary college in this study includes math and English comprehension questions.

Proprietary college: Private, for-profit institution of postsecondary education. This terminology is used interchangeably with "career college."

Two-year college: Higher education institution that primarily offers Associate Degrees.

Four-year college: Higher education institution that primarily offers Bachelor Degrees and/or higher.

Summary

While the GED equivalency debate continues, this study takes a divergent look at the GED research and found notable support for the type of higher education institution

affecting the probability of academic success for GED recipients. However, there is a unique category of institution that has been disregarded in the GED literature. The proprietary college has an important presence in postsecondary education, especially with regards to GED recipients seeking higher education. Proprietary colleges must no longer be ignored in higher education research. This is particularly true within GED research.

Oklahoma and Arkansas comprise a notable geographical area located in South Central United States where GED recipients have relatively high ratios to traditional high school diploma earners. A higher than average GED ratio, combined with lower than average socioeconomic population ratios, substantiates a fundamental need for GED research in this geographic area.

Age is a critical variable researched extensively in both the college retention and GED literature. General education literature advocates age as an important variable in predicting student success in college. However, conflicting evidence exists within the GED literature for using age as a variable to improve the predictability of student success. Other important variables previously researched in the GED literature, although to a lesser degree, include: gender, ethnicity, course of study, and placement test scores. An important variable, funding source, was not found in the GED research literature. None of the four dozen-plus GED studies reviewed by this researcher for age, gender, ethnicity, course of study, placement tests, or funding source were performed at a two-year proprietary college. An important task for this researcher is to converge these variables into a first-time GED research study at a two-year, proprietary college.

The anticipation is for this study to provide a founding guide to proprietary college administrators and staff for actions to be taken with GED recipients regarding

enrollment, student services, financial aid, and placement. An important secondary

purpose is to provide a comprehensive listing and categorization of GED studies.

Further, this study may provide insights for GED recipients as they seek out and

assess the variety of postsecondary education institutions. By broadening the scope of

GED research, filling a void within the research, and shedding light on contradictive

research results, this study is capable of providing a more encompassing view of GED

and low socioeconomic tendencies in enrolling, persisting, and completing postsecondary

education.

Organization of Chapters

Chapter I has provided an introduction to the GED debate, related the significance

of the GED test and proprietary colleges, provided some insight into other possible

interacting variables, and gave an overview of this study. Chapter II goes further in depth

with previous literature to explain the history of GED Testing, proprietary colleges, GED

research, potential interacting variables, and the specific college campus utilized in this

study. Chapter III provides the methodology and design of the study. A comprehensive

discussion, comparison, and analysis of the findings by the researcher are proffered in

Chapter IV. The conclusion and a summary of the study, with recommendations are

presented in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

Since the GED's inception in 1943, each decade had research projects and papers written either to support or debunk its claims of equivalency to high school completion. In the most recent full decade (1990's), the number of research projects and papers increased yet again. The following literature review will sort, categorize, and analyze past GED investigations. Because there is a lack of research on proprietary colleges, a brief background of this type of postsecondary education is presented in this chapter.

Organization of the Review

Initially, histories of the GED test and proprietary colleges are provided. The focus of these reviews is to give the reader a good understanding of the growth of importance behind both GED testing and two-year proprietary colleges. A short history and description of the specific proprietary college campus utilized for this study is then presented. The history and description of Vatterott College – Tulsa will aid the reader in determining the generalizability of this research.

The literature surrounding GED studies is then reviewed. This research was vast; therefore, the studies are first generalized and then divided and discussed by school type, time frame, and geographic location. Other related areas of research are age, gender, ethnicity, placement tests, course of study, and funding source and their affect on college success. A brief review of these investigations concludes Chapter Two.

History of the GED

During World War II the United States Armed Forces Institute commissioned the American Council on Education to develop the General Educational Development Test (GED). From these earliest stages of development, educators from universities were closely involved. Such universities included the University of Chicago, University of Iowa, and University of Minnesota (Quinn, 1990; 1997). The goal was to design a battery of tests that could measure a level of accomplishment comparable to the outcomes of four-years of high school instruction. This battery was designed to be used for military personnel coming back from the war without a traditional high school diploma. The imperative question for educators and the Roosevelt Administration was how to treat high school students coming home after interrupting high school to go to war. Therefore, the forerunner to the GED was produced to avoid the economic depression of a massive number of jobless veterans and/or the huge costs of reenrolling these veterans into high school.

Prior to common acceptance of the GED, Wisconsin passed a law, and other states considered doing the same, granting diplomas to all high school seniors who

interrupted school to enlist for the war (Quinn, 1990). However, many educators objected to such a blanket credit without some type of measurement. Quinn (1997) maintains this tension permitted progressive educators to gain acceptance of a battery of general tests created to certify high school equivalency.

The American Council of Education's GED committee looked for a prototype and found it in the Iowa Tests of Educational Development, a precursor to the GED effort. Three years after the commissioning, the Veteran's Testing Service (VTS) gained control of administering the GED (Allen & Jones, 1992). This responsibility fit naturally into the VTS focal point of helping war veterans to pursue educational goals without having to return to high school.

The first GED tests were administered to veterans and active military members in 1943. Eighty-eight thousand veterans enrolled in higher education at the end of World War II and over 2.2 million attended college, at the government's expense, utilizing the War's GI bill (Smith, 2003). For the most part, the GED appears to have served its initial purpose of reintegrating war veterans into the educational system and helping to prevent widespread unemployment.

As early as 1946, The American Council of Education clearly stated that the GED should be used for non-veterans and veterans, alike. Two-years after World War II, a new perspective arose from the state of New York regarding the GED. Setting the precedent for decentralized state managed GED testing; New York became the first state to offer the GED as an equivalency test for civilians (Henry, 1999). Just a few years later, in the late 1940s, the GED test was modified in content and methodology in an attempt to convince state leaders it could serve as a legitimate alternative to the traditional high

school diploma (Houle, 1992). This original test battery included correctness and effectiveness of expression, interpretation of reading materials in the natural sciences, interpretation of reading materials in the social studies, interpretation of literary materials, and general mathematical ability (Auchter, Sireci, & Skaggs, 1993). Administering this original GED test battery took ten hours.

By the 1950s the GED was treated throughout the United States as a reasonable equivalent to the high school diploma (Armani, 1990). Before the end of the decade more non-veterans than veterans were taking the GED test (Sharon, 1972). The GED's use was greatly expanded in the 1960s. The GED had clearly transformed from its original intent as a high school equivalency test for military returning home. For example, many correctional and health institutions began using the GED in the 1960s. GED testing centers were established outside of the United States for Americans on foreign soil. By the end of the Sixties, Canada began making the GED available to its citizens (Allen & Jones, 1992).

The first substantial change to the GED since the late 1940s occurred in the 1970s. The original tests were developed in an industrial era, when a high school education was sufficient for most jobs. During the decades prior to the eighties most test-takers took the tests for employment reasons. However, high school curriculum and teaching philosophy, as well as public attitude toward education, had evolved accruing pressure to evaluate GED test specifications. New generations of tests were developed from recommendations of high school curriculum specialists. In the mid to late 1970s studies were conducted by the Educational Testing Service and others for standardizing the tests to graduating high school senior level and to determine appropriate time

requirements for taking the tests (Aspinwall, 1999; Stadler, 1994). The new time limit for taking the tests was set at six hours. This was in contrast to the ten hour average of the original tests.

Other modifications to the tests at this time, included a shift in emphasis from science and social studies reading materials to a separate reading test; a transition away from recall of facts toward application of conceptual knowledge and evaluation of presented information; introduced real-life contexts (such as work or home settings); and, reading materials (schedules, newspaper articles) relevant to adults.

Another emphasis to modernize the GED tests occurred a decade later in the late 1980s. The American society had become an information society and typified by standard usage of technology in the workplace and global awareness in the home. In response, the GED Testing Service initiated a five-year review, enlisting the expertise of professionals from all sectors of adult education (Quinn, 1997). The panel of education experts recommended five modifications: (a) addition of a direct writing sample (essay); (b) an increased emphasis on critical thinking and problem-solving skills; (c) an increased reflection of the diverse roles adults play in society; (d) greater emphasis on understanding the sources of societal change; and (e) an increase in contextual settings relevant to adults (Quinn, 1997).

The Eighties saw a shift in the reasons given by GED candidates for taking the tests. Two-thirds of candidates said they were taking the tests for entry into postsecondary education, while 30 percent reported taking the tests for employment. The ratio had reversed from the industrial decades of the past, reflecting the new information age (Auchter, Sireci, & Skaggs, 1993).

In 1997 the GED standards for test scores were revised based on a normalization using samples of graduating high school seniors tested in the spring of their senior year. Standards were based on a sampling of graduating high school senior's average score of 50 for each test in the battery.

A recent modification to the battery of tests was implemented in 2002. Although the subjects in this study (all participants entered college prior to 2002) did not take the new 2002 version of the GED, the changes are significant and should be noted by anyone studying the GED's history or performance. In an effort to incorporate more business-related and adult-context information the commission made the following updates.

1. The writing test was modified to increase emphasis on organization and implement a revised scoring scale for the timed essay portion.

2. The mathematics test now has two parts. Part one permits the use of a calculator, Part II does not. Candidates must complete both parts of the test to earn a score.

3. At least one excerpt from the <u>Declaration of Independence</u>, the <u>United States Constitution</u>, or a landmark Supreme Court decision will now be included in the social studies test.

4. The science test will now ask candidates to select the best way to set up an experiment, interpret others' results, analyze experimental flaws, apply scientific conclusions to their personal lives, and use the work of renowned scientists to explain everyday global scientific issues.

The GED battery of tests, created in the early forties, has endured a great deal of change in who, how many, and why people partook in the tests throughout its history. However, the tests experienced little change in specifications until the seventies, and since has been modified multiple times in keeping with societal and educational evolutions. Today GED testing is managed jointly by the nonprofit American Council on Education (ACE) and each state, or province. The GED Testing Service was a division of the ACE and provides recommended and minimum guidelines for testing. Each state, however, has the authority to establish regulations more rigorous than the GED Testing Service's minimum guidelines for earning a GED diploma. For example, restrictions that states might differ on include the setting of minimum passing test scores and minimum age allowed to take the GED.

History of Proprietary Colleges

Early private career schools, known as proprietary schools, offered niche education to the populace that was otherwise unobtainable. These schools focused mostly on direct business education, such as commerce, bookkeeping, and accounting. The largest chain of proprietary schools in the mid 1800s was Bryant Stratton. At the time of the Civil War, Bryant Stratton schools were in nearly 50 cities with more than 50 schools. Although the school's reputation was of quality education and a model organization, the chain dissolved soon after co-founder H. D. Stratton died in 1867. Some of the successors to the Bryant Stratton schools exist today (Lee & Merisotis, 1990).

Another prominent mid 19th Century predecessor to today's private career schools was established by the nephew of George W. Eastman (of photography fame), H. G. Eastman. Late in the 19th Century proprietary schools, like Eastman's, gained a giant boost with the invention of the typewriter and the growing popularity of John Gregg's shorthand system (Lee & Merisotis, 1990). These led to one of the most important, yet obscure, contributions of private schools throughout history. Proprietary schools recognized women were an untapped source of students and workforce. The offering of incentives for women to attend their schools promoted the progression of females in the American workforce. By the beginning of the 20th Century the percentage of women exceeded men enrolled at proprietary schools (Wilms, 1980).

The next big push for proprietary schools occurred in the 1940s. Immediately following World War II, Congress passed the GI Bill, providing $14 billion in education and job training assistance to nearly 8 million war veterans. Nearly twice as many veterans chose to enroll at a vocational school, including proprietary schools, than a traditional college or university. Mostly to accommodate this influx of veterans, the number of proprietary schools tripled during the twenty years after World War II (Lee & Merisotis, 1990).

Unfortunately, along with the tremendous growth in proprietary numbers came less scrupulous schools than the original, reputable proprietary schools. Allegations of billing the government for students not enrolled, falsified cost and attendance records, and other exploitations were made against private schools. However, in response to the large number of the Nation's population attending vocational oriented schools, Congress passed the National Vocational Student Loan Insurance Act in 1965. Direct lending and

federal loan guarantees were now available to vocational, trade, and technical postsecondary students. This was another huge boost for proprietary colleges. In an attempt to reward the legitimate schools and negate the questionable ones, Congress included special provisions. For example, they set forth that a school must be accredited by a nationally recognized accrediting agency in order to obtain federal funding (Moore, 1992).

Proprietary colleges of all types continued to flourish throughout the next two decades. The 1992 reauthorization of the Higher Education Act of 1965 further attempted to limit questionable for-profit, post-secondary institutions by mandating institutions receiving Title IV funds meet appreciably more rigorous eligibility conditions than were previously required. Even further legislation and regulatory oversight mechanisms have been implemented since 1992. Proprietary schools have felt the tightening effect, with the number of schools dropping substantially during the 1990s. Although the number of proprietary schools has decreased, the proprietary market share has increased dramatically. For-profit colleges generated over five billion dollars in the 2000 -2001 academic year, an increase of 52 percent since 1996. Strong growth is predicted by many education industry authorities to continue for proprietary colleges (Silber & Ring, 2003).

Along with the strong financial growth, the academic and occupational importance of proprietary colleges to American higher education continues to grow and be noticed. The Chronicle of Higher Education reported ("A Special Report," 2003) from the results of a public opinion poll for higher education that 92 percent of respondents feel the most important role for a college was preparing students for a career, 90 percent think colleges should provide an education to adults so they can qualify for better jobs,

and only 50 percent felt a four-year college degree was necessary. These statistics point toward the potential continued upswing in the significance of private career colleges. In an article that addresses primarily four-year college and university administrators, Lahey (2003) attempts to draw attention to the growing importance of private, for-profit institutions. As Lahey recognized, the effect for-profit education will have on the higher education industry is an important question to study for all higher education institutions.

Differences between Public and Private Two-year Colleges

Although on the surface a proprietary college and a public community college can appear very similar, there are fundamental differences. The NCES National Postsecondary Student Aid Study found that in 1995-96 the characteristics of students at "less-than-4-year," for-profit institutions were considerably different than those of students attending less-than-4-year, public institutions. Students at less-than-4-year, for-profit institutions were more likely to be single parents, independent, and in the lowest income quartile for both dependent and independent students. In addition, they were more likely to delay their enrollment for a year or more after high school (U.S. Department of Education, 2002).

Proprietary colleges typically focus on work-related courses (depth) and terminal degrees and certificates. Community colleges typically focus on general education courses (breadth) and transferability of credit. Predominantly, proprietary colleges offer occupational Associate Degrees and community colleges offer academic Associate Degrees.

Decision-making is different at a proprietary college than other colleges. The process has generally been very stream-lined, with critical decisions made by the owner(s)/stockholders and carried out by management. Public institutions commonly have board of regents, administrators, faculty senates, government officers, and others that can directly affect decision-making. With less bureaucracy, proprietary administration has the ability to respond more quickly to changing economies. This allows proprietary leaders to be more sensitive to the marketplace and shift rapidly, as needed.

Another difference has been the scaffolding approach to curriculum common for proprietary colleges. This approach views occupational education as building blocks of a job skill. Therefore, for the most part, all students take the same courses and the same sequence of courses at a proprietary college. This generates yet another difference of more start opportunities for enrolling at proprietary colleges than at public colleges. For example, while a traditional community college has Fall, Spring and Summer enrollments, a proprietary college is likely to have five or more enrollment periods in a year.

A strong focus on work-related courses (depth) in building specific job skills at the typical proprietary college designates a more hands-on training than at a public two-year college focused on general education courses (breadth) and transferability of credit.

Other fundamental differences exist between typical public and private two-year colleges. Public community colleges are more likely to have student housing, sports facilities, sports events, health facilities, artistic performances, or food concessions than a proprietary college. Faculty at a public institution is more likely to have tenure than at a

proprietary college. This generates teaching positions that are generally less permanent at private institutions.

One of the primary differences in public and private colleges is their distinct background. For the most part, community colleges were established with a common goal and identity. Proprietary schools have various, independent goals and suffer from a lack of solid identity. This was reflected even within the research literature. Proprietary colleges and schools were referred to by many names in the writings, including: technical, career, private, for-profit, for-profit vocational, and private for-profit.

Along with the above-mentioned fundamental differences, the proprietary literature points out important outcome criteria differences. Some researchers have found completion rates and other important success variables for proprietary schools have been superior to public community colleges ("ACE Chief," 1989; Lee & Merisotos, 1990; Stone, 2001). Earnings for two-year private college graduates have also been shown to be higher (Rivera-Batiz, 1995). Wilms (1980) suggests proprietary schools are more effective at developing vocationally prepared students. However, both institutions may be equally fulfilling their goals and missions. Instead, discrepancies may be a simple case of comparing apples to oranges, where there are plenty of differences between these types of institutions to warrant separate research and conclusions. Although, there exists, as Lee (1996) suggests, "...(an) academic establishment's philosophical bias," resisting the treatment of private two-year colleges as legitimate, separate institutions equal in value and research.

Proprietary colleges have a long history that began with pride and recognition. Unfortunately, greedy entrepreneurs have since stained the proprietary college past. In

response the government has enacted many rules and regulations to allow only the more accountable schools to flourish. For the time being, these policies appear to be working. As evidenced by proprietary schools becoming fewer in number, but growing larger in size and importance. Although researchers have paid very limited attention to two-year proprietary colleges, as Rutherford (2002) found, "for-profit higher education was an understudied area of which knowledge could be useful." This is an understatement.

Oklahoma and Arkansas

Calculations from U.S. Department of Education National Center for Education Statistics designate Arkansas and Oklahoma as having the highest ratios of GED completers to total high school completers in the year 2000. Arkansas was highest with 20.5%; Oklahoma was second highest with 17.7%. The national average was 6.3%.

According to the Integrated Postsecondary Education Data System (IPEDS) website, Oklahoma has four two-year proprietary postsecondary schools: two in Tulsa and two in Oklahoma City. Arkansas has one two-year proprietary postsecondary school, located in Little Rock. All five schools are accredited and Title IV participants. Among Oklahoma City, Tulsa, and Little Rock, the city closest to the geographic middle of this two state area is Tulsa. One of the two proprietary colleges in Tulsa was focused on one specific program area. The other Tulsa two-year, proprietary college had four independent program areas at the time of this study. Therefore, this later college, Vatterott College, was selected for the current research project because the school is a) located in the heart of the highest GED ratio area of the United States, b) recognized by The Department of Education as fully accredited, c) eligible to receive Title IV funding,

d) diversified, with multiple programs in trade and technical areas from which to draw data, and e) willing to allow this researcher access to historical data files for research purposes.

Vatterott College

Vatterott College is one of the fastest growing and most innovative private career colleges in the past decade. Founded in 1969 in St. Louis, Missouri, as Vatterott Education Centers, Incorporated, the college now serves more than 9,000 students per year at seventeen Midwestern campuses in eight states. In 1990, Vatterott College was named the best school in Missouri by the Missouri Association of Private Career Schools. Vatterott specializes in technology-focused, hands-on training in fast growing industries. While degree and certificate offerings differ from campus to campus based on regional demand, most training programs are concentrated in technical trade (e.g., electrical, heating, air conditioning, refrigeration, etc.), Information Technology (e.g., computer networking, computer programming, etc.), and/or medical (e.g., medical office assistant, pharmacy technician, dental assistant, etc.) industries. Vatterott Global Online, a distance education division, offers diploma and occupational Associate degrees in Information Technology.

Vatterott College opened its Tulsa campus in 1997 as a branch location of the St. Ann (one of two St. Louis locations) Campus. The Tulsa campus began by offering diploma certificates in Electrical Mechanic (EM) and Heating, Venting, Air Conditioning and Refrigeration (HVAC-R) programs. The year 2000 was significant for the Tulsa

campus as they purchased an additional 20,000 square foot office building and commenced offering diploma certificates in Computer Technology and Computer Programming and occupational Associate Degrees in Electrical Mechanic and Heating, Venting, Air Conditioning and Refrigeration. In 2001 they added Occupational Associate Degrees in Computer Technology and Computer Programming. In 2003 the school added a Medical Office Assistant program.

The Vatterott College - Tulsa campus served more than 500 students in 2002. All courses are offered in the morning and duplicated in the evening. Students attend in blocks of 4 ½ hours each day, morning or evening, Monday through Thursday. Classes are held year round with Diploma programs lasting sixty weeks and Associate programs ninety weeks. A graduating student in a diploma program will have received at least 1080 hours of classroom/lab training. In the Associates program, a graduating student will have received at least 1620 hours of classroom/lab training.

Vatterott College is nationally accredited by the Accrediting Commission of Career Schools and Colleges of Technology and approved by the U.S. Department of Veteran's Affairs and U.S. Department of Veteran's Affairs Vocational Rehabilitation. The Vatterott College - Tulsa campus is also accredited by the Oklahoma Board of Private Vocational Schools and State Department of Rehabilitation Services. In 2003 the Tulsa Campus earned a five-year accreditation renewal by the Accrediting Commission of Career Schools and Colleges of Technology and given a School of Excellence Award by the Accrediting Commission.

Vatterott College readily admits students of any race, without regard to origin, age, physical handicap, creed, sex, national and ethnic origin, to all rights, privileges,

programs, and activities generally made available at the school. Students enrolling at

Vatterott College for regular programs must have either a high school diploma or General

Educational Development Certificate (Vatterott College Catalog, 2003).

The most recent available enrollment data (2001) indicates approximately eighty

percent men, twenty percent women, seventy-four percent white, twenty percent black,

and three percent Hispanic attending the Vatterott College - Tulsa campus (National

Center of Education Statistics, 2003). All students at the Tulsa campus are enrolled full-

time.

According to Vatterott College's 2003 Catalog, for a student to graduate they

must meet the following conditions:

1. successful completion of each class within each phase of training with a minimum 70% grade average,
2. obtain a final attendance average of 80%, and
3. full payment of all costs incurred during the tenure with the school.

GED Versus High School Diploma

Search for GED research literature was conducted through multiple resources,

including, but not limited to, the following.

1. Dissertation Abstracts International

2. Educational Resources Information Center (ERIC), both online and

   through ERIC's document reproduction service.

3. National Center for Education Statistics (NCES)

4. Integrated Postsecondary Education Data System (IPEDS)

5. Oklahoma State University Library Catalog

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6. Dissertation.com

7. UMI ProQuest

8. American Council on Education

9. Center for Adult Learning and Educational Credentials (CALEC)

Well over one hundred studies and reviews concerning the legitimacy of GED earners were discovered and examined. In general, the overall GED literature was divided between researchers that found results to support the GED equivalency and those that found high school graduates to be better equipped than GED earners to succeed in higher education.

