

2016

## The Influence of Enrollment in Career and Technical Education Courses on the Achievement of High School Special Education Students

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THE INFLUENCE OF ENROLLMENT IN CAREER AND TECHNICAL  
EDUCATION COURSES ON THE ACHIEVEMENT OF HIGH SCHOOL  
SPECIAL EDUCATION STUDENTS

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy

in

The School of Human Resource Education  
and Workforce Development

by

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August 2016

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To all the special education students I had the pleasure to teach. Words cannot express how thankful I am for the life lessons they taught me.

## ACKNOWLEDGMENTS

I would like to express the deepest appreciation to my committee chair Professor Michael Burnett who without his guidance and persistent help this dissertation would not have been possible. I would like to thank my committee members, Professor Earl Johnson and Professor Satish Verma, for their exemplary teaching and educational guidance. In addition, a thank you to Professor Eugene Reagan, who participated in my defense committee and offered his expertise to this work.

A special thanks goes to Barbara O'Rourke, my junior high school English teacher. I so appreciate her patient instruction and special attention to my humble attempts at writing. She believed in my abilities and encouraged me in ways she may never truly understand. A true gift!

I would also like to thank my parents, Wallace and Hilda Simoneaux, for providing an educational foundation on which to build.

Finally, I would like to thank my husband, Doug, for his love and support. I am also grateful to my sons, daughter-in-love and grandsons, Taylor, Wes and Kimmy, Drew, Hudson and Eli. They provided kind words, hugs and happy thoughts all along the way. And to Kim, my sister, who started me on this path and consistently provided all the support needed to see it to completion.

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## ABSTRACT

This dissertation joins a conversation in the special education arena about the academic and vocational agenda for special education high school students. It explores the influence of enrollment in Career Technical Education (CTE) courses on the achievement of high school special education (SPED) students. The purpose of this study was to compare the achievement of special education (SPED) students enrolled in Career Technical Education (CTE) courses with special education (SPED) students who were not enrolled in Career Technical Education (CTE) courses.

The study was designed to determine whether or not SPED students enrolled in CTE improved on the academic scores as measured by the Graduate Exit Exam (GEE) standardized test. The target population of this study was special education students enrolled in Louisiana public high schools. The sample for this study was made up of all 10th and 11th grade special education students who had taken part in the state mandated GEE during the 2008-2009 school year.

The instrument used to collect data for this study was a computerized recording form. The variables of the investigation were copied directly from the archival data source, developed by the Louisiana State Department of Education's Division of Student Standards and Assessments, into the study's recording forms.

To determine if relationships existed between CTE participation and achievement scores on standardized testing, ELA and Math scores were used as dependent variables. The other variables were treated as independent variables including the demographics of Age, Gender, Race, Socioeconomic Status (Full, Reduced and Free Lunch) and CTE program participation.

The major findings were that the CTE students had significantly higher scores on the overall ELA measures than non-CTE students. All six of the Math standards for which data were available were found significantly higher for the CTE students than for the non-CTE students. Also according to the finding, the majority of SPED students did not participate in a CTE program.

This researcher concluded that there was a positive academic outcome for those SPED students who participated in CTE. She recommended that SPED students be enrolled in CTE courses while participating in Louisiana public high school program.

## CHAPTER 1: INTRODUCTION

Education is a necessity for all people. Education broadens the horizons of its participants and gives a better understanding of the world and its many resources. The goal of today's educational culture is a respect of differences and acceptance of all persons within its domain, which includes all of its participants. Often times, in the educational arena, a percentage of the students is being excluded. While the rhetoric of the last few years has centered on encouraging every young person in America to go to college as a way to find gainful employment and a guaranteed route to the middle class, some are increasing their calls for additional pathways to those outcomes (Bidwell, 2014). Even President Barack Obama has called for more robust job training at both the high school and college levels, saying it's not enough for students to get an education past high school –they also must have the skills needed for in-demand jobs (Obama, 2006)

Historically, European countries have well-established vocational education programs, but often in the U.S. it comes with a stigma. The stigma suggests only under-achieving or troubled students end up in such programs. However, Career and Technical Education (CTE) has made its way back into the mainstream of educational arena such that with many high schools starting or reintroducing programs that focus on vocational skill building along with the rigor needed for academic success and assessment in the classroom (Schloss & Gunter, 2011).