An initial, cursory analysis of GED literature indicated there was no clear pattern or distinction between GED and high school diploma success in higher education. In fact, there appeared to be considerable conflicting results in the first round of literature review. If subsets of the literature were broken out and analyzed, would any patterns emerge? This question led to the dismantling of GED literature in an organized attempt to find patterns or meanings, if they existed, among the crowded and contradictory GED literature. Such a divergent look at the GED literature exposed attributes suitable for inductive categorization. From this second layer of analysis the following categories were established and examined.

1. By school category: Four-year and two-year colleges are dissimilar in many ways. A legitimate argument could also be made that four and two-year college students are also dissimilar in many ways. Therefore, a deserving

separate observation of results was performed to uncover potential categorical differences by school category.

2. <u>By time frame</u>: Extensive GED research has not been just in the past few years or well into the past. It has been consistently widespread for the past fifty to sixty years. Therefore, an evolutionary review of GED studies from long-standing research to recent results was reviewed in an attempt to reveal valuable time-related trends or effects of GED modifications.

3. <u>By geography</u>: Studies have been performed throughout the United States. Two-thirds of the fifty states have had at least one GED study performed at one or more of its higher education institutions. It is well known that geographical differences exist in customs, beliefs, preferences, traditions, etc. Therefore, a geographic categorical analysis was performed to expose any regional patterns in the GED research.

GED Studies by School Category

The GED is widely accepted in the admissions process by both four and two-year colleges as equivalent to a high school diploma. However, the goals demonstrated as most important is unique for each category of college. For example, four-year colleges tend to focus more on research objectives than two-year colleges. Therefore, the following review and analysis separates two and four-year colleges.

Four-year

Approximately one-third of the studies reviewed in this analysis examined four-year college students, with roughly ninety percent of those studies showing GED students not performing as well as high school diploma students. Studies looking at four-year college students included very negative comments regarding the GED and its attempt to emulate the achievement of a high school diploma. Such comments written by researchers, included: "staggering failure rates," "wide disparity," and "total academic failure." All of the four-year studies looked at grade point average (GPA) as an indication of performance, or success. Most four-year studies also looked at persistence as another indicator of success.

Researchers, such as Larsen (1979), Rogers (1977), and Roon (1972), used first year GPA to determine success at four-year colleges. Larsen wrote that GED earners had "total academic failure" in their first year (note: the actual failure percentage was 40 percent). Rogers declared the GED was not equivalent to attending four years of high school and that GED earners would likely experience difficulties in college, especially their first year. In a study at metropolitan State College in Colorado, Roon found high school diploma earners with higher GPAs, but also found that when only students with GPA's over 2.0 were considered, there was no significant difference between GED and high school diploma earners.

Jerry Rogers (1987) looked at 442 GED and 375 high school diploma enrollees to a four-year university and found that high school diploma earners were 11 percent more likely to persist and had a slight, but statistically significant higher GPA. George Rogers

(1977) compared 170 GED and 688 high school diploma enrollees at a four-year college in Kentucky. After reviewing first semester college performance, he found GED recipients had lower GPAs and nearly 60 percent performed at or below "D" grade level.

In a study covering a twenty year enrollment period, Fugate (1972) found that 47 percent of GED freshmen enrollees at Middle Tennessee University earned below a "C" average. He also found one-fourth of the GED students graduated and nearly one-fourth (24 percent) were put on probation. Quinn and Haberman (1986) studied nearly three thousand GED earners attending four-year colleges and concluded that obtaining a GED "...does not insure that the student possesses the skills or the perseverance necessary to complete college" (p. 80).

In the most recent studies of four-year college students, Osei (2001) reported high school diploma earners have significantly higher GPAs than GED earners. She also found the majority of GED earners who enroll directly in a four-year degree program drop out in their first year. Ebert (2002) found high school diploma earners performing significantly better on both GPA and persistence than GED earners. However, she found no significant difference in GPA after the first year between GED and high school diploma earners. Of those that graduated in four years, the difference in percentage of GED and high school earners that originally enrolled was not large: 30 and 35 percent, respectively. However, the gap was appreciably wider for those graduating within five years. Sixty percent of GED earners and 75 percent of high school earners graduated within five years. The overall years to graduation was not found to be statistically significant at 5.6 (years) for GED and 5.3 for high school diploma earners.

At least four investigations found GED recipients just as successful at four-year colleges as high school graduates. When Baird (1960) researched differences in academic achievement he found no significant difference between students with high school diplomas and those with GEDs. Whitley (1958) investigated male undergraduates and observed that GED earners who dropped out actually had higher grade point averages than high school diploma earners who dropped. Whitley also found no significant difference in GPA between graduating GED earners and high school diploma earners (from a four-year university). In comparing the GED mathematics subtest scores and first semester GPAs, Andrew (1952) found the GED to be a good indicator of potential success at a four-year college. In two separate studies at a small four-year university in Canada, Colert (1984) concluded that while high school diploma earners had numerically higher GPAs and number of credits passed to attempted, neither were statistically significant in difference.

A large percent of four-year college studies found high school diploma earners perform better than GED earners in college. GPA and/or persistence were the most commonly used test variables among four-year college studies to determine success.

Two-year

In contrast to four-year college studies, approximately two-thirds of the two-year college studies concluded GED students perform as well as high school diploma students, or better. Private two-year colleges were excluded from these studies. Most of these studies looked at GPA and persistence as indicators of success.

Two separate North Carolina community college studies found GED and high school earners with equal success (Ayers, 1978; Bryd, Hayes, Hendrick, Simpson, & Custer, 1973). Subsequent to comparing first year math and English grades, Bryd and his colleagues, concluded GED and high school diploma earners perform equally. Ayers found GED earner's GPA lower than high school earner's GPA, but not enough to be statistically significant.

Sosa (2000) studied mostly Hispanics and found the GED graduates had superior persistence in college versus the high school graduates. Scales (1989) studied placement scores, English and math grades, and GPAs for 47 GED and 45 high school completers. She concluded obtaining a GED or earning a high school diploma is not significantly different in predicting success at a two-year college. In 1987, Clark found no significant difference when she compared GPA averages of 56 GED and 56 high school earners attending two-year colleges. Hannah (1972) compared grade point averages, for 300 GED earners and 300 high school earners in two-year public colleges and found they were equally successful in their first year of school. In their second year of college, GED earners were more successful than high school diploma earners. Furthermore, high school diploma earners had a higher percentage of dropouts in their first year of college than GED earners.

Soltz (1996) analyzed the records for over 5,600 students with GEDs at a two-year college. The records correspond to a 23 year period and disclose that one-fourth of GED earners who enrolled at the college failed to earn any college credits. However, those that did earn credits earned grade point averages similar to high school graduates

enrolled at the same college. Although, Soltz also found less than 10 percent of GED

students that enrolled went on to graduate from the two-year college.

At a public, two-year technical institute, Willis (1995) studied a student

population that was 99% female and a mean age of greater than twenty-five. She

examined the records of 366 high school and 33 GED graduates and found no statistically

significant difference between the mean GPAs. Ziegler (1992) analyzed records at three

two-year technical colleges. He found no statistical difference between mean GPA for

high school and GED earners. An interesting find by Ziegler was that marital status did

show a significant difference in mean GPA, thereby providing some predictive power for

student success.

Not all two-year studies found GED earners performing equally, or better. Moore

(1973) studied the GPA and persistence of 220 each for GED and high school diploma

earners and found GED earners had considerably lower GPAs. GED earners were also

four times as likely to drop out of their two-year college. Although Klein and Grise

(1987) found both GED and high school earners averaging "C" grades, the difference was

found to be statistically significant, with high school graduates having higher grade

averages. They also found college graduation rates to be poor for GED earners. Shepard

(1992) studied 3,429 students at twelve two-year colleges and found high school students

performed better than GED, except for technical programs, where they performed the

same.

Bigby (1989) studied 83 GED and 106 high school diploma earners attending a

two-year public college and found the high school diploma earners had significantly

higher accumulated grade point averages. In a study of 51 GED and 50 high school

earners, all age 17 or 18 and enrolled at a public, two-year technical college, Ricketts (1996) found high school earners performed significantly higher in GPA. He also found high school earners to have statistically greater persistence. Interestingly, both groups in Rickett's study performed equally well on the pre-college placement test. Although, Schillo (1990) studied 40 each GED and high school diploma earners at a community college and found the high school earners performed better on GPA, persistence, and placement tests.

Converse to the four-year college studies, which predominately found GED earners to perform less successful than high school diploma earners, most two-year studies found GED earners performing equally, or better. However, several two-year studies did find high school diploma earners performing at a higher level in college than GED earners. Like four-year college studies, GPA and persistence were the test variables most often researched.

Appendix A summarizes selected GED studies by school type.

GED Studies by Time Frame

The GED has evolved over time. In the initial five years of its existence the GED tests were altered many times to accomplish shifting and maturing objectives. Once these objectives were settled upon, the tests were not significantly altered during the 1950s and 1960s. Meanwhile, a notable transformation occurred in the test taking population during this time period. The ratio of non-veterans to veterans taking the GED increased dramatically. Changing trends and test-taking populations caused major revisions to

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update and advance the tests in both the 1970s and 1980s. Major updates to scoring standards also occurred in the Seventies and Nineties. Most recently, another major revision to the tests occurred in 2002. The following review of GED studies by decade may reveal a previously unspecified trend and/or it may reflect the above-mentioned historical changes in the accumulated results reported by researchers.

1940s

The first battery of tests was given in 1943. Although the inception of the GED tests was not until the 1940s, at least three post rollout studies were performed during the decade. All three investigations found high school diploma earners more successful than GED earners. Two of the three studies examined veterans only.

1950s

An important metamorphosis of the GED test-taking populace emerged in the 1950s. What was once used primarily as a means to infiltrate veterans back into the educational and working establishments was becoming more and more a tool for non-veterans to reenter these same institutions. No less than seven studies were performed in the 1950s. All of the studies looked at four-year colleges. Two studies looked at both two-year and four-year schools. Two of the studies compared veterans only.

Only two of the seven studies did not find high school graduates to be more successful in college than GED earners. High school graduates performed better

statistically than GED earners in Tyler's 1954 investigation. However, one should note that Tyler's research project found both high school graduates and GED earners succeeded in college. High school graduates just performed statistically better. A further note is that Tyler did not limit his study to one location, as most studies do, but studied college students across the nation (Tyler, cited in Fisher, 1999).

Whitley's (1958) study at Florida State University found the GED to be sufficient and recommended colleges should use either GED or high school diploma toward entrance requirements. Whitley's study included only males. In comparing the GED mathematics subtest scores and first semester GPAs, Andrew (1952) found the GED to be a good indicator of potential success at a four-year college.

In separate studies, Roeber (1950) and Mumma (1950) looked only at veterans with GEDs and compared them to high school diploma earners. Both researchers found veterans did not perform as well. Both Dressel & Schmid (1951) and D'Amico & Schmidt (1957) studies looked at veteran and non-veteran GED earners and found high school earners to out perform GED earners.

1960s

Of the full decades since the GED inception, the decade with the fewest GED studies encountered was the 1960s. This was despite the fact the GED's use was greatly expanded during the 1960s and that by the end of the decade the inevitable transformation of the GED from a method of primarily reintegrating war veterans to

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primarily reintegrating non-veteran high school dropouts into educational and workforce institutions was fulfilled.

Only three studies and a history of the GED discourse from the 1960s were found in the current research. Two of the three studies found no significant difference between GED and high school earners success in college. Among GED earners, Baird (1960) found no difference in success even when allowing for age or how many years or units of high school completed. However, Fisher (1999) stated Russo found GED earners that were older and/or married performed better academically in college. But, overall he found high school earners performed statistically equivalent to GED earners (p. 38).

1970s

The first substantial change to the GED since the late 1940s occurred in the 1970s. A new generation of tests was developed from solicited recommendations of high school curriculum specialists. The 1970s was also the first decade to have a multitude of studies (the current research found approximately twenty studies) and for the first time a considerable number of the studies included two-year colleges.

Several studies in the 1970s found GED earners with equal, or better, success than high school earners. Using grade point average, Hannah (1972) compared GED earners with high school earners and found them to be equally successful in their first year of school. There was even a higher percentage of high school diploma earner dropouts in their first year of college than for GED earners. For the second year of college, GED

earners were more successful than high school diploma earners and the dropout rates were not significantly different.

Bryd, Hayes, Hendrick, Simpson, & Custer (1973) looked at first year math and English grades and reported equal success for GED and high school earners. Fisher (1999) reported that Topp found GED earners at overall equal success with high school earners, but GED earners who were either veterans and/or married were the most successful (p. 38). Although Ayers (1978) found GED earner's GPA lower than high school earner's GPA, they were not enough different to be statistically significant. On average, GED earners who finished or dropped had respectable grade point averages in a study by Roy (cited in Shepard, 1975).

Many studies in the 1970s determined high school earners performed better overall in college. Moore (1973) studied the GPA and persistence of GED and high school diploma earners and found GED earners had considerably lower GPAs. GED earners were also four times as likely to drop. Larsen (1979) studied 33 GED earners and found thirteen (40 percent) had dropped in their first year of college. High school earners also outperformed GED earners academically in Larsen's study. Roon (1972) also found high school diploma earners with higher GPAs than GED earners. Rogers (1977) compared GED and high school diploma enrollees on first semester college performance. He found GED recipients had lower GPAs and nearly 60 percent performed at or below "D" grade level. Fugate (1972) found that nearly half of GED freshmen enrollees earned below a "C" average and nearly one-fourth were put on probation. Sharon (1972) performed two studies, one at forty colleges and another at 28 colleges, throughout the United States. In both studies, Sharon found GED earners had success in lower level

courses, but lacked success in higher-level courses. Ultimately, he found high school earners persisted and performed better in the long term.

The 1970s were an important decade for the GED, and GED research, since it was the first decade to (a) include a major change to the tests since the Forties, (b) contain a large number of studies, and (c) incorporate a number of studies that looked at two-year colleges. However, the significant number of research studies only sharpened the GED debate with their contradictory results. There were multiple studies that concluded GED earners perform as well as high school earners, although the majority of studies in this decade found high school earners outperformed GED earners.

1980s

The 1980s were filled with GED research. Around thirty studies were found that specifically compared GED and high school earner's success in higher education. This is the first decade in which most of the studies utilized public two-year colleges. In addition, the switch from an industrial to an information society had also completed itself in the eighties, necessitating another major revision to the GED. Among other modifications to the GED, an essay was added and more emphasis was placed on critical thinking and problem-solving skills. A shifting in the public's reason to take the GED also occurred in the eighties. A sizeable ratio of GED takers wanted to attend postsecondary education. Intriguingly, obtaining direct employment was no longer the primary reason to obtain a GED.

Most studies in the 1980s found GED and high school diplomas equivalent for predicting college success. Scales (1989) assessed the placement tests, GPA, math and English grades for 47 GED earners and 45 high school diploma earners and concluded neither group was significantly different in their success in college. Clark (1987) found no significant difference when she compared GPA averages of 56 GED and 56 high school earners. Colert (1984) concluded that for GPA and number of credits passed-to-attempted, GED and high school diploma earners were statistically no different. Wilson, Davis, & Davis (1981) evaluated data for 104 GED earners and 77 high school earners in a vocational program at a two-year public college and concluded GED earners were equally as successful in grade point averages and graduation rates. Willett (1982) evaluated GPA and graduation rates for 68 GED and 68 high school diploma earners and found the groups to be statistically equal in their academic success and persistence. Beltzer (1985) found both category of students were equally persistent. Beltzer also found first year grade point average to be an important predictor of persistence for GED earners.

Spillar (1982) reviewed the placement test scores, GPA, and persistence for 210 (105 each) GED and high school diploma earners. Both groups performed equally on all three criteria. Grady (1983), after studying 458 GED and 458 high school diploma earners for three years, found the two groups performed equally, although GED students were not as well prepared for college. Wolf (1983) determined the same results after reviewing 100 GED and 250 high school diploma earners. Banner (1989) studied 232 community college students that had earned their GED and deduced these students had equivalent grade point averages and persistence as high school diploma earners.

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The above mentioned studies found the two groups performed equally, but at least two studies in the 1980s concluded GED earners were more successful in college than high school diploma earners. Both Freas (1989) and McElroy (1989) found merits in the GED after Freas studied community college students in three states and McElroy studied 50 GED and 50 high school diploma earners attending a community college in Illinois.

An interesting study that crossed the borders of the United States and Canada to include seven states and one province explored the goals of GED takers and found access to the GED provided more motivation for non high school diploma earners to continue education, especially at a technical college (Sabino & Seaman, 1988).

However, not all studies in the 1980s found the GED so invincible. Quinn and Haberman (1986) studied GED earners attending college and concluded that GED earners had a "staggering" failure rate of 85 percent. They also felt there existed a "wide disparity" between what it took to earn a GED or a high school diploma. Rogers (1987) found that high school diploma earners were 11 percent more likely to persist and had a higher GPA than GED earners. Klein and Grise (1987) found high school graduates with higher grade averages in college than GED graduates. They also found college graduation rate to be poor for GED earners. Bigby (1989) and McLawhorn (1981) both concluded in their studies that GED earners do not perform as well as high school diploma earners in college.

The 1980s included a major update to the tests, more two-year than four-year college studies for the first time, and a shift in research results away from an inequality between GED and high school diplomas. The majority of studies in the 1980s found GED and high school diplomas equivalent for predicting college success.

A substantial revision occurred in the 1990s to the GED scoring standards. The resulting changes made it tougher to pass the GED. A large number of studies and debate papers on the GED were written during the 1990s. For the most part, studies focused on two-year colleges.

Shepard (1992) studied almost 3,500 college students and found high school graduates performed better than GED graduates. Shepard did find no difference in their performance in technical programs. Schillo (1990) and Ricketts (1996) found high school diploma earners performed significantly better based on GPA and persistence. Soltz (1996) found one-fourth of GED earners who enrolled at a college failed to earn any college credits. However, those that did earn credits earned grade point averages similar to high school graduates enrolled at the same college, although Soltz also found less than 10 percent of GED students that enrolled went on to graduate from the college. Kroll (1993) reevaluated the 1983 study by Grady and determined that high school diploma earners outperformed GED earners when looking at the proportion of students completing college remedial courses. In a study to identify persistence indicators, Kothenbeutel (1993) calculated GED earners were four times as likely to drop as high school diploma earners. She also determined high school diploma earners have significantly higher GPAs.

Turner (1990), in a study of 87 GED earners attending a community college, found they typically do not perform well in college. However, strong support from family

and friends, combined with consistent contact from college staff, significantly improved their performance.

In a qualitative study of six GED earners, Falk (1995) detected that GED and high school diploma earners performed similarly, but only when certain student service conditions are in place. O'Neill (1995) followed 47 GED earners and 92 high school diploma earners in an inner city community college and observed both were at high risk of attrition. Willis (1995) found no significant difference in GPA between GED and high school diploma earners at an urban, public technical institute. At three two-year colleges, Ziegler's (1992) research results showed no statistical difference in mean GPA between the two types of students.

Harderson (1993) performed a qualitative analysis with 16 GED graduates attending college. His two major findings were that GED earners tended to not be familiar with the college environment and that student services offered to these students have a propensity to be disjointed. Both situations increase stress and likelihood of attrition for GED earners.

The large number of studies carried out in the 1990s failed to end the GED debate. Once again, a decade came and went, with a multitude of GED studies and segregated results.

Since 1999

The latest modification to the GED tests did not occur until 2002. The recent time frame has not allowed researchers the ability to study GED graduates of this "new and

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improved" battery of tests and their collegiate success. Though, in the few years since 1999, a few studies and multiple papers discussing the GED's merit have been published.

Among the recent studies, Osei (2001) reported high school diploma earners have significantly higher GPAs than GED earners. She also found the majority of GED earners drop out in their first year. Ebert (2002) found high school diploma earners performing significantly better in both GPA and persistence than GED earners. However, she found no significant difference in GPA after the first year or for the overall years-to-graduation. Sosa (2000) studied mostly Hispanics and found the GED graduates had superior persistence in college versus the high school graduates.

By Decade Summary

Nine of the first ten studies (1940s and 1950s) found High school diploma earners performed significantly better in college than GED earners (e.g.: Dressel & Schmid, 1951; Damico & Schmidt, 1957; Mumma, 1950; Roeber, 1950). In addition, many of the first research studies looked only, or mostly, at veterans. The transformation from veterans to non-veterans as the primary test takers was completed in the 1960s. Only a few research studies were performed in the 1960s, with mixed results. The 1970s was the first decade to have a multitude of research studies and the first to widely include two-year colleges in the research. The 1970s also saw the first major revision to the GED battery of tests since their inception in the 1940s. Although study results were mixed, the majority of studies found high school earners outperformed GED earners (e.g.: Fugate, 1972; Moore, 1973; Rogers, 1977; Roon, 1972; Sharon, 1972). In the 1980s, two-year

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colleges increased in prominence among the GED studies. Although still mixed, the majority of research results from the 1980s found the two groups statistically equivalent in postsecondary achievement. The 1990s also found varied results. Two-year colleges continued to be heavily studied by GED researchers in the Nineties (e.g.: O'Neill, 1995; Turner, 1990; Willis, 1995; Ziegler, 1992). Even though only a few studies have been reported since the 1990s, the results are still deviating, with some studies finding GED earners performing better than high school earners and vice-versa.

Unfortunately, no conclusion regarding the GED debate can be settled by the above time frame analysis. Nevertheless, some important trends are noticeable. For example, the focus of who is studied has evolved. In the beginning veterans were the primary subjects of the GED research. This evolved over the decades to become almost entirely non-veterans. The location of research focus evolved, as well. Until the 1970s, a large majority of GED research concerned four-year colleges. There has been an increase in the number of two-year colleges as the focal point for GED research in each decade since the 1960s. This could be expected as the number of two-year colleges increased throughout the U.S. Constant through the decades has been the mixture of results. However, the equilibrium has shifted. Until the 1980s, the greater part of studies found high school diploma earners to outperform GED earners. A majority of studies found them to have equal success in the 1980s and 1990s. Finally, both the degree and reason for importance of the GED research have evolved. The significant increase in the number of research studies throughout the past three decades indicates the escalated attention GED research has acquired. GED research has grown in importance, if for no other reason, because of the large increase in number of GED graduates. The strong growth in

GED graduates from 1968 to 2001 is presented in Figure 1. GED graduates, themselves, have grown in importance as colleges search for increased enrollment and retention.
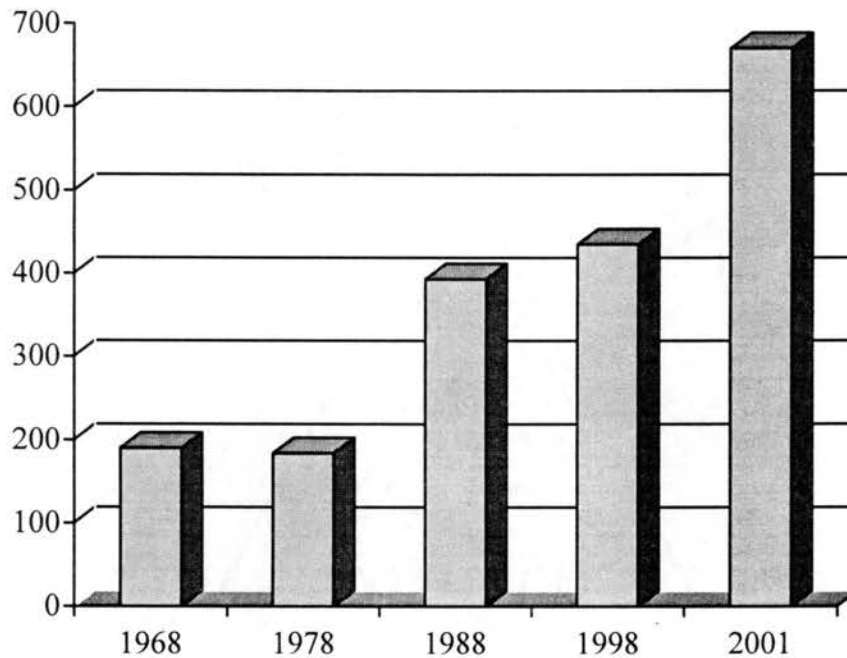
Figure 1. GED Credentials Earned in Selected Years (in 000's)

Unchanged throughout the decades, the variables GPA and persistence have been the principal comparative variables and high school graduates the primary benchmark to compare GED graduates against. Appendix B summarizes selected GED studies by year.

GED Studies Geographically

Because of possible differences in traditions, preferences, beliefs, etc., the GED studies were categorized geographically to determine if differences exist in results

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United States of America

Figure 2. United States Map Differentiated by Regional Analysis

between sections of the United States. This study divided the GED studies into

Northeast, Southeast, Midwest, and Western states. Figure 2 depicts these four regions.

Northeast

For purposes of this study the Northeast was described as states east of the

Mississippi River and roughly north of the Ohio River and Washington, D.C.

Approximately twenty studies were performed throughout this region, involving at least

eleven states. Not all studies directly compared GED with high school recipients. Of ·

those that did, approximately half of the studies reported high school diploma recipients

and GED recipients have equal success in college, while half reported high school

diploma recipients have more collegiate success. One study found GED recipients have

more success in college.

In an attempt to identify characteristics of GED earners, Swarm (1981) focused

on students from universities and community colleges in five Northeastern states. She

found GED earners attending community colleges were aged 19 to 32, typically highly

mobile, married and worked full time. Many had a stronger desire to succeed in college

than in high school and recognized education was advantageous to increased earning and

economic potential. They also reported having difficulties with reading and studying.

GED earners attending universities were aged 24 to 35, married, with children, and

employed full time. Many also reported "having to work harder than their high-school-

graduate counterparts" and feeling alone; yet they reported having more self-esteem and

felt optimistic (about their future).

Another study covering multiple Northeastern states found high school diploma holders more successful at community college campuses than high school equivalency (GED, etc.) certificate holders (Freas, 1989). The researcher recommended community colleges to delineate equivalency holders and develop extended orientation courses and other student services for this group.

In a study of GED earners enrolled at two Detroit community colleges, Junne (1988) found the GED to be a tremendous tool for single, black mothers. He advocated colleges treat the GED as equivalent to a high school diploma and provide special student services, especially for the single, black mothers, who he found to be very intrinsically motivated.

Southeast

For purposes of this study the Southeast was described as states east of the Mississippi River and roughly south of the Ohio River and Washington, D.C. Approximately thirty studies were performed throughout this region, involving at least eight states. Not all studies directly compared GED with high school recipients. Of those that did, about sixty percent reported high school diploma recipients and GED recipients have equal success in college, while almost forty percent reported high school diploma recipients have more collegiate success. One study found GED recipients have more success in college.

Nine of the ten college studies in Georgia and Florida concluded the GED to be equivalent to a high school diploma. All ten studies analyzed GPA and persistence. A

Florida study by Grady (1983) took the research a step further than other GED studies by matching race, age and gender. Comparisons for the 458 GED and 458 high school diploma earners found persistence and performance to statistically equal. In contrast, three of the four studies in Tennessee concluded high school diploma earners perform significantly better in college than GED earners.

Three studies in Florida studied high school dropouts prior to entering college. These studies found (a) most students drop out of high school because they are frustrated, not because they are dumb (Stoker, 1984), (b) GED families are typically from lower economic and educational families than high school earners (Ladner, 1986), (c) the families of GED graduates were less involved in high school than high school graduates (Ladner, 1986), (d) GED graduates were less involved in high school than high school graduates (Ladner, 1986).

Midwest

For purposes of this study the Midwest was described as states west of the Mississippi River and east of the Rocky Mountains. Approximately twenty studies were performed throughout this region, involving at least five states. Not all studies directly compared GED with high school recipients. Of those that did, approximately forty percent of the studies reported high school diploma recipients and GED recipients have equal success in college, while about sixty percent reported high school diploma recipients have more collegiate success. One study found GED recipients have more success in college (Sosa, 2000).

Studies in both Texas (Moore, 1973) and Iowa (Kothenbeutal, 1993) found GED earners were four times as likely to drop out of college as high school diploma earners. Although, most of the studies conducted on Texas schools deduced GED and high school diploma earners performed equally in college. Together the Texas studies analyzed the records of 2,486 GED and 3,836 high school diploma earners and spanned from 1973 (Moore) to 2000 (Sosa). An added note about the Texas GED studies reviewed in this analysis is that all were conducted with two-year colleges.

Studies conducted throughout the Midwest, across multiple states, found GED earners to be more self-critical and anxious. One large Midwest study of 5,616 GED earners that attended two-year colleges found 83 percent of GED earners did not go beyond freshman status and less than five percent of the GED earners graduated (Soltz, 1996).

Two Wisconsin based studies determined the GED was not a good success indicator for college. Quinn & Haberman (1986) and Larsen (1979) wrote scathing remarks concerning the GED results they found, including: "wide disparity," "staggering failure rates," and "total academic failure (in first year)"

West

For purposes of this study the West was described as states west of the Rocky Mountains. Approximately ten studies were performed throughout this region, involving at least eight states. Not all studies directly compared GED with high school recipients. Of those that did, one study reported high school diploma and GED recipients have equal

success in college, three reported high school diploma recipients have more collegiate success. One western study, in Wyoming, found GED recipients have more success in college (Means, 1987). Due to California's large number of colleges, significant minority presence, and vast population, it was surprising to find only one GED study (Phillips, 1996).

Geographic Summary

For the most part study results were still mixed, even when analyzing by geographic region. However, geographic pockets of analogous results did occur. In Texas, Florida, and Georgia, GED earners appeared to perform well when compared to high school earners. In Wisconsin and Tennessee GED earners appear to fail miserably in higher education, compared to high school diploma earners.

Appendix C has selected GED studies categorized by state and region.

GED and Age

A missing interacting variable(s) could explain the inconsistencies within the GED research results. Based on the theory of andragogy, there is a strong possibility age is a critical interacting factor. According to Malcolm Knowles (1978), the father of andragogy, older students have different needs, experiences, focus, and motivations.

Further, there has been a growing dichotomy of age in higher education. The U.S. Education Department's National Center for Education Statistics estimates that adults

above the age of 24 comprise about 40 percent of higher education enrollments (U.S. Department of Education, 2000). The number of 25 to 44 year old students has grown from 4.9 million in 1987 to six million in 2000, an increase of 23 percent (Choy, 2002).

Stage of life, potentially reflected in the age variable, and past experience in school, perhaps reflected in the GED variable, have the potential to greatly affect college success. For example, in a study on nontraditional-aged students, Eschenmann and Olinger (1992) found age beyond 40 to be a barrier to success in higher education at a small, rural community college. The study found adults were more likely to face a "series of barriers" that included lack of funds, lack of time, family commitments, health problems, job conflicts, and lower motivation. Important early adult development theory created by Erikson (1964) suggests adults go through three stages of development: early, middle, and late. Influenced by Erikson's work, Daniel Levinson (1986) developed a more detailed segregation of adult development. Levinson's theory has received considerable research support (Berk, 1998). Table 1 is adapted from Laura Berk's Development Through the Lifespan and depicts Levinson's categorization of adulthood. A key component to Levinson's life cycle is movement through amorphous transition periods to reach more stable structured periods. During transition periods adults are building and blending components to build the next structured period. Levinson suggests adults are in transition periods from age 17 to 22, 28 to 33, and 40 to 45. It would seem reasonable to believe adults typically attend higher education during transition periods in preparation for laying the foundation of a new structured period.

During the first transition period, ages 17 to 22, young adults construct dreams of self in the adult world which guides their decision making. Do GED earners and high school diploma earners seek different dreams? Not necessarily, the dream may be the

Table 1

Levinson's Stages of Adult Psychosocial Development

Age	Transition/Structure Cycle	Underlying Value
17 - 22	Early adult transition	Intimacy
22 – 28	Life structure for early adulthood	
28 – 33	Age 30 transition	Career consolidation
33 – 40	Life structure for early adulthood	
40 – 45	Midlife transition	Generativity
45 – 50	Life structure for middle adulthood	
50 – 55	Age 50 transition	Keeper of meanings
55 – 60	Life structure for middle adulthood	
60 – 65	Late adult transition	Ego Integrity

same, but the choice of how to obtain that dream may be different. For many traditional high school diploma earners the early adult transition period is spent continuing their

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education. Many GED earners may have a shortened early adult transition period, entering their early life structure phase earlier than high school diploma earners. This advanced movement through phases may continue throughout early adulthood for GED earners. GED earners attending higher education in their early to mid twenties may be reaching the Age 30 Transition period sooner than high school diploma earners.

A review of the GED research reveals that multiple researchers have found GED recipients in college significantly older than traditional high school diploma holders attending the same college. At the University of Arkansas, Rogers (1987) found the average GED student to be six years older than the average high school diploma student. GED students were also 64 percent more likely to have a permanent address within thirty miles of campus. In a study covering multiple states, Swarm (1981) found GED takers were typically 19 to 26 years old – older than the traditional high school diploma earning college freshman. George-Bowden (1990) found GED earners to be older, but found no significant difference in other demographic variables. Spillar (1982), Wilson, Davis, & Davis (1981), and Willis (1995) also found GED students attending college to have significantly older mean age than their high school diploma earning counterparts.

Given the typically older age average for GED earners attending postsecondary education, it is interesting to note the results of Eldridge's (2000) study of 450 GED graduates. She reported respondents under the age of 26, regardless of gender, had post secondary education as the chief motivator for taking the GED. However, respondents 26 and over, both male and female, were principally motivated to take the GED by job promotion.

Some of the GED researchers have tested for age as an interacting variable. Owens (1989) and Hannah (1972) found when age was added as an interacting variable with GED attainment, predicting college success was increased. Moore (1973) found the same increase in predictability, but that age had a negative relationship with predicting college success.

Some GED researchers have found including age when studying GED success in college makes a significant difference. Osei (2001) compared GED earners attending Virginia's four-year colleges and universities. Among her observations was the statistical finding that older GED undergraduates were more likely to achieve higher GPAs and accumulate more credit hours than younger GED undergraduates. At a four-year university in Tennessee students 24 years or older were more likely to graduate and less likely to be placed on probation according to a study by Fugate (1972). Ebert (2002) evaluated graduation rates by age within each of the high school and GED earner groups. Inside the GED group, graduation rates were similar for younger (13 percent) and older students (15.4 percent). Conversely, she found students in the younger high school diploma group were much more likely to graduate (54 percent) than the older students within the high school diploma group (14.5 percent).

There are also researchers that have not found age, when added to GED attainment, to reflect college success. Shepard (1992) did not find any significant difference in college performance for students over the age of 21, regardless of GED or high school graduates, at twelve community colleges in North Carolina. Baird (1960), Henry (1999), Turner (1990), Wolf (1983), and Ziegler (1992) all found no significant differences, regardless of GED or high school diploma, in student academic achievement

based on age. These findings are supported somewhat by data from the American College

Testing Program (ACT). Levitz (1982) cross-referenced ACT scores of 107,059 freshmen

at 223 institutions with age. She found age alone explained only four percent of the

variance in ACT composite scores. Furthermore, Levitz found first year GPA predictions

based on ACT composite scores were accurate, regardless of age, although most accurate

for students aged 17-19.

Based on andragogy theory, results of studies on nontraditional-aged students, the

large increase of older students into higher education, and the older mean age of GED

college students, it would clearly appear student age should play an interacting role

within GED research results. At least six GED studies have reflected such an

intermingled relationship. However, at least seven studies have not found a significant

relationship between college success, age, and GED attainment. Unfortunately, it appears

age alone does not help clear the dispersed results of GED research.

GED and Gender

Apart from the fact gender is usually a convenient variable to study since it is

often, or easily, captured, it is also reasonable to believe that brain processing is different

between the genders. Numerous studies have reported gender differences in the patterns

of hemispheric specializations (e.g., Bryden, 1980; Elias, 1979; Geheb, Brannon &

Whitfield, 1994; McGlone & Davidson, 1973; Witelson & Swallow, 1987). Kimura

(1992) suggested the different patterns of cognitive ability between men and women are

probably a reflection of the hormonal influences during brain development. While this

argument has been debated ferociously in the literature, there is little doubt that inherent brain differences exist between genders. In addition to the many scientific studies revealing brain processing differences, there are brain-originating anomalies that have strong correlations to gender. For example, males suffer from schizophrenia 2.7 times more often than females and are prone to a more severe form of this disorder (Castle & Murray, 1991); females outnumber males approximately three to one with suffering from anorexia nervosa, stuttering, autism, and bulimia; males outnumber females three to one with dyslexia and sleep apnea; males are nine times more likely to suffer from Tourette's syndrome; and, males are eight times more likely to be color blind than females (Swaab & Hoffman, 1995).

Physically speaking, at least two structures of the brain have been found to be significantly different between genders. The corpus callosum has appreciably more connections between the left and right sides of the brain for females than males (Springer & Deutsch, 1989) and the hypothalamus is two to three times larger in males (Swaab & Hofman, 1995). Based on the functions these structures perform or control, these physical differences support theories that espouse female thinking as "whole brained" and male thinking as "departmentalized." Regardless of what the differences are, the point is that basic brain processing differences appear to exist between genders that could cause differentiation in performance in situations such as the one being studied.

Numerous GED studies included gender as a possible interacting predictor variable. Several of these studies found females outperformed males on grade point average or persistence. For such studies, gender would be a valid predictor of college success. White (1996) studied GED earners attending a two-year college in Mississippi

and did not find age or marital status factors in predicting college success, but did find

gender to have predictive ability. Females were twice as likely to maintain continuous

enrollment. Therefore, in White's study, females significantly outperformed males on

persistence. All of the subjects were over 25 years old. Fugate (1972) studied 490 GED

earners attending two-year colleges in Tennessee and reported age and gender were valid

predictors of both grade point average and persistence. Both Griffin (1980) and Ziegler

(1992) studied students from multiple community college and found gender added

significance to the predictability of college success when combined with the GED

variable. Osei (2001) and Nicholas (1976) found females outperformed males on grade

point average and when gender was combined with GED the two variables became valid

predictors of first-year grade point average. Females with GED diplomas outperformed

female high school graduates and males with either GED or high school diploma in a

community college study by Ricketts (1996).

In a Florida study, Fisher (1999) found male high school diploma earners

performance superior to male GED earners at a two-year college. However, she also

found female GED earners outperformed female high school diploma earners on several

key success measures. Either way, as long as a researcher understands the relationship

direction of the predicting variable a predictive model can be utilized.

Yet, like the age variable, studies disagreed on the gender variable's predictive

value. Inquiries that reported gender as not an interacting factor with GED for predicting

student success almost equaled those who did find gender to be relevant. At a four-year

college in Alaska, Owens (1989) found age a predictive factor when combined with

GED. However, he did not find gender with predictive power when added to the GED

variable. Sharon, in 1972, studied 40 colleges across the U.S. and found gender did not help predict grade point average. Quinn & Haberman(1986) studied records of nearly three thousand GED earning students attending a four-year college and found gender not to be predictive of college grade point average. Wolf (1983), Bigby (1989), and Henry (1999) suggest gender is not a significant consideration when combined with GED completion for predicting community college grade point averages. In predicting first semester grade point averages for GED completers at thirteen two-year campuses in Wisconsin, Quinn (1986) reported gender did not help explain any additional variance.

GED and Ethnicity

Ethnicity has been included in much of the GED research as a control variable. A few studies researched the effect of ethnicity colluding with GED attainment as a predictor of academic success. Predominantly, they found no significant affect by including ethnicity. However, Whelan (2002) suggested race contributed significantly to the variability in GED Test performance. Hammons (1999) found at an urban, historically black, comprehensive community college that ethnicity did add to the predictability of cumulative grade point averages. In a study that paired GED and high school diploma earners by ethnicity, Fisher (1999) described black GED's as having higher first-semester grade point averages and graduating at higher rates than black high school diploma earners. She also noted black high school diploma earners were placed on probation in higher proportion to black GED earners. Fisher also pointed out that the results were most likely affected by the fact 50 percent of the black subjects were born in Jamaica.

In a south Texas study, Bean (1999) studied a mostly Hispanic two-year college population and found no difference in predictability of grade point average based on GED or ethnicity. Another south Texas study with a large Hispanic subject base looked at college success based on persistence (Sosa, 2000). The study found half of the Hispanic students dropped out during the two-year study. However, Hispanic GED earners persisted at a higher rate than did Hispanic high school diploma earners. No comparisons were given to other ethnicities.

GED and Placement Test Scores

Numerous non-GED studies have investigated and found placement test scores are typically useful in predicting success in college. From their research, Goldman & Slaughter (1976) and Spencer (1996) claim SAT entrance exams are good predictors of college success. Krol (1993) and Hughes & Nelson (1991) concluded from their studies the ASSET placement exam is a good predictor of community college grade point average. Nielson (1986) also found the ASSET exam to be a good predictor of persistence at a two-year college. A study of two-year college students in California, however, found placement tests were not good predictors of community college grade point average (Phillips, 1996). A study of 1344 GED earners attending two-year college in Texas found the ACT and GED exam scores correlated (Smith & Goetz, 1988). Furthermore, the study found the GED scores correlated with two-year college grade point average eight percent better than the ACT scores.

Various GED studies looked specifically at college placement test scores as the determinant of GED (versus traditional high school) success. Stoker (1985) matched scores on the GED battery of tests to Florida State Student Assessment Test Part II (SSATII) scores and found the scores could not be predicted from each other. Using GED tests, Stoker also compared a representative random sample of 700 high school diploma earners to the GED national norm group. The high school diploma earners did score significantly higher on the math and science portion of the GED tests, but otherwise differences were slight. Using Univariate Analysis to control for age, gender, and ethnicity, Aspinwall (1999) did not find a significant difference between GED and high school diploma earners on the ASSET entrance exam. He did find a significant difference between GED and high school diploma earners on the reading portion of the ASSET exam. Spillar (1982) analyzed scores on The Test of Standard Written English (TSWE), an entrance exam utilized by the College of the Mainland (Texas). He found no statistically significant differences in placement scores between GED and high school diploma earners. In a study of 40 GED and 40 high school diploma earners at a two-year college in Ohio, Schillo (1990) reported GED students had lower English, reading, and mathematics placement scores. Rogers (1987) stated high school diploma earners scored significantly higher than GED earners on the ACT entrance exam in his study at a four-year university. A study by Willis (1995) at a two-year public technical college found GED earners scored significantly higher than high school diploma earners on the TAPP reading and comprehension exams, while the reverse was true for the TAPP math exam.

A few GED studies expanded the view to investigate placement test scores as a potential predictor of college persistence for GED recipients. For the most part, high

placement test scores were found to be positively associated with college persistence for GED recipients. Nielsen (1986) compared ASSET scores at a two-year college in Iowa. He stated a significant difference existed between mean ASSET test scores of persisters and dropouts, with persisters recording the highest scores. No breakout of GED was mentioned. Scales (1990) looked for significant differences between GED and high school diploma earner scores on ACT/ASSET placement tests, but reported no significant difference. Sosa (2000) found traditional high school diploma earners performed significantly better on the Texas Academic Skills Program (TASP) test than GED -earners.

A non-GED study with a high potential relevance to the current study found students who majored in Vocational Education and students who are 20 years or older have non-significant correlations between ACT test scores and college grade point average (Gee, 1988). The study also found no correlation between the ASSET placement test scores and college grade point averages for the same groups.

GED and Course of Study

Although most GED reports do not emphasize course-of-study as an analyzed variable, those studies that explore only one type, or cluster, of courses are inherently reviewing by course of study. A study of a secretarial diploma program found no significant difference in program success between GED and high school diploma earners (Willis, 1995). Aspinwall (1999) found no significant differences in grade point average or program completion rates between GED and high school diploma earners. Banner

(1989) found GED earners performed significantly better than high school diploma earners in Business Technology, Engineering Technology, and Vocational-Industrial Education programs, but worse in Medical and General Education programs. According to Shepard (1992) GED students tend to perform better in technical and trade programs than in traditional academic programs.

GED and Funding Source

Although student education funding (e.g.: Title IV, agency, private, etc.) is a critical topic for adults with children and a hot button for state and national governments, research on persistence and success by funding source was not found within the GED literature. Outside the GED literature a number of studies have suggested a relationship exists between financial aid variables and college persistence (Cofer & Somers, 1995; Dillman, 2002; Lachman, 2002; Powell, 2002; St. John, 1992). In 1997, The U.S. General Accounting Office asserted that on average, the higher a school's reliance on Title IV funds, the lower its students' completion and placement rates. In addition, Sherlin (2002) found parental educational background, regardless of ethnicity, combined with financial aid received variable correlated significantly with persistence in college. Sherlin's study did not analyze GED earners separately. Using a model developed by St. John (1992), Lachman (2002) found during the first year of enrollment, receipt of grants positively influenced persistence and receipt of loans negatively influenced persistence. However, during the second year, receipt of grants negatively influenced persistence and receipt of loans positively influenced persistence. Less than fifteen percent of the students in

Lachman's study borrowed from federal student loan programs. A study by Hammons (1999) of a historically Black, urban community college found no significant difference in cumulative grade point average between students who received and those who did not receive financial aid.