During the last decade in Louisiana, changes were being decreed. Two controversial bills- House Bill 612 and Senate Bill 259 – required school districts to establish a career diploma for students who don't intend to attend college. Governor Bobby Jindal signed the two bills in July 2009 (Louisiana Department of Education, 2009). The bills proposed to reduce Louisiana's school dropout rate by creating a new career track high school diploma. The bills would

introduce a high school curriculum, which will offer more vocational and technical courses. However, the concept of two high school tracks produced quite a stir among educational and community leaders. But the need was clear and leaders determined change had to occur. Perhaps leaders were persuaded by the mandate of U.S. Education Secretary, Arnie Duncan who stated, “Education is the civil rights issue of our generation. We must come together to create a more equitable, hopeful, and prosperous future for every child and for our nation.” (Duncan, 2010 p. 1).

Among those who have the power and position to make necessary changes, what seems to be needed is a clear view of what is facing Louisiana public schools.

Ignoring the fact that some kids do not want to go to college has not erased the dropout problem in Louisiana. We must do what makes sense to rectify this problem. We cannot continue to do what we have always done and expect a different outcome. That's just insane. (Gewertz, 2009, p. 4)

Louisiana’s public school system is facing a crisis. The dropout rate for Louisiana high school students is staggering. Many feel this political change gives the state of Louisiana an opportunity to reach students who might otherwise slip through the cracks of our education system.

General Colin Powell, a United States statesman and a retired four-star general with the United States Army, was the 65th United States Secretary of State (2001-2005), serving under President George W. Bush. Powell, along with his wife, Alma, began America’s Promise Alliance as part of their dedication to the wellbeing of children and youth of all socioeconomic levels and their commitment to seeing that young people receive the resources necessary to succeed. He and Alma also formed Grad Nation- a 10-year campaign to “reverse the dropout crisis.” He calls the problem a “moral catastrophe.” (Powell, 2009). In America’s Promise he states that every 26 seconds, another student drops out of school in America – more than 1.3

million students per year. Present policies often dictate one-size-fits-all solutions and do not produce individual success in the “present day” classroom. Instead, this organization seeks to foster a flexible culture that will help schools meet this educational challenge. America’s

Promise provides these reasons for change:

- Every 26 seconds, another student drops out of school in America – more than 1.3 million students per year;
- More than one in three students fail to graduate from high school. As a result, we lose an entire graduating class every three years;
- Among minority students, less than 50 % of Native American and only a little more than half of African American and Hispanic students are completing high school on time;
- Young people who drop out are twice as likely as graduates to be unemployed, three times as likely to live in poverty, eight times more likely to wind up in prison, and twice as likely to become the parent of a child who drops out;
- Of those who do graduate, only about one-third have the skills they need to succeed in college and the 21st century workforce.

“America’s Promise” believes the solution to this crisis is providing more opportunities for young people to explore careers. The key is having students placed in real-world experiences; this allows the students to have opportunities, which can expose them to new things, helping them appreciate the relevance of their schoolwork. These at-risk-students may then become more motivated to stay in school and succeed. They also may be given the desire to reach career goals they set for themselves. Their aim is to encourage states to promote solutions that serve 21st century students and the challenges they face (Powell, 2009).

Social issues are also brought into play when dealing with high school graduation rates. A 2008 report by Invest in Kids, a national nonprofit organization made up of more than 4,000 police chiefs, sheriffs, prosecutors and violence survivors, found that high school dropouts are three and a half times more likely than graduates to be arrested and eight times more likely to be incarcerated (Louisiana Public Broadcasting, LA Public Square, 2009). This does not bode well for Louisiana, which currently claims the highest incarceration rate – one out of every 55 residents – than any other state. America’s Promise also reports that individuals who fail to earn a high school diploma are generally less healthy, die earlier and are more likely to become parents when very young. They are more likely to need social welfare assistance. Sadly, often their children are more likely to become high school dropouts themselves. This sets in motion an endless cycle of poverty. (Powell, 2009).