Summary

Although the history of the GED test spans nearly seventy years, mixed results continue for GED versus high school diploma earner's success in higher education. Never has the debate been more prevalent and essential to American society. The history of proprietary colleges is yet longer than the GED test. A vital component of American education in the 1800s, proprietary colleges and schools have again grown important and some predict are the next big revolution in American higher education. The growing importance of GED testing and two-year proprietary colleges make it imperative for further GED research into proprietary colleges.

The GED research is vast; therefore, this chapter outlined, discussed, and categorized the GED studies by school type, time frame, and geographic location. Although accommodating, the organization of the GED research still did not provide clear answers to the GED debate, especially not for two-year proprietary colleges. Therefore, the following chapter will provide the design and methodology to be explored in this study.

CHAPTER III

DESIGN AND METHODOLOGY

The importance of determining the true equivalency of the General Education

Development Test (GED) has motivated a continuous flurry of research for several

decades. And, though research indicates a GED earner is more likely to select a private,

two-year, for-profit college/school than a traditional high school diploma earner, little

research reveals itself for GED success at a private, two-year, for-profit college.

Therefore, the purpose of this study is to determine if academic performance, persistence,

and postgraduate achievement differs between GED graduates and traditional high school

graduates who enrolled at a two-year proprietary college in Tulsa, Oklahoma from

December 1997 to November 2002. The anticipation of this research is to gain insight

regarding collegiate success of GED earners in a proprietary college environment by

using traditional high school diploma earners as a benchmark. This study is intended to

become a valuable comparative tool available to academic administration of public and

private postsecondary education for contrasting the myriad of GED studies.

Academic administrators, counselors, and instructors at public higher educational

institutions often voice concern about the academic ability of GED earners (Aspinwall,

1999). Their concerns seem reasonable since the literature review has indicated most

GED earners possess risk factors that usually encumber academic performance and spawn attrition from traditional higher education. Should two-year private college administrators, counselors, and instructors be as concerned about the academic ability of GED graduates as public institutions? With such a strong emphasis placed on retention by accrediting bodies and proprietary colleges' reliance on tuition dollars (proprietary colleges do not get public tax money, like public colleges do) they absolutely should be concerned.

Academic Performance

In determining the relative success of GED earners the collection, comparisons, and analysis of performance, persistence, and postgraduate achievement data is needed. Most prior research intuitively used grade point average to represent performance. In addition, several prior studies utilized placement test score as an indicator of performance. For this study, accumulative grade point averages for students completing the school's graduation requirements are available for those graduating after 2000 and calculable for graduates prior to 2000. Placement exam tests at Vatterott College are given to all students prior to being admitted and scores are readily attainable for this investigation. Therefore, based on precedence and convenience, this study will utilize accumulative grade point averages for completers and placement exam scores for all students enrolled as indicators of performance in determining if a significant difference exist in academic performance between GED recipients and high school graduates attending a two-year proprietary

college. The most recent version of the Vatterott College placement exam is included in Appendix D.

Persistence

Historically, GED research has looked at attrition and graduation rates to define persistence. As previously noted, proprietary colleges often have nontraditional schedules and start dates. It is commonplace for proprietary colleges to go year round, without winter, spring, summer, or fall breaks. For most two-year proprietary colleges an academic year does not follow the traditional public college calendar year time frame. For all students at the college in this study the standard graduation term equaled 1080 contact hours, or approximately 15 months of fulltime schooling. All students at this college attended fulltime. This study will compare attrition for the entire graduation term and graduation rates to determine if there was a significant difference in persistence for the standard allotted time between GED recipients and high school graduates attending a two-year, proprietary college.

Theoretically, graduation and attrition rates are diametrically opposite of each other. There are students that graduate and those that drop out. Therefore, as mirror images, the analysis of both would reflect the same findings. However, it is possible for students at the college under investigation to complete and not graduate. Students who took all required courses but did not score a grade of 70 percent or higher in all classes and/or had a less than 80 percent accumulative attendance did not graduate. Although the expected

number of such students is few, they would cause graduation and attrition rates to not be mirror images and therefore justifies analyzing attrition and graduation rates separately.

Allowing for students who legitimately do not finish a program within a school's predetermined time frame, The Department of Education has set a precedent of analyzing rates of graduation for both the normally allotted timeframe (referred to as "standard allotted time" above) and a timeframe of one and a half times the normally allotted time. Therefore, this study will also compare graduation rates at the end of the extended allotted time frame to determine if there was a significant difference in persistence for graduating during the extended allotted time between GED recipients and high school graduates attending a two-year proprietary college.

Postgraduate Achievement

Graduation is an important achievement in itself. However, for the vast majority of students attending college, an anticipated benefit of further education is the potential for improved employment and/or to pursue an even higher degree. Therefore, for the purpose of this study, achievement is defined as post-graduation and measured by employment in a student's field of study or continuation of their education. This study will attempt to determine if there is a significant difference in the rates of GED recipients and traditional high school diploma earners that graduate from a two-year proprietary college and then continue their education or become employed in their field of study.

Proprietary college administrators and counselors would have an advantage if a model could be created to predict the probability of success for an entering GED or high school graduate. For this study an obvious potential predictor variable will be GED versus high school diploma earner. In addition, potential intervening variables available to the study include: age, gender, ethnicity, course of study, placement test score, and funding source. Chapter II described the varied results previously found within the GED literature for age and gender in studies involving public two-year and four-year colleges. Also disclosed in Chapter II was the deficiency of studies within GED studies at any level of college for ethnicity, course of study, and funding source. This study will attempt to determine the amount of predictability GED attainment, age, gender, ethnicity, course of study, placement test scores, funding source, and combinations there of, add to a model attempting to predict accumulative grade point averages, graduation rates, attrition rates and job placement/further education rates for students attending a two-year proprietary college. A description of the statistical method to be utilized in creating this predictive model will now be described in more detail.

Research Design and Null Hypotheses

This is an ex post facto study, as defined by Kerlinger (1973). The researcher does not have direct control of the independent variables since existing data were used. Interactions and manifestations between variables have occurred; therefore suppositions

concerning relations between variables are inferred without direct intervention and reflect a noninvasive research study. Consequently, it is important to note this study does not attempt to show causation, but seeks to establish the relationship that exists between selected variables.

This study will attempt to determine if relationships existed between variables by using correlational study methodology. As an ex post facto study, use of archival data excepted this study from the IRB process, as defined by the Institutional Review Board.

A matrix analysis of independent and dependent variables for this study indicated a nested affect, with one overarching independent variable: GED/high school diploma. All variables were evaluated using accepted statistical procedures and professional statistical software. Initial procedures identified usable data and provided descriptive statistics. Statistical analyses were performed through Manova (Multivariate Analysis of Variance) to determine if significant differences existed between GED and high school diploma earners (Glass & Hopkins, 1984). As statistical significance was found, the Manova results provided univariate statistics to analyze each of the null hypotheses listed below. These hypotheses are critical components underlying the primary question of this study and were investigated to help analyze possible answers and debates to the primary research question: Do GED and high school diploma earners attending a two-year proprietary college have equal success with persistence, academic performance, and postgraduate success?

Because there were multiple dependent variables, a multivariate analysis of variance (Manova) was performed to test whether the GED and high school diploma means differed on the grouping of dependent variables due to chance or systematic

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differences. The Manova procedure calculated and tested the ratio of the between-group and within-group's variances. The statistical assumption of a Manova test is that if between-group variance is significantly larger than within-group variances, then there is a significant difference between means. For this study the mean values analyzed were for GED and high school recipients on the following dependent variables: accumulative grade point average, placement exam scores, graduation rates (standard and extended timeframes), attrition rates, continuing education, and field related employment.

The discriminant analysis method was utilized to examine the degree of association between all independent, including the nested independent variables, and dependent variables related to the rejected null hypothesis. The discriminant model complemented the Manova tests results. This method is considered one of the most versatile and complex multivariate procedures available (Borg & Gall, 1983; Huberty, 1994; Klecka, 1980; Pedhazur, 1997). A less complicated series of analysis of variance tests or t-tests were used to determine if the independent variables were significantly different. In fact, almost all previous GED studies utilized t-tests. However, inherent with ANOVA and t-tests are the potential accumulation of Type I error in a multiple variable study, a lack of interdependent testing, absence of legitimate variable weights, and a general bulkiness of running multiple tests. These limitations of running multiple ANOVA and t-tests provide rationale for choosing discriminant analysis to expand the initial Manova analysis for this specific study.

Discriminant analysis addresses inter-correlation of variables by partitioning (referred to as partialing in statistical literature) the correlations between independent variables. As discriminant analysis calculates differences between groups with one

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independent variable, the results are moderated by any correlation(s) of the other variables with the first variable. Therefore, results reflect only the unduplicated variance between groups. With multiple independent variables nested within the GED/high school diploma variable it is critical to control for their interdependence.

A model produced by discriminant analysis can have predictive value by predicting group membership (in this study the groups would be GED versus high school diploma and successful versus non-successful) when using pre-selected variables in subsequent samples drawn from the same or similar population. Thereby, the originating model can be used to eliminate or keep potentially predictive variables. Further still, discriminant analysis provides discriminant weights, from which the researcher can determine the relative contribution of each independent variable in differentiating between-group membership. Even then, however, given the restrictions of ex post facto research, the methodology to be utilized in this study will only attempt to add descriptive value to the investigation and will not proclaim pure predictive ability.

There are two types of discriminant analyses: predictive and descriptive (Pedhazur, 1997). This study used descriptive discriminant analysis in aiding the reader to understand the relationship(s) between GED and high school diploma earner achievement. Discriminant analysis is a good method to determine the relative contribution of each independent variable in differentiating between two groups (Tabachnick & Fidell, 2001).

One research question governs this research analysis: Did GED and high school diploma earners attending a specific two-year proprietary college have equal success with persistence, academic performance, and postgraduate success? If this study finds the two

groups are not equally successful, further analysis explores the ways they differ in their success (or lack of) and what other variables captured might mitigate or accentuate the differences. To aid in resolving the current ambiguities addressed in this study, computerized statistical analysis, using SPSS (Statistical Package for the Social Sciences) Software (SPSS, 2003), will be performed on data for each of the critical areas mentioned. The GLM: MANOVA procedure was employed to derive simple statistics and statistical values in determining group differences and relationships. The following null hypotheses are components underlying the primary question of this study and were investigated to help analyze answers to the primary question.

HO_1: There is no significant difference in accumulative grade point averages between GED and high school diploma earners graduating from a two-year proprietary college.

HO_2: There is no significant difference in placement exam scores between GED recipients and high school graduates attending a two-year proprietary college.

HO_3: There is no significant difference in graduation rates during the standard allotted time (60 weeks) between GED recipients and high school graduates attending a two-year proprietary college.

HO_4: There is no significant difference in attrition rates between GED recipients and high school graduates attending a two-year proprietary college.

HO_5: There is no significant difference in graduating during the extended allotted time (90 weeks) between GED recipients and high school graduates attending a two-year proprietary college.

HO6: There is no significant difference in the rates of GED recipients and traditional high school graduates that graduate from a two-year proprietary college and then continue their education or become employed in the field of study.

HO7: There is no significant difference in accumulative grade point averages, placement exam scores, graduation rates, or attrition rates between GED recipients and high school graduates attending a two-year proprietary college when age, gender, ethnicity, course of study, and/or funding source are/is included as a predictor(s).

Most GED studies have used the statistical t-test to determine if there is a difference between group means, as in GED and high school diploma earner means. The current study used discriminant analysis to more thoroughly determine differences between means and augment with canonical discriminant analysis to identify relationships between means.

Since the subjects in this research project represent an exhaustive sample procedure in which all necessary and relevant data included within a time-sensitive database was utilized for the college being studied, results reflect the true values for the population.

Procedure

Historical data were utilized in order to study only students who had significant time to graduate. The proprietary college under study began operations December 1997. At the time of data collection, the most recent graduation was January 2004. Students who enrolled in November 2002 and completed without interruptions graduated January

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2004. Therefore, for elements of the study analyzing standard allotted graduation time, students that enrolled from December 1997 to November 2002 will be included. In addition, The U.S. Department of Education (DOE) guideline for extended graduation is one and one-half of the given degree timeframe. For this study, 90 weeks after a student initially enrolled is equivalent to the DOE guideline (sixty weeks times one and one-half). Therefore, only students who enrolled from December 1997 to ninety weeks prior to the January 2004 graduation date (April 2002) were included in the extended graduation time component of the study. All students at the college attended fulltime.

The bulk of the data was obtained from the campus Registrar. To maintain confidentiality, data did not include an identifier, such as name or social security number. Only the following variables were extracted from the college's database: education source (GED or High school diploma), placement test score, gender, ethnicity, start date, graduation date, completion date (only for those who completed the courses but did not graduate), date of birth (to be used in calculating age category), program of study, final (accumulative) grade point average, and payment source (i.e., Title IV, V. A., V. R., etc.). In addition, grade point average was calculated manually from final course grades for students prior to 2001. Without a name, social security number, or other identifier to allow the variables for each student record to be mutually inclusive throughout the analysis, the student records were numbered sequentially. Confidentiality was further protected becase data analysis was conducted on the group level, never on the individual level.

Variables were collected for all students that enrolled from Winter 1997 to November 2002. The campus Registrar used Dbase IV reporting structures to extract

these variables. Data for post graduate employment and furthering education was obtained from the campus Placement Coordinator, also using Dbase IV reporting. Data were then imported to a Microsoft Excel spreadsheet and then to a SPSS Statistical 12.0 Data Editor. Multiple sorts were performed within the Excel worksheet and SPSS Data Editor to scrutinize data values and determine demographic measures. Contaminated data for all variables were eliminated or repaired where possible. Other than the possibility of subjects without a GED or high school attainment recorded in the database, the data did not contain major problematic contamination. Examples of the data cleaning include: standardizing the multiple codes (GED, GDP, etc.) used for GED attainment; standardizing the formatting for dates; and, removing the percent sign in the placement test scores to create an exclusively numeric field. The following identifies and discusses each of the study's variables, including more detailed information of the data cleaning.

Subjects

This study examined records of all students who enrolled at Vatterott College, Tulsa Campus, from Winter 1997-1998 to November 2002. Although the Vatterott College Tulsa campus could not represent all of the myriad of two-year, proprietary colleges, it was significant for this study since it was an accredited institution located within the nucleus of a GED significant environment (Oklahoma/Arkansas). Furthermore, the college's administration was willing to allow systematic research in the name of public awareness. Demographically, subjects were expected to be primarily male since at least half of the programs are traditionally male-dominated trade fields. Ethnicity should

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roughly match the surrounding geographical area. It was suspected the average age to be slightly higher than traditional public two-year colleges since two-year proprietary colleges tend to attract after-market students. These students have usually been out of education for an extended time and are returning to change or obtain a new career.

Variables

Dependent

The following dependent variables: accumulative grade point average, placement exam scores, standard (time) graduation rates, extended (time) graduation rates, attrition rates, continuing education, and field-related employment, were used to determine if differences exist between the means of GED and high school diploma earners' achievement.

Independent

GED versus high school diploma attainment: This independent variable denotes if a student earned a GED certificate or traditional high school diploma. It is a dichotomous variable.

Theoretically, it is possible a student could have both or neither. However, a GED or high school diploma is required for enrollment at this college and it is extremely unlikely a person would obtain both diplomas. Therefore, the coding allows for only

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GED or high school diploma. In the school's database this field is referred to as Education Background.

Many independent variables would be worthwhile for study with the GED versus high school diploma attainment variable. The independent variables used in this study were chosen over other equally useful variables simply because they were attainable from existing sources of information. These additional independent variables are nested within the GED/high school diploma variable. The following is a brief description of each nested independent variable used in this study.

Age bracket: Categorical variable indicating what age range a student was classified when they enrolled at Vatterott College. The category ranges were chosen based on adult development theory and attempt to keep each category relatively comparable and significant. The selected ranges follow the order of Levinson's (1986) suggested categories while maintaining approximately the same range size for each category. Range size refers to the number of years within each category. For this study, each category range is approximately a five year span to create analogous categories. The age range categories selected are as follows: less than 25 years old; 25 to 29; 30 to 34; 35 to 39; 40 to 44; 45 to 49; and 50 and above.

Gender: A dichotomous variable that is either male or female. No other gender values are recorded in the school's database.

Source of funds: a categorical variable that signifies what source of funds the student used to pay for their education. There are three sources identified in the school's database: cash and scholarship, Title IV, and agency. Partial scholarships are available to students, but seldom exceed ten percent of the total tuition. Title IV refers to Government educational loans and grants. The most common agency resources are The Veteran's Administration (VA), Vocational Rehabilitation (VR), VA/VR, Indian Councils, and Workforce (WIA). Many students utilize combinations of these resources.

Variable Cleaning and Re-coding

Because this research includes database entries from the establishment of the college, there are many inconsistencies within each variable data set. Data entry was completed by multiple employees of the school and without procedural guidelines for data values until 2001. Since then one employee has been assigned the bulk of student data entry and data value guidelines have been implemented. This resulted in diverse data entries within variables prior to 2002 that must be recoded for consistency to be used by this analysis. For example, students with a GED were sometimes coded "GDP" and other times "GED." Allowing for statistical analysis, some variable values were changed to numeric values or combined with other variables to create a new variable. For example, the gender variable was changed from "M" or "F" to "1" or "2", respectively, and the time from enrolling to graduating was calculated by subtracting "start date" from "graduation date" to create a new variable: "graduation." Listed below are the variables and what was cleaned and/or recoded using Microsoft Excel and SPSS Statistical 12.0

Data Editor. Data sets with missing GED and HS data were deleted from the study. Missing values for all other variables were excluded only for the analysis utilizing that variable.

<u>Independent Variables</u>

GED or HS: In the school's database the variable education-background represents a student's GED or HS diploma status. Multiple values representing either value are in the education-background variable field. For instance, HS, HSP, HSG, and other values represent a high school diploma earned student. All legitimate values were converted to either a 1 (GED diploma earner) or 2 (high school diploma earner).

Course: The variable course had been entered into the school's database for each student as CP (Computer Programming), CT (Computer Technology), EM (Electrical Mechanic), and HVAC or HVA (Heating, Ventilation, and Air Conditioning). The variable was recoded to 4 (CP), 3 (CT), 2 (EM), and 1 (HVAC and HVA).

Age: An initial value for age was calculated by subtracting student's "birth-date" from "start-date," both values held within the school's database. A new variable, age-category, was then calculated by comparing the newly calculated value to the study's predefined age categories. The categorical values of 1 through 7 (less than 25 years old (1); 25 to 29 (2); 30 to 34 (3); 35 to 39 (4); 40 to 44 (5); 45 to 49 (6); 50 and above (7))

were then given to individual subjects depending on which predefined age category the subject belongs.

Source of Funds: A variety of values had been entered for the same source of funds. For example, a student using agency and Title IV money might have been coded agency/Title 4, agncy/title 4, or Title 4/agency. All source of fund values were coded into one of five numeric codes (1 through 5) representing: cash/scholarships only (1), cash and Title IV (2), Title IV only (3), Title IV and agency (4), or agency only (5) monies.

Ethnic Origin: One of the cleanest raw data sources in the school's database, ethnic origin was changed from a string variable of A (Asian), B (Black), H (Hispanic), I (Indian), and W (White), to a numeric variable of 1 through 5, respectively, representing each type of ethnic origin.

Gender: In the school's database males are coded M and females F. For this study, males were coded a 1 and females a 2.

Dependent Variables

Graduated: The graduation-date field from the school's database was used to determine if a student graduated. Subtracting "start date" from "graduation date" provides the number of days from start to graduation and determines if a student graduated in the normal or extended allotted time. Students that did not graduate were coded 0. Students

graduating in the normal allotted time will be coded a 1 and in the extended allotted time a 2. Students graduating beyond the extended time will be coded a 3.

GPA: Grade point averages were added manually to the data set. The school's database does not contain all previous student final grade point averages. However, the Registrar maintains a hard copy of the student's final transcript within each student's file. These transcripts for earlier students were used to add grade point averages to the data sets. GPA was retained as a numeric field for the analysis.

Placement Test Score: This is a discrete variable, having a value between 0 and 100 for each student. The placement test was created by Vatterott College corporate staff and primarily includes reading comprehension and math. The test is intended to give the potential student and the admissions staff a benchmark for where the potential student measures regarding critical skills required in the programs offered. Although students are not denied school entry based solely on their placement score, recommendations are made to low scoring students to seek tutoring or remedial coursework prior to starting their program. All students in this study with a placement test score completed the test prior to starting classes at the college. The placement test changed modestly during the time frame of this study. The current placement test is attached to this study in Appendix D.

Many values for this field were fractions representing the number of right answers as the numerator and total questions as the denominator. Other entries included whole

numbers with the percent sign and whole numbers without percent signs. For this study all percent signs were deleted and fractions calculated to whole numbers.

Attrition rates: A separate field for attrition was computed from graduation and completion date fields. Subjects without an entry in either date field were coded a "0" in the newly created "attrition" field.

Continuing Education and Field Related Employment: Students continuing their education were coded a 2, and those obtaining field-related employment were coded a 1. All other students were coded a 0. Continued education is a student furthering their education after graduation from Vatterott College. The continued education can be at Vatterott College or another college. Field-related employment is considered employment in a field closely related to their course of study.

Method of Analysis

Prior to running statistical analysis, manipulations of the data using Microsoft Excel Sort commands and SPSS Statistical 12.0 Data Editor provided data counts and demographic analysis. The SPSS procedure Descriptive Statistics was utilized to identify any extreme outlying data on any of the variables, frequencies, and cross tabulations. Extreme outliers were examined to determine whether or not to include in the remainder of the study. Because there is one independent variable, GED versus high school diploma (the remainder of the independent variables are nested within GED/HS), and

multiple dependent variables (placement test score, grade point average, graduated/not graduated, and job placement/further education), the GLM: Manova procedure in SPSS was utilized to provide a significance ratio (F statistic) to help determine if a significant difference ($p < .05$) exists between the GED and high school diploma means on the dependent variables. Manova (Multivariate Analysis of Variance) is recommended to find main and interaction effects of an independent categorical variable on multiple categorical dependent variables (Bray & Maxwell, 1985; Garson, 2004; Leeper, 2004) and is considered by some statisticians as the most versatile procedure in SPSS (Pedhazur, 1997).

The SPSS Discriminant procedure was then employed to further determine how much and in what way the captured variables distinguish between subpopulations. The basic idea underlying discriminant function analysis is to determine whether groups differ with regard to the mean of a categorical variable, and then to use that variable to predict group membership. Computationally, discriminant function analysis is very similar to multivariate analysis of variance. Because of the common features, some researchers treat the two procedures as interchangeable for studying group differences on multiple variables. However, many statisticians suggest discriminant analysis be used subsequent to MANOVA to further identify the dimensions along which a group differs (Huberty, 1994; Pedhazur, 1997).

Discriminant analysis calculates discriminant functions to classify variable observations into pre-selected groups on the basis of one or more variables. The discriminant function is computed using the generalized squared distance between group mean and observation. Depending on the variables being analyzed, the discriminant

function is computed based on homogeneity of within-group or pooled group covariance matrixes, while separating prior inter-correlations of the groups. Another way of describing this procedure is that each observation is placed into the group whose mean is the closest (smallest generalized squared distance) to the observation. For this study, discriminant analysis was used to

- investigate independent (sometimes referred to as predictor or discriminating) variable mean differences between groups formed by the dependent (sometimes referred to as grouping or criterion) variables.

- determine the percent of variance in each dependent variable explained by the independent variables.

- determine the percent of variance in each dependent variable explained by the independents over and above the variance accounted for by controlled variables.

- assess the relative importance of each independent variable in classifying each dependent variable.

This study's observational values were for the following dependent variables: accumulative grade point average, placement exam scores, graduation rates (standard time), graduation rates (extended time), attrition rates, continuing education, and field-related employment. Values for independent categorical variables in this study include: age category, education (GED vs high school diploma), funding source, ethnic origin, and gender.

Discriminant analysis has three steps. First, an F test (Wilks' lambda) is computed as the ratio of the between-groups variance in the data over the pooled (average) within-

group variance and used to test if the discriminant model as a whole is significant. Second, if the F test shows significance, then the individual independent variables are assessed to see which differ significantly in mean by group and these are used to classify the dependent variable. Third, utilizing the results of step two, a model to best predict which group a data set belongs, discriminant analysis calculates standardized canonical coefficients. These discriminant canonical coefficients provide discriminant weights for each variable in the model.

Towards building a robust, descriptive model, this study utilized the Discriminant stepwise function, in which a discrimination model is built step-by-step. More specifically, during each step of the procedure all variables are reviewed and evaluated to determine which one will contribute most to the discrimination between groups. That variable will then be included in the model, and then the process starts again. Both forward and backward stepwise routines were implemented to verify each method's results. In a backward stepwise analysis all variables are included in the model and the variable that contributes least to the prediction of group membership is eliminated. Thus, only keeping the significant variables in the model, that is, those variables that contribute the most to the discrimination between groups. Whether to enter or remove a variable during a stepwise procedure is directed by each variable's F value. The F value for a variable indicates its statistical significance in the discrimination between groups. In other words, it is a measure of a variable's unique contribution to the prediction of a group membership.

Summary

Seven hypotheses were established in this chapter to provide information for the comprehensive research question of this study. Manova was chosen as the preliminary statistical research tool to be used by this study, because of the number of dependent variables and Manova's essential statistical reporting. Discriminant analysis was chosen as the consequential statistical program for its ability to provide a descriptive model. The following chapter provides demographic and statistical findings based on the statistical analysis.

CHAPTER IV

RESULTS

The GED battery of tests, created in the early forties, has endured a great deal of

change in who, how many, and why people partook in the tests throughout its history.

The importance of the GED has also evolved. It has grown in importance and its impact

to the U.S.'s economic and social climate continues to escalate. Nowhere is this more

magnified than in higher education, where entrance doors are typically opened only to

those with GED or high school diplomas. Despite similarities, fundamental differences

exist between typical public and private colleges, especially at the two-year level. GED

research at private two-year colleges has been deficient, at best. This research project

studies a portion of the relationship impact between GED diploma earners and two-year

proprietary colleges. Seven hypotheses were tested in an attempt to determine if GED and

high school diploma earners attending a two-year proprietary college have equal success

with persistence, academic performance, and postgraduate success. In areas the two

groups were not equally successful, further analysis explored the ways they differed in

their success and what other variables captured in the analysis might mitigate or

accentuate those differences. Both Microsoft Excel and SPSS 12.0 were employed to

derive basic statistics and higher-order statistical values for analysis. This chapter

presents the results and findings of this statistical data and analysis.

Presentation of Findings

The analysis of this study includes the 796 students who qualify by being enrolled

at the specified two-year proprietary college between Winter 1997-1998 and November

2002. Of the 815 original qualifying data sets, 19 did not include GED or high school

attainment records, the focus of this study, and were not included in this analysis.

Between two and three percent of the student records were either duplicates or missing

the critical element of GED / high school diploma attainment. As Table 2 indicates, over

97 percent of the remaining eligible students (n=796) were utilized in this research study.

Therefore, no statistical sampling tests are necessary, as this study is utilizing an

exhaustive sample procedure in which all necessary and relevant data is included within a

time-sensitive database. Due to missing or erroneous data within each variable, a number

of subjects are excluded from some, but not all, components of the study.

Table 3 offers the number and percentage of students to be used in the analysis of

the following dependent variables: grade point averages, placement exam scores,

graduation, attrition, extended graduation, further education, and field-related job

placement rates. The potential n is the same for all variables except accumulated grade

point average, which was gathered only for students that graduated (n=400). "N w/ valid

data" includes all subjects with valid data for that variable. In this study a data value of 0

is considered valid.

Table 2

Calculation for total number of valid subjects

Description	n	%
Total number of students provided by the school database	817	100
Number of duplicate records	2	< 1
Total number of students started Winter 1997 to Nov. 2002	815	99.8
Total number of students without GED/HS recorded in school database	19	2
Total number of valid subjects	796	97.4

Table 4 specifies how many students are included in the analysis for each of the independent variables studied. Again, valid data includes values of zero. As these tables reflect, this project is able to utilize a substantial percentage of the qualified students for each variable analyzed. However, the model that utilizes all variables has an

Table 3

Valid Data for Dependent Variables

Variable Description	Potential n	n w/ valid data	% of potential n
Standard graduation time	796	796	100
Extended graduation time	796	796	100
Placement exam score	796	712	89
Attrition rate	796	796	100
Graduates only:			
Accumulated grade point average	400	400	100
Further education or field-related job	400	400	100

accumulative effect that causes the n to decrease considerably (see Table 4a), but the n is considered substantial, with valid entries for all dependent and independent variables for 400 subjects.

Variables were evaluated using accepted statistical procedures and professional statistical software. Initial procedures identify usable data and provide descriptive statistics. Statistical analysis utilized Manova (Multivariate Analysis of Variance) to determine if significant differences exist between GED and high school diploma earners.

Table 4

Valid Data for Independent Variables

Variable Description	Potential n	n w/ valid data	% of potential n
GED/high school diploma	815	796	97.7
Age	796	794	99.8
Gender	796	796	100
Ethnicity	796	796	100
Course of Study	796	796	100
Funding Source	796	688	86

Table 4a

Manova Model with all Dependent and Independent Variables

Variable Description	Potential n	n w/ valid data	% of potential n
Model	796	400	50.3

If a statistical significance was found then the Manova results provided univariate statistics to analyze each of the null hypotheses listed. These hypotheses were critical components underlying the primary question of this study and were investigated to analyze possible answers and debates to the primary research question: Do GED and high school diploma earners attending a two-year proprietary college have equal success with persistence, academic performance, and postgraduate success?

HO$_1$: There is no significant difference in accumulative grade point averages between GED recipients and high school graduates graduating from a two-year proprietary college.

HO$_2$: There is no significant difference in placement exam scores between GED recipients and high school graduates attending a two-year proprietary college.

HO$_3$: There is no significant difference in graduation rates during the standard allotted time (60 weeks) between GED recipients and high school graduates attending a two-year proprietary college.

HO$_4$: There is no significant difference in attrition rates between GED recipients and high school graduates attending a two-year proprietary college.

HO$_5$: There is no significant difference in graduating during the extended allotted time (90 weeks) between GED recipients and high school graduates attending a two-year proprietary college.

HO$_6$: There is no significant difference in the rates of GED recipients and traditional high school graduates that graduate from a two-year proprietary college and then continue their education or become employed in the field of study.

HO7: There is no significant difference in accumulative grade point averages, placement exam scores, graduation rates, or attrition rates between GED recipients and high school graduates attending a two-year proprietary college when age, gender, ethnicity, course of study, and/or funding source are/is included as a predictor(s).

Subject Demographics

Table 5 provides selected demographic variables describing the study's population of 796 students who enrolled at Vatterott College from Winter 1997-98 to November 2002. The data in Table 5 does not include the 19 students with inconclusive GED/high school diploma data excluded from the study. Based on these figures, the Vatterott College – Tulsa student is 88 percent likely to be a white male, 70 percent likely to have a high school diploma and is 34 percent likely to be enrolled in the Heating, Ventilation, and Air Conditioning (HVAC) program. In addition, this typical student is 28 years old, would graduate in the standard allotted time frame with a 3.3 grade point average, and utilize Title IV funds to pay for most of their postsecondary education.

About every third enrollment in this study is a GED graduate. Seventy percent of the students that enrolled for this college during the specified time period had a high school diploma. For every nine male enrollments there is one female. For every one minority there are three White/Caucasians. Black/African Americans comprise 20 percent of the entire student enrollment for this study. They also compose 78.2 percent (158/202) of all minority students that enrolled during this study's timeframe. There are 13 (1.5%)

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Table 5

Demographic Description of the Study's Population

Category	Demographic	Number	% of valid population
Educational background:			
	GED	239	30
	High school diploma	557	70
	Unkn. (disqlfd from study)	19	n/a
Gender:			
	Male	703	88
	Female	93	12
Ethnicity:			
	Asian	4	.5
	Black/African American	158	20
	Hispanic	17	2
	(American) Indian	23	3
	White/Caucasian	581	74
	Unknown	13	1.5
Course of study:			
	Electrical	168	21
	Heating, vent., and a/c	272	34
	Computer Technology	180	23
	Computer Programming	176	22

students without an ethnicity recorded. Electrical, Computer Technology, and Computer Programming are represented nearly equal in enrollments for this study's time period. However, the Heating, Ventilation, and Air Conditioning program has a notably larger enrollment. One out of every three students at this two-year proprietary college is enrolling in Heating, Ventilation, and Air Conditioning.

The age range for subjects in this study is 17 to 62 years old. Initially, the research design for age analysis required partitioning subjects into seven age categories. The category ranges were chosen based on adult development theory, while at the same time keeping each category relatively comparable and significant. The selected ranges had followed the order of Levinson's (1986) suggested age categories while maintaining the same range size for each category. Range size referred to the number of years within each category. With the exception of the first and last category, each category range had a near five year span to create analogous categories. The age range categories identified were: less than 25 years old; 25 to 29; 30 to 34; 35 to 39; 40 to 44; 45 to 49; and 50 and above. However, the initial data search revealed a surplus population in the less-than-25 category, one of two categories with a more than five year span. This category had nearly double the number of subjects than the next most populated category. Antecedent to the data review, the typical age for a two-year proprietary college was expected to be sufficiently higher than for traditional college. Therefore, it was assumed, the number of students under the age of twenty would not be significant enough to skew the less-than-25 age category. However, after the data analysis, although the average age is considerably higher than traditional college, the assumption of few students under the age of 20 became clearly invalid. In a post hoc decision, correcting this inaccuracy

required the data to be rerun with the less-than-25 category divided into two categories: 20 to 24 and less-than-20. The result was eight age categories for the analysis.

Figure 3 graphs the eight age category frequencies. For Vatterott College – Tulsa the mean age category is 25 to 29 years old. The mode category is age 20 to 24. Analysis of age (not age category) reveals a mean age at Vatterott College – Tulsa of 28.4 years old and a standard deviation of 7.8 years. During the specified timeframe of this study the oldest student at their time of enrollment was 62 years old. All other students at Vatterott College - Tulsa from Winter 1997-1998 to November 2002 were between the ages of 17 and 53 (inclusive) when they enrolled. Six students were at the youngest age of 17 at time of enrollment. More subjects were 22 or 25 years old at time of enrollment, with 50 students each, than any other age.

The one age outlier (62 years old) was temporarily deleted to determine what effect the outlier would have on the overall data. The adjusted mean age became 28.3 years old with a standard deviation of 7.7 years. The original mean age was 28.4 with a standard deviation of 7.8 years. With such minor effects, the one age outlier remained in the study. It is interesting to note that the 62 year old enrollee put on their application they anticipated attending school only for the knowledge and had no intention of obtaining a job after graduation.
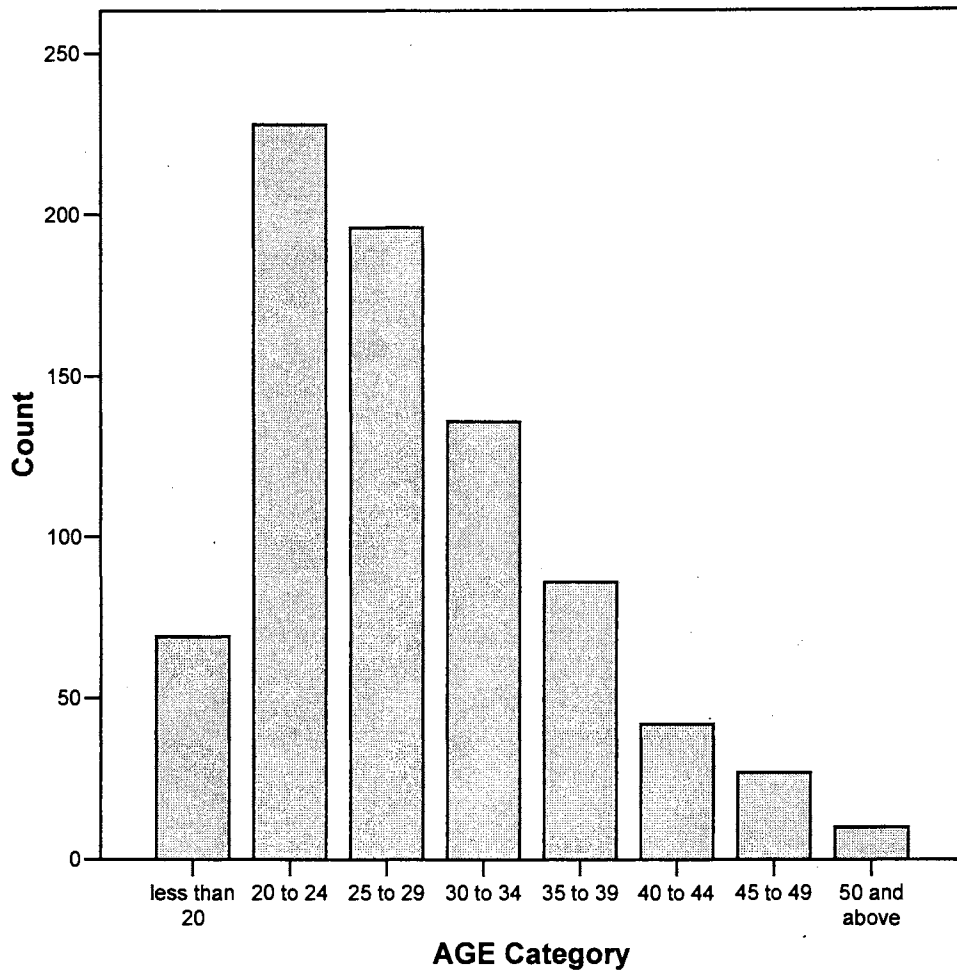
Figure 3. Age Distribution by Category

Note: Data was collected at the time students enrolled at Vatterott
College – Tulsa, from Winter 1997-98 to November 2002.

Course of study distribution is depicted in Figure 4. Electrical (EM), Computer

Programming (CP), and Computer Technology (CT) are similar in allotment with 21 to

23 percent of the student population attending each of these programs. The largest course

of study was the Heating, Air Conditioning, and Refrigeration Program (HVAC), with 34

percent of the students.

Percentage by Program of Study

CT 22%   CP 23%

CP
Electrical
HVAC
CT

Electrical 21%

HVAC 34%
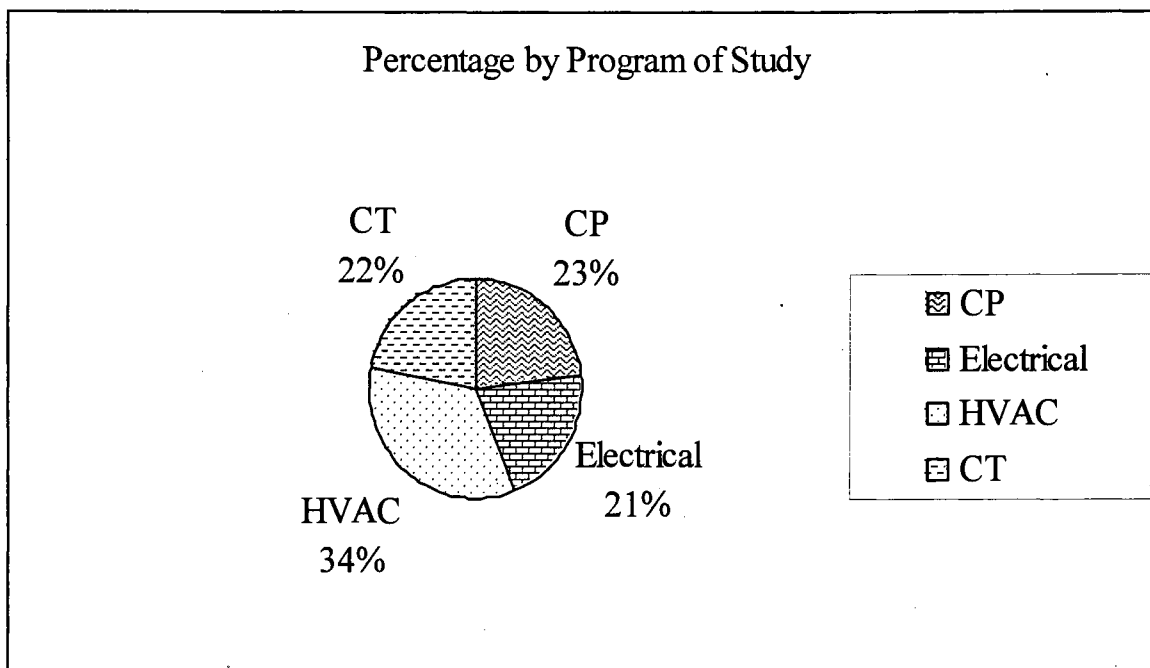
Figure 4. Enrollment Percentage by Program of Study

Note: This figure partitions the students enrolling at Vatterott College – Tulsa from
Winter 1997-98 to November 2002 by program of study.

Demographic Cross-Tabulations

This research project has a valuable secondary goal of providing a constructive tool for academic administration, counselors, and instructors of both public and private postsecondary education for comparing and contrasting their own student base and other GED studies. Consequently, a complete analysis of subject demographics is expanded to variable cross analysis.

Education Background

Table 6 reflects the ratios of GED versus high school diploma earners within selected variables. Overall percentages at the college are thirty percent GED and seventy percent high school diploma earners.

Within each program of study the ratio is very similar to the overall ratio. The smallest percentage of GED enrollees in a program is Computer Technology at 27.2 percent and the highest is HVAC at 32 percent. High school diploma earners have a tight range, from 68 percent (HVAC) to 72.8 (Computer Technology). A two-sided Chi-Squared test was performed between programs based on education background. A Pearson Chi-Square of 1.575 and statistical significance value of .665 indicate there is no significant difference between enrollment ratios of GED and high school diploma earners between programs.

Table 6

Educational Background Cross-Tabulations

| | Variable | Educational Background Percentage | |
		GED	H. S. Diploma
Overall		30.0	70.0
Program of Study:	HVAC	32.0	68.0
	EM	31.5	68.5
	CT	27.2	72.8
	CP	28.4	71.6
Ethnic Origin:	Asian	0.0	100.0
	Black/African American	22.8	77.2
	Hispanic	35.3	64.7
	(American) Indian	26.1	73.9
	White/Caucasian	31.8	68.2
Age:	Less than 20	18.8	81.2
	20 to 24	32.5	67.5
	25 to 29	31.1	68.9
	30 to 34	30.9	69.1
	35 to 39	27.9	72.1
	40 to 44	35.7	64.3
	45 to 49	14.8	85.2
	50 and above	50.0	50.0
Gender:	Male	30.3	69.7
	Female	28.0	72.0

Within ethnic origin, all Asians have high school diplomas, although it is worth noting that only four Asians were in this study. Of the Black/African, 77.2 percent have high school diplomas compared to the overall percentage of 70 percent. Similar to Asians, there were few Hispanic students in this study, but converse to the Asian students, a higher percentage of Hispanic students (35.3 percent) at the college have GED diplomas than the study's overall ratio. For this study, the ethnicity with the largest proportion of GED earners is Hispanic.

Over eighty-one percent of the students that enrolled at an age less than 20 have a high school diploma. Furthermore, over eighty percent (85.2) of the students in the age category of 45 to 49 have a high school diploma. The highest percentage of GED diploma earners are in age brackets 50-and-above (50 percent) and 40 to 44 (35.7 percent). There are only ten students in the age 50 and above category.

Gender

The overall percentage of males to females in this study is 88.3 percent to 11.7 percent, respectively. Table 7 provides the cross-tabulations for gender. Within program of study, percentages were similar to the study's overall gender percentage for the Computer Technology Program. The male percentage was over 97 percent in the Electrical and HVAC Programs. The female percentage was larger in the Computer Programming Program, at 34.1 percent. Gender percentages per age category are also found in Table 7. The smallest age percentage for men is the 40 to 44 category. The

Table 7

Gender Cross-Tabulations

	Variable	Gender Percentage	
		Male	Female
Overall		88.3	11.7
Program of Study:	HVAC	97.1	2.9
	EM	97.6	2.4
	CT	88.3	11.7
	CP	65.9	34.1
Ethnic Origin:	Asian	75.0	25.0
	Black/African American	83.5	16.5
	Hispanic	94.1	5.9
	(American) Indian	82.6	17.4
	White/Caucasian	89.7	10.3
Age:	Less than 20	82.6	17.4
	20 to 24	90.4	9.6
	25 to 29	90.8	9.2
	30 to 34	89.0	11.0
	35 to 39	86.0	14.0
	40 to 44	78.6	21.4
	45 to 49	88.9	11.1
	50 and above	80.0	20.0

smallest age percentage for females is the 25 to 29 category. Analogous to the overall

gender ratio, nine out of ten White/Caucasians in this study are male. Both American

Indian and Black/African American were closer to four out of five male to female ratio.

Almost 95 percent of the cash pay students are male. Only one female paid

entirely with cash. No females combined Title IV money with agency money to pay for

their education. Only six percent of the students that utilized agency monies in-full or in-

part are female.

Ethnic Origin

Almost two thirds of female students are White/Caucasian and more than a fourth

are Black/African American. At this proprietary college, combined the two ethnicities

make up 90 percent of the female student population. Three-fourths of males are

White/Caucasian and about one-fifth are Black/African American. Combined, the two

ethnicities make up roughly 95 percent of the student population. Of the four Asians, one

enrolled in each of the four programs offered by the college studied. Twenty-nine to 35

percent of Hispanics each enrolled in HVAC, Electrical, and Computer Technology. Only

six percent enrolled in Computer Programming. American Indian students enrolled twice

as often in a trade program (HVAC and Electrical) than a computer-related program.

<u>Program of Study</u>

HVAC and Electrical programs are dominated by males, at more than 97 percent.

The Computer Technology and Computer Programming Programs are male dominated, at

88.3 and 65.9, respectively. All four programs were similar to the study's total population

percentage of GED and high school diploma earners. The programs of study also have

similar distributions between sources of funding.

<u>Funding Source</u>

Overall, 2.6 percent of the students paid for their education in full with cash

and/or scholarships. Ninety-four percent of the students utilized Title IV (government

student loans and grants) to pay tuition either in-full or in-partial. Eleven percent of

enrolled students combined cash with Title IV monies and 1.6 percent combined agency

monies with Title IV monies. Twenty-two (3.2 percent) students enrolled with full

agency payment for tuition. Twenty-seven percent of the agency students are GED

enrollees. One of the eighteen (5.5 percent) cash paying students holds a GED; the

remaining seventeen have high school diplomas.

Eighty-seven percent of GED recipients paid entirely with Title IV monies.

Eighty percent of the students, who funded their education in-full or in-part by agency

monies, are high school graduates. Sources of agency monies included Veterans

Administration (VA), Vocational Rehabilitation (VR), Veterans Administration

Vocational Rehabilitation (VA/VR), and Indian Tribes. More than 93 percent of Hispanic

students at this college used only Title IV monies to pay for their education. The average for students using only Title IV monies was 81 percent. All students utilizing agency monies to pay in-full their education were either Black/African American or White/Caucasian. The same was true for cash paying students. Agency monies were spread out across all age categories. Nearly 40 percent of the cash (in-full) paying students were aged 35 to 39, while only 10 percent of the total school population is in this age category. All other categories, except one, have less than two percent paying by cash only. Seventy-three percent of students combining Title IV and agency monies were between 25 and 34 years old. Only 40 percent of the entire school's population was in this same age category. All students aged fifty and above utilized Title IV or agency funds to pay for all or part of their education.

A Fundamental Comparative Analysis

There were 210 GED and 502 high school diploma earners that enrolled at Vatterott College - Tulsa between Winter 1997 and November 2002. Review of placement test scores revealed that high school diploma earners had the two lowest scores (34 and 40 percent out of 100). However, a nearly equal 1.9 percent of GED and 1.8 percent of high school diploma earners scored below 60 - traditionally considered "F" or failure for tests. On the upper end, 4.3 percent of GED and 6.8 percent of high school graduates scored a perfect 100 percent on the placement exam. At first the high school diploma earners appeared to have an edge in high scores. But, evaluation of scores that traditionally are "A" (above 90) demonstrated a nearly equal 31.4 percent of GED and

31.5 percent of high school diploma earners were in the "A" scoring range. The average placement test score for GED earners was 82.8 and for high school diploma earners, 82.7.

Collection of grade point averages was limited to only those students that graduated. One hundred ten (27.5 percent) of the graduates were GED earners and 290 (72.5 percent) were high school diploma earners. The highest grade point average was 4.0 and the lowest was 2.0. At the college under study, the lowest grade point average a student could earn and still graduate was 2.0. Six and one-half percent of GED earners and 7.9 percent of high school diploma earners graduated with a perfect 4.0 grade point average. Nine percent of GED and 3.5 percent of high school diploma earners graduated with less than a 2.5 grade point average. The average grade point average for GED earners was 3.325 and 3.429 for high school diploma earners.

Overall 47.7 percent (n = 356) of enrolling students graduated in the standard allotted time. Another 5.5 percent (44) of students graduated in the extended graduation time frame. Of the 557 high school diploma earners that enrolled, 47.8 percent (266) graduated in the standard allotted time and 4.3 percent (24) graduated in the extended time period. Of the 239 enrolled GED diploma earners, 37.7 percent (90) graduated in the standard allotted time and 8.4 percent (20) graduated in the extended time period. There were 13 students that completed their course work but did not graduate due to not meeting grade or attendance requirements. Twenty-three percent of these students have a GED and 78 percent have a high school diploma.

Exploring post graduation success, 41.4 percent (99) of GED and 48 percent (268) of high school diploma earners that enrolled graduated from the college and continued their education or found field-related employment. Of the 99 GED students and 268 high

school diploma earners with post graduate success, 53 GED diploma earners (54 percent) and 134 high school diploma earners (50 percent) were employed in a field-related job.

Performance of GED and High School Diploma Earners

The following discussion presents statistical data analysis results concerning the performance of GED and high school diploma earners. Results are from analyzing the data using SPSS 12.0 Manova (multivariate analysis of variance). Manova is like Anova (analysis of variance), except it allows for two or more dependent variables. For this study there is one central independent categorical variable (GED/high school) and multiple dependent variables. In SPSS 12.0, Manova is a General Linear Model (GLM) program. According to Garson (2004), this GLM Manova is better than traditional Manova because parameters (coefficients) are created for every category of every factor and this full parameterization better handles small numbers (in cells). Only data sets that include values for all variables (n=369) under study were used in the Manova testing. Table 8 reports the Multivariate statistical tests result for the one independent and six dependent model.

In Table 8 the test statistic, Wilks' Lambda, is shown for the Manova model using Educational background (GED/H.S.) as the independent variable and Grade point average, Graduated/not graduated, Placement test scores, Attrition, Extended graduate, and Postgraduate as dependent variables. Wilks' Lambda is the recommended test statistic for a model with more than two dependent variables (Garson, 2004; Pedhazur,

Table 8

Manova Test Statistics With Educational Background as the Independent Variable

	Wilks' Lambda	F Value	Degrees of Freedom	Significance	Eta Squared	Power
Intercept	.011	8235	4	.000	.989	1.00
Educational Background	.966	3.169	4	.014	.034	.821

1997). The F value, at .014, indicates the test is statistically significant at the predetermined .05 significance level. Eta Squared represents the proportion of the total variability in the dependent variable accounted for by the variation in the independent variable. Thus, educational background accounts for 3.4 percent of the variability in the dependent variables.

Observed power, the last column in Table 8, is the chance of believing there is no effect when there actually is one (Type II error). The closer the power value is to 1.0 the less likely a Type II error occurs. For this model there is roughly an eighteen percent chance of believing there is an effect when there really is not one.

Manova assumes that each dependent variable has similar variances for all groups (all cells in the design matrix). Although the Levene test statistic (see Table 9) indicates one of the dependent variables (grade point average) does not have equal variance across the four dependent variables (significance at the .05 level), when dependent variables are

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of equal sample size, Manova is considered relatively robust (Garson, 2004) and failure to meet the homogeneity of variances assumption is not fatal. All variables have equal sample size, 368. This is achieved by only using subjects with valid data for all variables involved (368 data sets out of a possible 796).

As previously stated, The F test in Table 8 indicates there is an effect on the dependent variables. The results give reason to believe GED and high school diploma earners do not have equal success at the studied two-year proprietary college. Univariate tests provided by the Manova results are examined to explore the possibility of determining which dependent variables the two independent group means differ from significantly.

Table 9

Levene's Test Statistics for Educational Background Model

	F Value	Degrees of Freedom	Significance
Postgraduate	4.58	1	.033
Graduate/			
not graduate	4.64	1	.032
Test score	13.66	1	.000
Grade point			
average	2.48	1	.116

Comparison Tests

The tests of effects between the dependent and independent variables are shown in Table 10. The significance tests suggest that when each dependent variable is taken separately, GED/HS means may be significantly different for some, but not all variables. From Table 3 the reader can identify the sub-populations with valid data used in testing each null hypothesis. Such as null hypothesis two ("There is no significant difference between placement exam scores ..."), with 712 data sets/subjects that have valid placement exam score entries. All 796 eligible subjects are used to analyze hypotheses three (graduation rates), four (attrition rates), and five (extended graduate). For null hypotheses one (accumulated grade point average) and six (postgraduate further education or field-related work), graduation is a prerequisite to their analysis; therefore, the four hundred subjects with valid and relevant graduation data are available for these tests. The four hundred graduated subjects represent just over 50 percent of the total valid data subjects involved in this study.

Hypothesis seven utilizes all dependent and independent variables listed in Tables 3 and 4, respectively. Just over fifty percent (400 out of 796) of the data sets have valid data for all dependent and independent variables and are used for hypothesis seven analyses. The following synopsis adheres to the order of the null hypotheses presented previously. Additional discussions, recommendations, and conclusions regarding the data analysis will be in Chapter V.

Null hypothesis one questions if there is a significant difference in accumulative grade point averages between GED recipients and high school graduates graduating from

a two-year proprietary college. The F value for the dependent variable grade point average is 5.196 and with a .023 significance value, is significant at the .05 level. An Eta Squared value of .014 suggests 1.4 percent of the variance in grade point average can be explained by whether a student's educational background is GED or high school diploma. These results do not support Null hypothesis one and indicate there is sufficient difference in grade point averages between GED and high school diploma earners attending the studied proprietary college and justifies further analysis to better describe the relationship of the variables.

Null hypothesis two asks if there is a significant difference in placement exam test scores between GED recipients and high school graduates attending a two-year proprietary college. The F value for the dependent variable test scores is .941 and is not significant at the .05 level. This failed to reject Null hypothesis two and indicates there is an insufficient difference in placement exam scores between GED and high school diploma earners attending the studied proprietary college.

Null hypothesis three asks if there is a significant difference in graduation rates during the standard allotted time (60 weeks) between GED recipients and high school graduates attending a two-year proprietary college. The F value for the dependent variable graduation is 6.675, with a significance value of .010, and is significant at the .05 level. An Eta Squared value of .018 suggests about two percent of the variance in graduation rate can be explained by whether a student's educational background is GED

Table 10

Tests of Effects Between Educational Background and Dependent Variables (Univariate

Tests)[1]

Dependent Variable		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Grade Point Average	Contrast	1.165	1	1.165	5.196	.023	.014
	Error	82.292	367	.224			
Placement Test Score	Contrast	121.319	1	121.319	.941	.333	.003
	Error	47335.996	367	128.981			
Graduated/Not Graduated	Contrast	.651	1	.651	6.675	.010	.018
	Error	35.793	367	.098			
Attrition[2]	Contrast	.647	1	..647	2.593	.108	.003
	Error	198.141	794	.250			
Extended Graduation	Contrast	.651	1	.651	6.675	.010	.018
	Error	35.793	367	.098			
Post Graduate Work or Educ.	Contrast	.074	1	.074	.936	.334	.003
	Error	29.151	367	.079			

[1] F tests the effect of Education Background (GED/HS) and is based on the linearly independent pairwise comparisons among the estimated marginal means. Computed using alpha = .05.

[2] A separate Univariate test was run for the attrition variable. This is explained further in the text discussion.

or high school diploma. These results do not support null hypothesis three and indicate there is sufficient difference in graduation rates between GED and high school diploma earners attending the studied proprietary college to warrant further analysis to better describe the relationship of the variables.

Null hypothesis four questions if there is a significant difference in attrition rates between GED recipients and high school graduates attending a two-year proprietary college. The completion rate of the studied population is 52 percent. Completion statistics are used in hypothesis four instead of graduation statistics because according to the school's catalog, it is possible for a student to complete their course of study and not graduate if they do not meet minimum attendance or grade requirements. An overall attendance of at least 80 percent and a grade of 70 percent or better in each class are required to graduate. Ninety-seven percent of the completers graduated and three percent completed without graduating. The F value for the dependent variable attrition is 2.593 and is not significant at the .05 level. These results fail to reject null hypothesis four and indicate there is not sufficient difference in attrition rates between GED and high school diploma earners attending the studied proprietary college to warrant further analysis.

Null hypothesis five asks if there is a significant difference in graduating during the extended allotted time (90 weeks) between GED recipients and high school graduates attending a two-year proprietary college. The F value for the dependent variable extended graduation is 6.675, with a significance value of .010, and is significant at the .05 level. An Eta Squared value of .018 suggests about two percent of the variance in the extended

graduation rate can be explained by whether a student's educational background is GED or high school diploma. These results do not support null hypothesis five and indicate there is sufficient difference in extended graduation rates between GED and high school diploma earners attending the studied proprietary college to warrant further analysis.

Null hypothesis six asks if there is a significant difference in the rates of GED recipients and traditional high school graduates that graduate from a two-year proprietary college and then continue their education or become employed in the field of study. The F value for the dependent post graduation is .936 and is not significant at the .05 level. This result fail to reject null hypothesis six and indicates there is insufficient difference in post graduation results between GED and high school diploma earners attending the studied proprietary college.

Null hypothesis seven asks if there is a significant difference in accumulative grade point averages, placement exam scores, graduation rates, or attrition rates between GED recipients and high school graduates attending a two-year proprietary college when gender, ethnicity, course of study, and/or funding source are/is included as a predictor(s). A Manova model with all independent, including nested independent, and dependent variables is used to test null hypothesis seven. Table 11 provides the Manova full model tests statistics. The F value for the full Manova model is .967, with a significance value of .025, and is significant at the predetermined .05 level. An Eta Squared value of .033 suggests about three to four percent of the variance in the full model can be explained by the model's independent variables. These results do not support null hypothesis seven and indicate there is sufficient evidence to warrant further analysis.

Table 11

Full Manova Model Statistics

	Wilks Lambda	df	F	Sig.	Partial Eta Squared
Full Manova Model	.967	4	2.836	.025	.033

Table 12 displays an analysis matrix of the dependent and independent variable interactions. The overarching independent variable is Education Background (GED or High School Diploma Earner). Gender, Age, Ethnicity, Course of Study, and Funding Source are nested variables within Education Background. For Table 12 the significance value that is related to each dependent's univariate F statistic for Education Background is listed. For the nested variables in Table 12 the discriminant values are provided for those dependent variables with a significant univariate F statistic. As shown in Table 12, it is not applicable to perform continued analysis on nested effects for dependent variables without a significant main effect (at the .05 level for this study) with Education Background. Such variables are Placement exam score, Attrition rate, and Field related job or further education.

Table 12

Variable Analysis Matrix

Dependent Variables	Independent Variable					
	Education Background (GED or High School Diploma)					
	Education Background	Nested Variables				
		Gender	Age	Ethnic	Course of study	Funding source
Accumulative GPA	.023	.744	.332	.411	.052	.511
Placement exam score	.333	n/a	n/a		n/a	n/a
Graduation rate	.010	.342	-.093	.022	.293	.486
Attrition rate	.108	n/a	n/a		n/a	n/a
Extended grad rate	.010	.517	.086	.083	.173	.640
Field related job or further education	.334	n/a	n/a		n/a	n/a

Null hypotheses two, four, and six were supported by the Manova tests results. The means of GED and high school diploma earners for placement test scores, post graduate (success), and attrition do not appear to be significantly different. The means of GED and high school diploma earners for grade point average, graduated, and extended

graduation (null hypotheses one, three, and five) appear to be significantly different.

Therefore, hypotheses one, three, five, and seven, are found to be worthy of additional

analysis using the SPSS Discriminant function. The Discriminant analysis that follows

will attempt to identify and describe the nature of the overall effect determined by the F

test. Multiple comparison tests for each pair of groups identify similarities and

differences.

Discriminant Analysis

Using the discriminant utility in SPSS, the independent variables of hypothesis

seven (Age category, Education, Gender, Ethnic origin, and Funding source) were tested

against each Manova pre-selected dependent variable. One by one, the dependent

variables Grade point average, Graduated/not graduated, and Extended-graduation were

designated as the "grouping variable" and the following tables created for each test:

Equality of Group Means, Eigenvalues, Wilks' Lambda, Standardized Canonical

Discriminant Function Coefficients, Structure Matrix, Prior Probabilities, and

Classification Results.

Discriminant analysis assumes group sizes within each dependent variable are not

grossly different and the dependent variable is a true dichotomy (Garson, 2004).

Although grade point average is an interval variable, it is nearly continuous between 2.0

and 4.0, containing a variety of n for each interval value. Therefore, the grade point

average variable is recoded for the discriminant analysis. Using frequency analysis, two

categories of grade point average are established creating relatively similar group sizes

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and an artificial dichotomy. Subjects with a grade point average less than 3.6 are coded a one and those with 3.6 and higher grade point average are coded with a two. For descriptive purpose, the Grade point average dichotomies are reported as "low" and "high." Statistical reporting for the Grade point average discriminant test is shown in Table 12. The eigenvalue of the Grade point average discriminant function is .043, reflecting a 4.3 percent of variance explained in the dependent variable by the independent variables in this model. The Wilks' Lambda test statistic is .959, resulting in a significance value of .019. Based on the predetermined significance cutoff of .05, this model is statistically significant in its ability to predict grade point average (low or high) based on age, education background, gender, ethnic origin, and funding source. The standardized canonical discriminant function coefficient for each independent variable in the Grade point average model is also shown in Table 13. The coefficient indicates the direction and strength of each independent variable's influence on grade point average. The largest influences in the Grade point average model are Gender and Funding source, with standardized canonical discriminant function coefficients of .744 and .511, respectively. The least influential independent variables on Grade point average in this model are Course of study and Education (GED/high school).

For the Graduated/not graduated variable, statistical reporting from the discriminant test is shown in Table 14. The eigenvalue of the Graduated discriminant function is .024. The standardized canonical discriminant function coefficient for each independent variable in the Graduated model is also shown in Table 14. The largest influences in this model are Education (GED/high school) and Funding source, with standardized canonical discriminant function coefficients of -.694 and .486, respectively.

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Table 13

Grade Point Average Discriminant Test Results

	Eigenvalue	n	Wilks' Lambda	Significance	Coefficient
Function	.043	367	.959	.019	

Independent Variables:

Course of study					-.052
Age category					.332
Education					.313
Gender					.744
Ethnic origin					.411
Funding source					.511

Table 14

Graduated/Not-Graduated Discriminant Test Results

	Eigenvalue	n	Wilks' Lambda	Significance	Coefficient
Function	.024	675	.977	.016	

Independent Variables:

Course of study					.293
Age category					-.093
Education					-.694
Gender					.342
Ethnic origin					.022
Funding source					.486

The education variable has an inverse relationship with the Graduated/not graduated dependent variable. The least influential independent variables are Age and Ethnic origin.

Statistical reporting for the Extended graduation discriminant test is shown in Table 15. The eigenvalue of the Extended graduation discriminant function is .022. The standardized canonical discriminant function coefficient for each independent variable is also shown in Table 15. The largest influences in this model are Gender and Funding source, with standardized canonical discriminant function coefficients of .517 and .640, respectively. The education variable has an inverse relationship and is third strongest in affect, with a -.452 coefficient. The least influential independent variables are Age and Ethnic origin.

Table 15

Extended Graduate/Non-Graduated Discriminant Test Results

	Eigenvalue	n	Wilks' Lambda	Significance	Coefficient
Function	.022	675	.979	.026	
Independent Variables:					
Course of study					.173
Age category					.086
Education					-.452
Gender					.517
Ethnic origin					.083
Funding source					.640

The Discriminant Model's predicted group membership is compared to actual group membership in Table 16. Grade point average has the highest percentage of correctly classified cases at 58.3 percent. The percentage of Graduated/not graduated cases correctly classified is the lowest at 55.4 percent. The percentage of Extended graduate cases correctly classified equals 55.6 percent. For Grade point average, the model is accurate in predicting low grade point averages more often than high grade point averages. The model actually predicted more wrong "high" grade point averages than right "high" grade point averages. With Graduates, the model is more accurate in predicting those who graduated than with those who did not graduate. Even though the Graduate discriminant model overall is correct over 50 percent of the time, the model actually predicted more wrong non-graduates than actual non-graduates. For Extended graduates, the model is also more accurate in predicting those who graduated than those who did not graduate. Again the model predicted more wrong non-graduates (extended time) than actual non-graduates (extended), while having an overall correctness of better than 50 percent.

For hypothesis seven, Manova was performed on all dependent and independent variables together. In the discriminant follow-up, each significant dependent variable was tested separate. Table 17 exhibits the discriminant model statistics for all independent variables in this model. These statistics indicate the relative influence of each independent variable on each dependent variable. Gender and Source of funds have the highest discriminant weights on two of the three dependent variables, Grade point average and Extended graduation. Gender has the most weight for Grade point average

Table 16

Discriminant Classification Results for GPA, Graduate, and Extended Graduate Variables

	Discriminant Model's Predicted Group Membership					
	Grade Point Average		Graduate		Extended Graduate	
	Low	High	Yes	No	Yes	No

Actual

GPA

Low	128	70				
High	83	86				

Total GPA (grade point average) cases correctly classified = 58.3%

Actual Graduate

Yes			190	159		
No			142	184		

Total graduated cases correctly classified = 55.4%

Actual Extended Graduate

Yes					137	171
No					129	238

Total extended graduated cases correctly classified = 55.6%

and Source of funds the most for Extended graduation. The Education variable, GED versus high school diploma, has the highest weight for the Graduate variable, with Gender and Source of funds second and third respectively.

An additional statistic, the absolute value, is calculated to help interpret the influence of each independent variable across all three dependent variables. Included in Table 17 are absolute averages for each independent variable. These values are calculated by averaging the absolute values of each independent variable across each dependent variable. The resulting statistic characterizes the influence of each independent variable across all three dependent variables. A three-tiered pattern emerges within this new statistic. Funding source and Gender have the highest absolute averages at .546 and .534, respectively. Course of study, Age category, and Ethnic origin have much lower absolute averages at .173, .170, and .172, respectively. Education is alone in the middle tier at .486.

Summary

A substantial percent of the qualified student data sets at Vatterott College – Tulsa were utilized in this study. For comparison purposes, detailed geographic profiles were provided in this chapter for contrast to other post-secondary schools. Seven hypotheses were tested in an attempt to address the focus of the research question concerning GED success compared to high school diploma success at a two-year proprietary college. Manova procedures using SPSS 12.0 were used in the preliminary statistical analysis. Null hypotheses one, three, five and seven were not supported by the statistical

Table 17

Discriminant Model Statistics for all Independent Variables Studied

Independent Variables	Dependent Variables			Absolute Average
	GPA	Graduate	Extended	
Course of study	-.052	.293	.173	.173
Age category	.332	-.093	.086	.170
Education	.313	-.694	-.452	.486
Gender	.744	.342	.517	.534
Ethnic origin	.411	.022	.083	.172
Funding source	.511	.486	.640	.546

analysis. Discriminant analysis was then performed on the variables implicated with Null

Hypotheses one, three, five and seven. All three discriminant models (one for each

dependent variable) were found to be significant predictors of group membership based

on the independent variables used in this study. The eigenvalue, statistical significance

value, and standardized canonical discriminant function coefficients were reported for

each independent variable on each dependent variable, indicating the direction and

strength of each independent variable's influence on each dependent variable. The

absolute average of discriminant weights was calculated and compared between

independent variables, revealing three levels of influence among the variables.

CHAPTER V

SUMMARY, DISCUSSION, AND IMPLICATIONS

According to multiple studies, U. S. citizens perceive the GED as a way to

enhance their lifestyle and become more productive citizens (Sabino & Seaman, 1988).

Students with GED certificates attempting to enroll in colleges are not going away. About

one in every seven "high school diplomas" issued each year is a GED credential (Tyler,

2003). Furthermore, GED earners are more likely to attend a proprietary college/school

than high school diploma earners. And, two-year proprietary colleges are not going away.

The number of two-year, degree-granting, proprietary colleges increased seventy-eight

percent from 1989 to 1999. And, despite stringent state and federal regulations and

accrediting requirements, proprietary college's share of the two-year college market grew

to twenty-eight percent from nineteen percent over the same time period (Borrego, 2001).

This study examines the records of all students that enrolled at Vatterott College,

Tulsa campus, from December 1997 to October 2001. Chapter II presents the history of

GED testing, proprietary colleges, and the specific college campus utilized in this study.

Appendixes A, B, and C provide a multifaceted, organized collection of GED research by

school category, timeframe, and geographically. The previous chapter described findings

from this study. Statistical tests results and demographic statistics were included. This

chapter includes a summary of the study, discussion of the study's results, limitations of the study, and recommendations for future research.

While the purpose of this research study is to analysis GED versus high school diploma earner success, other potential intervening variables are also analyzed to more precisely determine the amount of variability explained by education background (GED versus high school diploma) and its interaction with other variables. Quantitative methods of data analysis used to address the research question and hypotheses include Manova and Discriminant analyses. The following deliberation presents and discusses this study's findings for each hypothesis and concludes with consideration of the research question.

Summary of the Findings

Null Hypothesis One

In the Manova analysis of null hypothesis one, a statistically significant difference was found between GED recipients and high school graduates graduating from a two-year proprietary college for accumulative grade point averages. Grade point averages for high school diploma and GED earners are not far apart, 3.43 and 3.32, respectively. However, GED earners had more variance and a larger percentage of students who graduated with less than a 2.5 grade point average. High school diploma earners had a larger percentage of students graduate with a perfect 4.0 grade point average.

The Manova test found education background (GED versus high school diploma) to explain 1.4 percent of the variance in grade point average. The Discriminant test found up to 4.3 percent of the variance in grade point average was explained when educational background was combined with other variables. GED versus high school diploma was the fifth most influential of the variables tested for predicting grade point average.

Null Hypothesis Two

The Manova analysis of null hypothesis two found no significant difference in placement exam scores between GED recipients and high school graduates attending a two-year proprietary college. While high school diploma earners earned the two lowest placement test scores, they also earned a larger percentage of perfect scores than GED earners. Nearly identical in value were averages and variances on placement test scores for GED and high school diploma earners.

Null Hypothesis Three

In the Manova analysis of null hypothesis three a statistically significant difference was found in graduation rates during the standard allotted time (60 weeks) between GED recipients and high school graduates attending a two-year proprietary college. There is more than a ten percentage point difference in high school diploma earners (47.8 percent) and GED earners (37.7 percent) that graduated. The Discriminant test results suggest Education Background is the most influential of the variables tested

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on whether a student graduates in the standard allotted time from this college. Further, the discriminant directional value of Educational Background indicates a student is more likely to graduate from this college if they have a high school diploma. Only a small amount of additional variance in graduation rates was accounted for by combining other variables with Education Background.

Null Hypothesis Four

In the Manova analysis of null hypothesis four no significant difference in attrition rates between GED recipients and high school graduates attending a two-year proprietary college was found. Seventy-eight percent of the students that completed but did not graduate were high school diploma earners. This significantly offset the higher rate of high school diploma earners that graduate, creating a statistical difference in graduation rates (hypothesis three), but not between attrition rates.

Null Hypothesis Five

For hypothesis five, the Manova analysis found a significant difference in graduating during the extended allotted time (90 weeks) between GED recipients and high school graduates attending a two-year proprietary college. Of those graduating during the extended time, GED earners have twice the percentage as do high school diploma earners. For the Discriminant model, Educational Background was not the most

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influential variable, but the third largest influence, following funding source and gender, for graduating within an extended time frame.

Null Hypothesis Six

In the Manova analysis of null hypothesis six no significant difference was found in the rates of GED recipients and traditional high school graduates that graduate from a two-year proprietary college and then continue their education or become employed in the field of study. A strong percentage of graduating students from both educational backgrounds either found field-related jobs or continued their education. A higher percentage of high school diploma earners who graduated enrolled in further educational than did GED earners.

Null Hypothesis Seven

For hypothesis seven, the Discriminant model found a statistically significant difference in accumulative grade point averages and graduation rates between GED recipients and high school graduates attending a two-year proprietary college when age, gender, ethnicity, course of study, and funding source are included as a predictors.

Discussion

According to the results, students enrolling at a proprietary two-year college with GED credentials perform as well as high school diploma earners on placement tests taken just prior to their enrollment. This is the same result Aspinwall (1999), Scales (1989), and Spillar (1982) found in their research studies at two-year public colleges. GED earners also find equal success through field-related employment or further education immediately following graduation. However, the results also indicate that GED earners do not perform as well while in school, based on grade point average and graduation rates. This matched the findings of several two-year public college studies, including Bigby (1989), McLawhorn (1981), Moore (1973), Schillo (1990), and Soltz (1996). In general, high school diploma earners have higher grade point averages and are more likely to graduate than GED earners. This equivalent pre- and post-school success, combined with a nonequivalent during-school success, is an intriguing finding for teachers and administration of proprietary colleges.

Based on the results from hypothesis two, it is improbable to argue that GED earners have lower grade point averages (hypothesis one results) because of starting out in college behind high school diploma graduates or by lack of initial ability. Based on the combined results of hypotheses one and two, a lower grade point average may be an indication, not of skill level, but of other demands on time and energy, such as family and work. However, these results might also be reflecting GED students with similar skill levels as high school diploma earners, but having to re-adjust to attending school and studying more than high school diploma earners.

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Ebert (2002) suggests GED earners have personality barriers that inhibit their performance and skew their attitude toward formal educational settings. This might also explain why they are out performed by high school diploma earners while attending college. What about the many GED earners who do finish college? Perhaps the GED earners who finish adapt their personality to fit into a more traditional environment. This adaptation, though, does not fully allow for the nontraditional environment differentiation that proprietary colleges proclaim. In truth, it appears proprietary colleges are a mixture of traditional education, with similar rules and regulations, and non-conventional education, such as: hours, length of courses, teacher/student ratio, etc. Therefore, GED earners still have to deal with a formal structure, albeit, a structure more designed to accommodate nontraditional students than traditional education structure.

It would also seem from the results that GED students characteristically have as much initial ability and promising future success as high school diploma earners but may require more support during the schooling process. This is consistent with recommendations from researchers studying non-proprietary two-year colleges (for example: Falk (1995); Klein & Grise (1987); and Swarm (1981)). Another possible explanation of equal ability combined with unequal persistence is that dropping out of high school may have set a precedent for GED earners that allow them to drop out of college with lesser trauma.

The results of this study suggest admissions officials at this two-year proprietary college should treat the GED credential the same as the high school diploma when considering admissions criteria. However, faculty and school administrators must refocus their attention to factors that affect GED students once enrolled and attending classes.

Such in-schooling interventions might include childcare and work study, two programs seldom found at two-year proprietary colleges. Government officials in charge of grants, especially those aimed at helping nontraditional students and only available to nonprofit colleges, may want to rethink institutional eligibility.

Turner (1990) found self-motivation, consistent contact with school personnel, and support from family, friends, and college staff as significant factors associated with GED earner success within community colleges. The same can probably be said for two-year proprietary schools. With this study's results indicating GED students in general come into proprietary school with as much ability as high school diploma earners, the school administrators should review student services that address the factors found by Turner.

A five year study published by the American Association of Community Colleges, The National Profile of Community College Trends and Statistics, found 78 percent of all community college students failed to earn a degree five years after enrollment (Phillippe, 1998). The graduation rate at this college is much better than the reported community college outcome; however, according to the results of the current study, GED earners are the ones most likely to take longer to obtain their degree. This further emphasizes the need for two-year college administrators to understand and prepare adequate resources for GED earners.

Once GED students complete their postsecondary education, per the results of this study, job placement officials at this two-year proprietary college should treat GED and high school diploma earners equally since they appear to be equally successful in obtaining jobs or further education after graduation.

These overall findings are consistent with many prior GED studies that show GED earners who attend postsecondary education do relatively well and experience positive returns (Banner, 1989; Grady, 1983; Hannah, 1972; Junne, 1988; Spillar, 1982; Stoker, 1985; Willett, 1982). However, most GED earners obtain limited postsecondary education (Tyler, 2003). It is critical GED earners regard the GED not as a peak, but as an important stepping stone to the next step in their career path. It is also critical that proprietary administrators see the value of student services customized to maintain GED students enrolled in their school. Planning student services requires the school administrator to have solid knowledge of student demographics. Therefore, it is imperative administrators ask, "In what way(s) do demographics interact with educational background that could affect student success?" The following discussion provides answers to this question for Vatterott College – Tulsa.

Interaction of Demographics and Educational Background

Age: The discriminant analysis of this study found age category to have more predictability for grade point average than educational background (GED versus high school diploma), but less predictability for graduating. In other words, for the college studied a person's age is a better predictor of their grade point average than knowing whether they have a GED or high school diploma. The opposite appears to be true for predicting if a student will graduate. When age is combined with education background, predictability increases for both grade point average and graduation. This result is the same as Owens (1989) and Hannah (1972) experienced in their studies of two- and four-

year nonprofit colleges, respectively. However, the positive relationship between age and college success found in this study is different than the negative relationship found by Moore's (1973) study of a two-year nonprofit college.

The average age for GED earners was significantly higher than high school diploma earners attending this college. This corresponds with findings at numerous nonprofit two and four-year colleges (George-Bowden, 1990; Rogers, 1987; Spillar, 1982; Swarm, 1981; Willis, 1995; Wilson, Davis & Davis, 1981). Age is a factor this two-year proprietary college must consider when planning advertising, student services, etc. A major draw for two-year private colleges is nontraditional-aged students. Most are either changing careers or moving from job-focused earnings to career-focused earnings. This corresponds well with the GED findings. According to the 2001 GED On-line Statistical Report (http://www.acenet.edu/clll/ged/2002-Table3.pdf), the U.S. National and Oklahoma average age for GED test takers is 25 years old.

In addition, it is important for the college administrators to compare their school's and the surrounding area's age distribution. If they are not comparable, the school may be missing out on considerable student resources by simply missing marketing opportunities or not supplying adequate student services. Figure 5 displays the age distribution for both the college under study and the state of Oklahoma. The State of Oklahoma data was provided as a local geographic comparison. The percentage calculations for the State of Oklahoma were based on the state's total population aged 18 to 55. State categories are defined as under 25 years old; 25 to 34, 35 to 44; and 44 and older. For comparison purposes, this study's categories are combined in Figure 5 to match the state categories. There is a notable difference in age trend between the college studied and the state. For

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Age Distributions for Vatterott College and Oklahoma

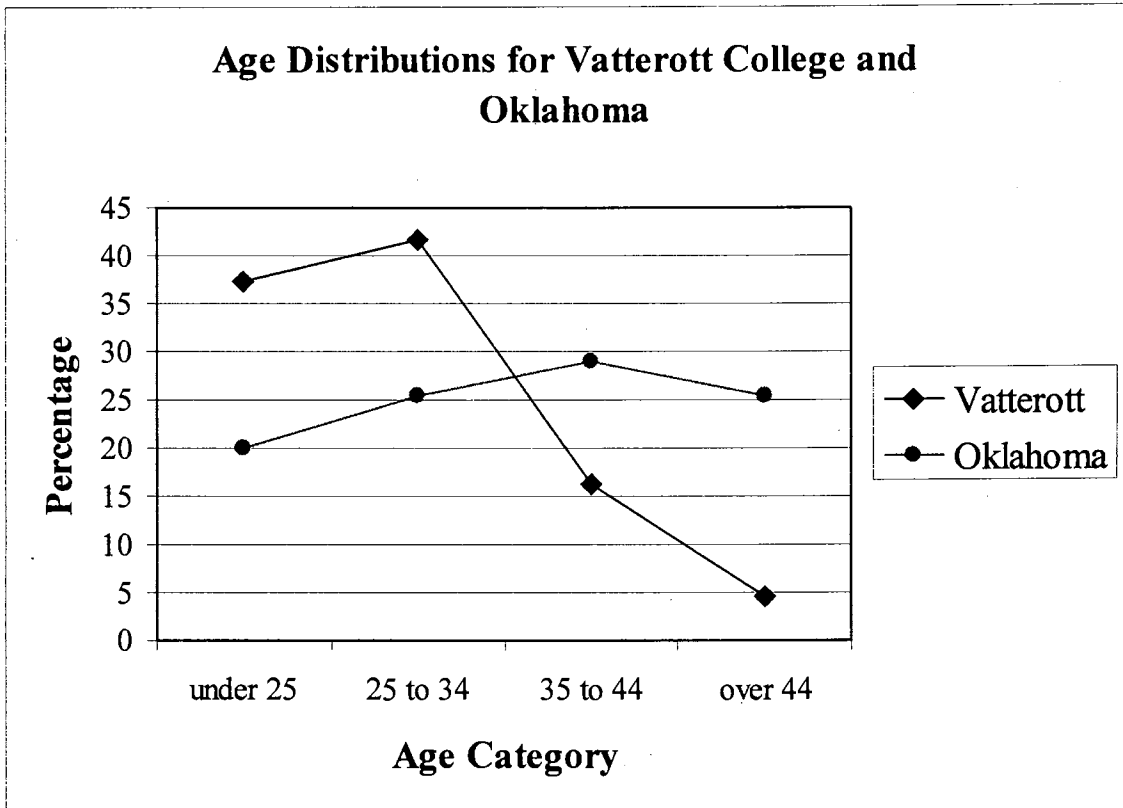Figure 5. Age Distributions for Vatterott College and Oklahoma

Source: State of Oklahoma data: U.S. Census Bureau, 2000.

Note: Under 25 for Oklahoma actually represents ages 18 to 24 and over 44 for Oklahoma actually represents ages 45 to 55. This was done to compare equivalently to the college's categories, since only one student, aged 63, was over 53 years old when enrolling at the college.

the state there is a steady upward trend in the first three age category populations followed by a small downward trend in the last age category. The college had a significant peak in the second grouping (25 to 34) before dropping sharply in each of the next two categories. While the state's median age was 35.5 (a point within the third grouping), the college's median age was seven years younger at 28.4 years old (a point within the second grouping). Still, the college's median age is undoubtedly considerably older than the traditional two-year college. For all two-year colleges during the 1999-2000 school year the NCES found 50 percent of students are under 25 years old and 25 percent of students fall into each of the 25-34 and over 35 categories (Not sure what category a 35 year old goes into?!).

Clearly, there is a significant population in Oklahoma of both GED and high school diploma earners in the age categories above age 34 that need to be addressed in advertising and promotions by the college studied. However, getting these older students enrolled is only the first step in the process of helping them find success.

For this study past educational experience, reflected in the GED/high school diploma variable, appears to hinder college success, as reflected in grade point average. However, stage of life, as reflected in the age category variable, appears to have a positive affect on college success. This may be explained by Levinson's identification of traditional transition periods and underlying values for adults. For this study, it is possible that nontraditional aged (28 or older) high school diploma earners attending college are in Levinson's career consolidation (age 30 transition) or a period of generativity (midlife transition), as reflected in Table 1. Perhaps these students are well focused on school in their effort to consolidate their career or generate knowledge and ability, as expressed in

Levinson's theory. However, for GED earners attending this college, who typically are nontraditional aged, possibly never left the early adult transition period (typically aged 17-22, per Levinson). During this first stage of adulthood there is a great amount of "contradiction and stress" (Levinson, 1986, p.5) from reconstructing the image of themselves and lifestyle. This contradiction and stress could certainly hinder their focus on school. Cross (1981) suggested there are three categories of barriers to college learning: situational, dispositional, and institutional. Many of the situational (new job and home responsibilities, financial status, etc.) and dispositional (lack of confidence, prior educational experiences, tired from or of school, etc.) barriers could belong in Levinson's category of early adult transition.

Gender: The discriminant analysis of this study revealed gender to have more predictive value than education background for grade point average and extended graduation. Combined, gender and education background had even better predictability for grade point average. Males and females performed equally well, statistically, with job or education placement after graduation, regardless of education background. However, beyond the enrollment issue, the school's administration should also be aware that female attrition in the trade (HVAC and Electrical) program is very high. Less than ten percent of females that have enrolled in the HVAC and Electrical programs at this college have graduated.

Furthermore, the college in this study is dominated by males and should look at the potential of marketing to the female population. For example, enrollment in degree-granting institutions declined in enrollment from 1992 to 1995, but it was overshadowed

by large increases in the late 1990s. Much of this growth was in female enrollment. Between 1989 and 1999, the number of men enrolled rose five percent, while the number of women increased by 13 percent (U.S. Department of Education, 2001). Furthermore, approximately seventy percent of all adult college students are female (Swail, 2002).

Obviously, the national growth and distribution of gender is not true at the college studied. Within this study, male dominance in the population census was expected, given the historically male dominated computer and trade fields. Unlike the national statistics, the overwhelmingly male dominated population remained consistent for three of the four programs: HVAC and Electrical, at 97 percent and Computer Technology field, at 88 percent. However, while males were still the majority, at 65 percent, females appeared to be much more willing to enroll in the Computer Programming field than the other three fields offered. There are many similarities between all four fields, such as hands-on and detailed work. But looking at what separates Computer Programming from the other three areas, perhaps the stigma of heavy lifting in HVAC, Electrical, and Computer Technology is keeping a good number of females from enrolling in those fields.

Male undergraduates are more likely to be dependent and to come from middle- and upper-income families than females. Female students are more likely than male students to be older, have dependents, earn a low income, and take out student loans (King, 1999). Therefore, among the methods to attract a larger female population, the college administration should look at ways to help students with dependent care and make certain the application process for student loans is made as simple as possible.

Ethnicity: The discriminant analysis of this study indicates ethnicity has some predictability for grade point average, but very little for graduation. In other words, for this college you can somewhat predict grade point average based on ethnicity, but you cannot predict graduation rates based on ethnicity because these rates are similar between ethnicities. When ethnicity was combined with educational background, predictability increased for grade point average, but not significantly for graduating.

It is important for a college to determine if they are reaching significant numbers of minorities in their marketing efforts. With this in mind, the following compares the college studied with the ethnic makeup of the surrounding geographic area. The ethnicity breakdown of the college may at first seem too heavy with Caucasian, but when compared to the area's ethnicity demographics the college is actually double the proportion of Blacks and slightly under the proportion of Caucasians. Figure 6 illustrates and compares the ethnicity demographics of the Tulsa Metropolitan Statistical Area (MSA), where most of the students live and commute from, to the demographics of the Vatterott College students used in this study. The Tulsa Metropolitan Statistical Area includes the following Oklahoma counties: Creek, Okmulgee, Osage, Pawnee, Rogers, Tulsa, and Wagoner.

Based on these comparisons, it appears the college is performing overall good in attracting most ethnicities. Proportionally, they are performing best at attracting Black and Asian students. Some consideration could be given to stronger marketing efforts customized to American Indian and White populations.

Ethnic Distributions for Vatterott College and Tulsa MSA
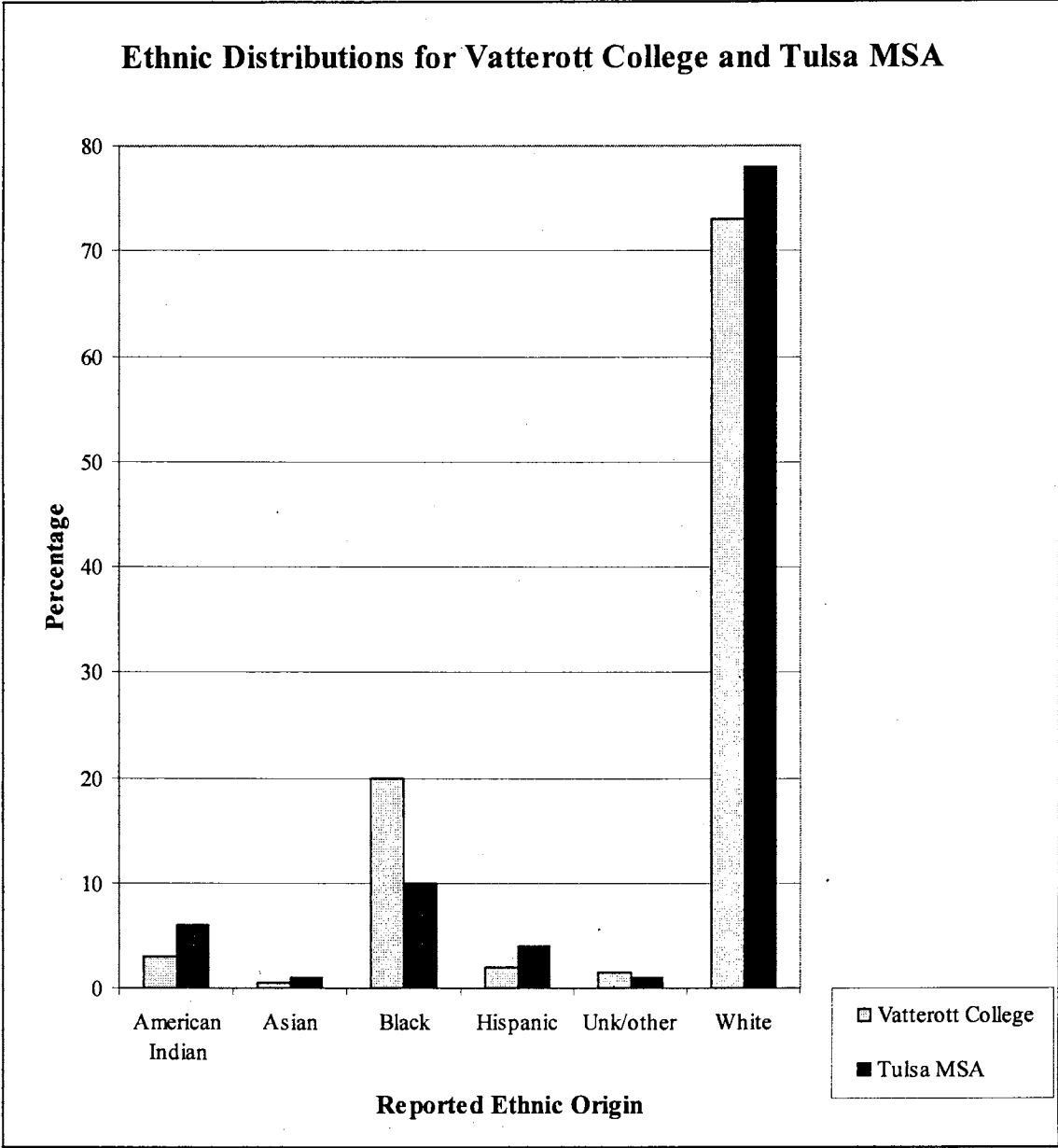
Figure 6. Ethnic Distributions for Vatterott College
and Tulsa Metropolitan Statistical Area (MSA)

Source of Tulsa MSA data: 2001 Supplementary Survey, U.S. Census Bureau.

Limitations

This is an ex post facto study. Interactions and manifestations between variables already occurred; therefore suppositions concerning relations between variables are inferred without direct intervention and reflect a noninvasive research study. Per Newman and Newman (1993), there are three primary limitations to ex post facto studies: 1) inability to manipulate independent variables, 2) inability to randomize, and 3) risk of improper interpretation because of the researcher's inability to manipulate. The limitations of ex post facto research lowered the internal validity. Outside forces were not controlled by the researcher for this project, but it still served its purpose of an initial exploratory research. This study did not attempt to show causation, as ex post facto studies cannot, according to Newman and Newman (1993). But it does attempt to show relationships between selected variables.

The study is also limited by the historical data available. For example:

1. It is not known if those students who dropped out enrolled at another postsecondary institution,

2. This study was limited by a definition of successful academic performance as accumulative grade point average, persistence rate, and graduation rate,

3. Demographic variables were limited by the population available,

4. This study could be limited by the set of instructors. A different set of instructors could have changed the outcomes,

5. This study could be limited by the learning environment. For example, the college studied has plans to move to a building three times its current size, more

attractive, and in a considerably nicer part of the city. Had the move occurred

prior to the study, it could have changed the demographic makeup, faculty and

staff attitudes, student attitudes, etc. and therefore, possibly the outcomes.

6. The only courses of study available to analyze at the time of the investigation

were the following: Computer Technology, Computer Programming, Electrical

Mechanic, and Heating, Air Conditioning, and Refrigeration Technology; thereby,

limiting the generalizability across other programs of study offered by proprietary

schools.

There also could be an historical time period effect, limiting the ecological validity

(extent to which the results can be generalized from the environmental conditions used or

created by the researcher (Borg and Gall, p640)). An example for this time period would

be the 9/11 (2001) World Trade Center bombing, which affected everything from the

economy, both national and local, to school enrollment. It is unknown what affect it had

on attrition, after graduation success, and other factors that could affect the outcome of

this study. Also, unknown interventions unique to the time frame of this study, such as:

teacher training, special student retention efforts, etc., could have affected the data. In

other words, the exact study performed during a different time frame might yield

different results due to economic, social, political, or other events.

While the internal validity is high since the entire school population was studied,

the external validity is limited by differences in proprietary colleges. There are significant

distinctions between proprietary colleges, such as mostly female or very specialized

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fields (i.e., court reporting). Generalizability of this study to a larger two-year, proprietary population is very limited.

Recommendation for Further Research

Further research into other areas of GED results will aid in establishing validity for a variety of situations. Where possible, studies are needed to cross validate this study's results by looking at proprietary colleges dissimilar to the one studied. Such distinctive attributes include:

1. concentrations of each possible ethnicity and more highly mixed school populations of ethnicities,

2. campus housing,

3. significant part-time student base,

4. largely female population and evenly mixed gender population,

5. populations with other strong age groups,

6. other programs of study,

7. and, a different blend of student funding sources.

Along with the examples listed above, it would be constructive to use the current model and try it on other populations challenging the cross validation of this study's results. Such replication would also expand the external validity of this study.

Although this study continued the trend of measuring performance through grade point average, future research can make an important contribution by studying the

comparison of ambition to performance for GED earners attending a proprietary college. Perhaps not every student attending a two-year proprietary college goal is to earn a 4.0 grade point average. A study of grade point average by term or year in school could identify possible trends. For example, do GED recipient's grade point averages improve as the student gets accustomed to attending school again?

Another recommended research project is to cross reference GED and high school diploma earning students by their career path status. For example, are they moving from job-focused earnings to career-focused earnings, changing careers, or starting with a career. This could also be cross-referenced with gender and age. It would also be worthwhile to study the statistics for age and success in college for GED and high school diploma earners to determine the shape of the statistical curve and if they are the same for both GED and high school diploma earners.

An ideal follow-up study would be to match subjects – select in such a manner that they are closely comparable - to increase relevancy and decrease mitigating variables. In addition, a longitudinal study of GED and high school diploma earners at proprietary colleges would provide more robust data.

A qualitative study with one on one interviews as a follow-up to this study would be very useful. Also, a study cross-referencing personality traits with GED and high school diploma earners could be beneficial.

There are many theories that researchers can test utilizing the proprietary college and/or GED versus high school diploma debates as fertile background. For example, Socioemotional Selectivity Theory (Fung & Carstensen, 2003) suggests that people of differing ages prioritize different types of goals. As people age they increasingly perceive

time as finite. It would be interesting to test this theory between proprietary and

traditional education, since proprietary students tend to be older than traditional students.

And, how is Socioemotional Selectivity Theory reflected in the age of when GED earners

first attempt the battery of tests?

A few of the additional established theories for future proprietary and GED

research include Expectancy Theory (Vroom, 1964), Social Need Model (McClelland,

1975), Need for Self-Determination (Decci, 1975), Motivational Control Theory (Hyland,

1988), ERG Theory (Alderfer, 1969), and Locus of Control Theory (Rotter, 1954).

Expectancy Theory states that people subconsciously judge the probability of completing

a task and create a value based on likelihood of completion and expected outcomes. The

Social Need Model looks at human need for affiliation, achievement, and power. Need

for Self-Determination Theory looks at intrinsic motivation based on a person's desire for

personal growth. Motivational Control Theory suggests that a person's actions are

dictated by a need to maintain homeostasis and that homeostasis is based on genetic and

leaning history differences. ERG Theory proposes that people are motivated by three core

needs: material, interpersonal relatedness, and personal development and growth. Locus

of Control divides people into two categories: those that believe external forces control

outcomes and those that believe they (internal) control outcomes.

Closing Comment

This study creates an inaugural guide for proprietary college administrators,

educators, and staff regarding success expectations of GED recipients. Until now,

proprietary college professionals have been deprived of relevant GED research that may well assist in decisions regarding enrollment, student services, financial aid, and placement. An important creation by means of this study has been the comprehensive listing, discussion, and categorization of GED studies (Chapter II and Appendixes A, B, and C).

Further, this study may provide insights for GED recipients as they seek out and assess the variety of postsecondary education institutions. By broadening the scope of GED research, filling a void within the research, and shedding light on contradictive research results, this study provides a more encompassing view of GED tendencies in enrolling, persisting, and completing postsecondary education. Also, GED architects now have more diversified data from which to work as they endeavor to improve the battery of tests. Never before has a GED study of proprietary education been available for those in charge of restructuring.

In conclusion, the current research project classifying prior GED studies and comparing GED and high school diploma earner's success at a proprietary college is essential for proprietary administrators and GED recipients to begin making research-informed decisions regarding college enrollment and support services. Potentially, this study can lay the groundwork and begin the advancement of GED research at two-year proprietary colleges.

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APPENDIXES

APPENDIX A

GED SELECTED STUDIES BY SCHOOL TYPE

Two - Year (Associates or Diploma Granting) Studies

Author	Year	Location	n = GED	n = High School
Aspinwall	(19)99	Georgia	85	309
Ayers C.	78	North Carolina	37	37
Banner	89	North Carolina	232	
Bean	99	Texas	422	2,934
Beltzer	84 & 85	New York	198	201
Bigby	89	Washington	83	106
Bottoms	83	North Carolina	109	201
Byrd, et. al.	73	North Carolina	311	50
Clark	87	Penn	56	56
Eschenmann & Olinger	92			
Falk	95		6	
Fisher	99	Florida		
Freas	89	PA, DE, NJ		
Fugate	72	Tennessee	490	
Grady	83	Florida	458	458
Griffin	80	North Carolina		
Hammons	99		659 combined GED & HS	
Hannah	72	Alabama	300	300
Hartung	48	Tennessee	59	
Henry	99	Midwest	131	
Junne	88	Michigan		
Klein & Grise	87 & 88	Florida		
Kothenbeutel	93	Iowa	410	
Krol, E	93	Michigan		
McElroy	89	Illinois	50	50
McLawhorn	81	North Carolina		
Means	87	Wyoming		
Moore	73	Texas	220	220
Nicholas	76	Ohio		
Nielson	86	Iowa		
O'Neill	95	New York	47	92
Phillips	96	California		
Ricketts	96	Tennessee	51	50
Roy-cited in Shepard	75	Massachusetts		
Scales	89	Alabama	47	45
Schillo	90	Ohio	40	40
Schlick	69	AZ		
Shepard	92	North Carolina	3,429 combined GED & HS	
Smith & Goetz	88	Texas	1,344	
Soltz	96	Midwest	5,616	
Sosa	2000	Texas	42	327
Spillar	82	Texas	105	105

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Author	Year	Location	GED	High School
Stadler	94	Wisconsin	1,900	
Swarm	81	5 Eastern states		
Turner	90	Massachusetts	87	
White	96	Mississippi	112	
Willett	82	Illinois	68	68
Willis	95	Georgia	33	366
Wilson	79	Midwest		
Wilson, Davis, & Davis	81	Florida	104	77
Wolf	76, 80, 83	Texas	100	250
Ziegler	92	Ohio		

Four - Year (Bachelor's Degree Granting) Studies

Author	Year	Location	GED	High School
Owens	89	Alaska		
Baird	60	Tennessee		
Witley	58	Florida		
Andrew	52	Utah		
Roon	72	Colorado		
Ebert	2002	Tennessee	143	143
Love & Love	47	Ohio		
Rogers, J.	87	Arkansas	442	375
D'Amico & Schmidt	57	Indiana	307	307
Quinn & Haberman	86	Wisconsin	2,896	
Rogers, G.	77, 78	Kentucky	170	688
Roeber	50	Kansas	71	397
Putnam	47	Oregan		
Mumma	50	Maryland	56	
Osei	2001	Virginia		
Larsen	79	Wisconsin	33	
Swarm	81	Midwest		
Colert	84	Canada	94	

Both Two and Four Year School Studies

Author	Year	Location	GED	High School
Behal	83			
Eschenmann & Olinger	89	Virginia		
Sharon	72	28 colleges		
Dressel & Schmid	51			

APPENDIX B

GED SELECTED STUDIES BY TIME FRAME

Author	Year	Location	n = GED	n = H.S.
	1940's			
Love & Love	47	Ohio		
Putnam	47	Oregan		
Hartung	48	Tennessee	59	
	1950's			
Mumma	50	Maryland	56	
Roeber	50	Kansas	71	397
Dressel & Schmid	51			
Andrew	52	Utah		
D'Amico & Schmidt	57	Indiana	307	307
Witley	58	Florida		
	1960's			
Baird	60	Tennessee		
Schlick	69	AZ		
	1970's			
Fugate	72	Tennessee	490	
Hannah	72	Alabama	300	300
Roon	72	Colorado		
Sharon	72	28 colleges		
Byrd, et. al.	73	North Carolina	311	50
Moore	73	Texas	220	220
Roy-cited in Shepard	75	Massachusetts		
Nicholas	76	Ohio		
Wolf	76, 80, 83	Texas	100	250
Rogers G	77, 78	Kentucky	170	688
Ayers C.	78	North Carolina	37	37
Larsen	79	Wisconsin	33	
Wilson	79	Midwest		
	1980's			
Griffin	80	North Carolina		
McLawhorn	81	North Carolina		
Swarm	81	5 Eastern states		
Swarm	81	Midwest		
Wilson, Davis, & Davis	81	Florida	104	77
Spillar	82	Texas	105	105

Author	Year	Location	GED	H.S.
Willett	82	Illinois	68	68
Behal	83			
Bottoms	83	North Carolina	109	201
Grady	83	Florida	458	458
Colert	84	Canada	94	
Beltzer	84 & 85	New York	198	201
Nielson	86	Iowa		
Quinn & Haberman	86	Wisconsin	2,896	
Clark	87	Penn	56	56
Means	87	Wyoming		
Rogers, J	87	Arkansas	442	375
Klein & Grise	87 & 88	Florida		
Junne	88	Michigan		
Smith & Goetz	88	Texas	1,344	
Banner	89	North Carolina	232	
Bigby	89	Washington	83	106
Eschenmann & Olinger	89	Virginia		
Freas	89	PA, DE, NJ		
McElroy	89	Illinois	50	50
Owens	89	Alaska		
Scales	89	Alabama	47	45

	1990's			
Schillo	90	Ohio	40	40
Turner	90	Massachusetts	87	
Eschenmann & Olinger	92			
Shepard	92	North Carolina	3,429 combined GED & HS	
Ziegler	92	Ohio		
Kothenbeutel	93	Iowa	410	
Krol, E.	93	Michigan		
Stadler	94	Wisconsin	1,900	
Falk	95		6	
O'Neill	95	New York	47	92
Willis	95	Georgia	33	366
Phillips	96	California		
Ricketts	96	Tennessee	51	50
Soltz	96	Midwest	5,616	
White	96	Mississippi	112	
Aspinwall	99	Georgia	85	309

Author	Year	Location	GED	H.S.
Bean	99	Texas	422	2,934
Fisher	99	Florida		
Hammons	99		659 combined GED & HS	
Henry	99	Midwest	131	
	2000's			
Sosa	00	Texas	42	327
Osei	01	Virginia		
Ebert	02	Tennessee	143	143

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APPENDIX C

GED SELECTED STUDIES BY STATE

Author	Year	Location	n = GED	n = H.S.
Sharon	72	28 colleges		
Swarm	81	5 Eastern states		
Hannah	72	Alabama	300	300
Scales	89	Alabama	47	45
Owens	89	Alaska		
Rogers, J	87	Arkansas	442	375
Schlick	69	AZ		
Phillips	96	California		
Colert	84	Canada	94	
Roon	72	Colorado		
Fisher	99	Florida		
Grady	83	Florida	458	458
Klein & Grise	87 & 88	Florida		
Wilson, Davis, & Davis	81	Florida	104	77
Witley	58	Florida		
Aspinwall	99	Georgia	85	309
Willis	95	Georgia	33	366
McElroy	89	Illinois	50	50
Willett	82	Illinois	68	68
D'Amico & Schmidt	57	Indiana	307	307
Kothenbeutel	93	Iowa	410	
Nielson	86	Iowa		
Roeber	50	Kansas	71	397
Rogers G	77, 78	Kentucky	170	688
Mumma	50	Maryland	56	
Roy-cited in Shepard	75	Massachusetts		
Turner	90	Massachusetts	87	
Junne	88	Michigan		
Krol, E.	93	Michigan		
Henry	99	Midwest	131	
Soltz	96	Midwest	5,616	
Swarm	81	Midwest		
Wilson	79	Midwest		
White	96	Mississippi	112	
Beltzer	84 & 85	New York	198	201
O'Neill	95	New York	47	92

Author	Year	Location	GED	H.S.
Ayers C.	78	North Carolina	37	37
Banner	89	North Carolina	232	
Bottoms	83	North Carolina	109	201
Byrd, et. al.	73	North Carolina	311	50
Griffin	80	North Carolina		
McLawhorn	81	North Carolina		
Shepard	92	North Carolina	3,429 combined GED & HS	
Love & Love	47	Ohio		
Nicholas	76	Ohio		
Schillo	90	Ohio	40	40
Ziegler	92	Ohio		
Putnam	47	Oregan		
Freas	89	PA, DE, NJ		
Clark	87	Penn	56	56
Baird	60	Tennessee		
Ebert	2002	Tennessee	143	143
Fugate	72	Tennessee	490	
Hartung	48	Tennessee	59	
Ricketts	96	Tennessee	51	50
Bean	99	Texas	422	2,934
Moore	73	Texas	220	220
Smith & Goetz	88	Texas	1,344	
Sosa	2000	Texas	42	327
Spillar	82	Texas	105	105
Wolf	76, 80, 83	Texas	100	250
Andrew	52	Utah		
Eschenmann & Olinger	89	Virginia		
Osei	2001	Virginia		
Bigby	89	Washington	83	106
Larsen	79	Wisconsin	33	
Quinn & Haberman	86	Wisconsin	2,896	
Stadler	94	Wisconsin	1,900	
Means	87	Wyoming		

APPENDIX D

VATTEROTT SAMPLE PLACEMENT TEST

Name _____

HVAC/Electrical

ADDITION   SUBTRACTION

1.) 5489   2.) 5273   3.) 6   4.) 1305   5.) 2000   6.) 5032
     + 103   4001   9   - 196   - 167   - 4109
                     +7982   4
                                    + 1

MULTIPLY   DIVIDE

7.)   39   8.) 1943   9.) 780 10.) 974 ÷ 12   11.) 312 ÷ 26   12.) 72 ÷ 72
       x 8   x 12   x 107

13.) Round to the nearest TENTH:
        a. 36.0156   _____
        b. 3.781   _____
        c. 0.987   _____

14.) Materials to landscape a new home cost $643.75. What is the amount of tax if the rate is 6%? Round to the nearest cent.

15.) When ordering sand, 5% waste is added to the order. What is the total amount that should be ordered if 450yd^3 of sand are needed?
        a.   22.5 yd^3
        b.   460 yd^3
        c.   472.5 yd^3

16.) ADD   32 5/8   17.) X = _____ °
           +16.625
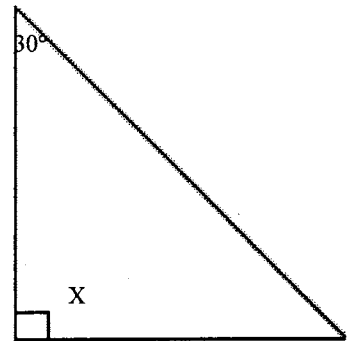
18. X + 7 = 23   X = _____

19.) Which of the following numbers is the same as 6 ¼?
        a. 6.14
        b. 6.4
        c. 6.01
        d. 6.25

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20.) On a particular day, four operators finished the following number of pieces: 112; 135; 129; and 137: What is the total number of pieces finished on that day?

21.) An air conditioning system circulates 450ft³ of air per minute. How many ft³ of air are circulated per hour?

22.) Which of these four numbers is the largest?
   a. 0.087
   b. 0.0093
   c. 0.013
   d. 0.12

23.) A piece of metal 1/8" thick is place between two blocks, each ¼" thick. What is the thickness of the three pieces together?

24.) If sand costs $2.50 per yd³, what would 3 ½ yds³ cost?

25.) How many units were produced in April? _____
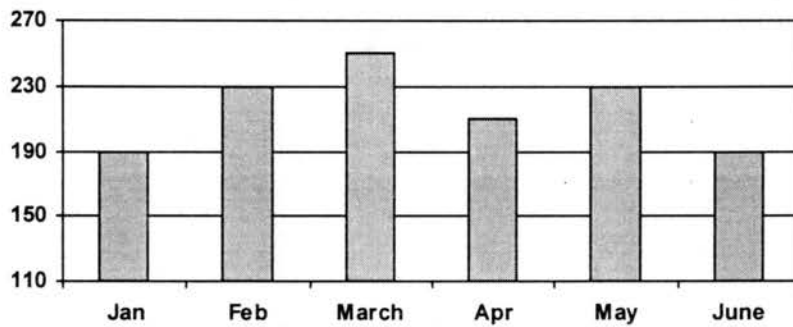
26.) In punching washers out of a metal strip, the average wastage is 35%. If the cost of the metal is $18,000, how much money is lost as waste?

27.) At Comey Manufacturing Col, machine operators are paid $1.50 per hour for a base production of 100 units and a bonus of $.20 for each 10 units above base production. What does a machine operator receive for 140 units per hour?

28.) Three samples of steel wire are tested for strength with these results: 268 lbs; 279 lbs; and 275 lbs. What is the average strength of the wire?
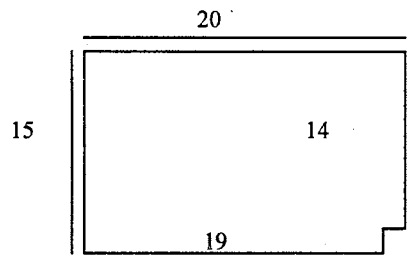

29. Four blades (A, B, C, D) of a feeler gauge are shown. Which <u>THREE</u> together give a thickness of 0.09"?
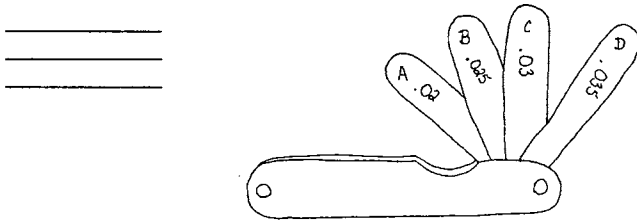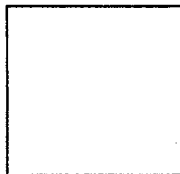

30.) A box 3' wide and 2' deep is to have a volume of 24 ft^3. How long must the box be?

31.) How many pieces of lumber are stacked in a pile 24" high is each board is 1/8" thick?

32.) The diagram shows a floor plan. What is the area of the floor in square feet? _____

33.) How many lines must be drawn on a 3 foot square piece of cloth to mark off nine 1 foot squares? _____

34.) A circular patch is to be placed over a 3" hole in a sheet of metal so that the patch extends ¾" all around. What will be the diameter of the patch?

35.) If 87% of all employees are present, what percent is absent?

VITA

Paul David Shuler

Candidate for the Degree of

Doctor of Philosophy

Thesis: ANALYSIS OF ACADEMIC PERFORMANCE AND
PERSISTANCE OF GED AND HIGH SCHOOL
DIPLOMA EARNERS AT A MIDWESTERN
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Oklahoma State University, Stillwater, OK 8/95 - 8/98; Program
Director, Oklahoma State University, Okmulgee, OK, 8/98 - 1/00;
Campus Director, Vatterott College, Tulsa, OK, 11/00 - present.