Educational innovation and real change means discarding policies and practices that no longer serve all the students. Educational programs must improve teaching and the curriculum to make school more relevant and engaging. They must also enhance the connection between school and work. This is key for those students who choose not to attend a 4-year college. Needed are leaders to become problem-solvers to help children learn and give students opportunities for real world learning like internships, service learning projects, etc. This would improve the students’ chances of graduating from high school and linking school with jobs and may convince more students to stay in school.

Dropout rates and high-stakes testing receive their share of media attention, but the likely connection between the two is rarely discussed outside of education circles. Federal and state policy initiative, No Child Left Behind (NCLB), made schools accountable for the progress of all children. Yet much recent research and anecdotal evidence suggest at least a correlation between



high-stakes testing, those mandated by the No Child Left Behind Act (NCLB), and dropout rates. Students appear to be dropping out of school earlier and in much greater numbers than previously believed, and high-stakes testing may be a leading cause (Shriberg, & Shriberg, 2006).

What may be needed is a philosophy that allows for “focused” education, which could play a major role in student achievement. It would provide a strategy that would support and offer programs that afford students multiple pathways for student achievement. The vision would be a blend of career and technical education concepts within the academic programs. It could prepare students for direct entry into the workforce, postsecondary education, and/or further training. The goal would be to provide all students a challenging, relevant, meaningful, and seamless education that makes them life-long learners unleashed into the 21<sup>st</sup> century and beyond (Partnership for 21st Century Skills, 2010).

A diversity of opportunities is the key to the Career and Technical Education (CTE) program when engaging the high school learner. The CTE educators prepare students for a diverse array of careers in agriculture, family and consumer science, healthcare, technology, business, food preparation and trade and industry. Some CTE training is delivered in the traditional classroom setting, but vocational educators also spend time instructing and supervising students in other settings. CTE educators set their classrooms in laboratories and give students tasks based on their classroom instruction. Another important facet of CTE is experiential or work-based learning. The students are engaged in a variety of learning environments that involve real life scenarios. Those students participating in the child development area might run an on-site, daycare center. Those involved in culinary arts may operate a for-profit cafeteria. CTE educators may also assist students with job placement to

expand upon their learning experiences. Programs encouraging activities similar to CTE have long been an important source of secondary education opportunities. As CTE continues to evolve and expand, so do the opportunities for the under achieving students enrolled in the programs. CTE programs offer an opportunity to learn a marketable trade to be successful far beyond high school.

It is also imperative to note that CTE participation can yield academic benefits as well. As well as focusing on vocational skills, CTE is designed to provide students with the tools to learn and develop skills needed in the academic school programs-involving math, science, writing and thinking skills. It can also benefit the students when engaging in jobs at home and in the marketplace. The numerous careers integrated in CTE are diverse and pervasive. CTE high school programs are teaching technical and analytical skills that will drive the students' education and careers forward. This type of engagement not only hones their aptitude in a variety of vocational areas, but the students also gain a greater understanding of the complexities of core-subject areas, including ELA, Math, Science and Social Studies.

The Institute of Education Sciences reports that Louisiana provides 11.9 % of its student population with Individualized Education Programs (IEP). The SPED population is defined as those identified with one or more of the 13 disability categories specified in the Individuals with Disabilities Education Act (IDEA) and served by an IEP (Education Department Highlights Testing Resources for Educators, Students, And Families, (2016).

One of the issues facing SPED is the number of students failing to receive a high school diploma. Lost in all of the discussion about positive graduation numbers is recognition that graduation rates for students with disabilities remain abysmal. Across the United States, 63 % of students with disabilities graduated from high school in 2014- a rate of graduation roughly 20 %

lower than the national average (Grindal & Schifter, 2016) According to Education Week Resource Center 2015 data, 40% of special education students in Louisiana received a high school diploma while 34% dropped out of school. This reveals a problem in the Louisiana system when educating the SPED population (Education Week, 2015).

CTE can provide substantial benefits to SPED students. CTE enrollment provides educational avenues to make it more likely that SPED students will complete the academic requirements necessary to graduate from high school. Research shows that students with disabilities in secondary CTE programs were less likely to drop out and more likely to be employed, to have paid competitive jobs, and to work full time after high school (Cobb et al., 1999). Also, SPED students receiving CTE “reported higher wages” (Harvey, 2002). This is no insignificant accomplishment. This information in itself is a powerful representation of how the lives of SPED high school students can be altered in such a way to produce lasting effects throughout their lives as well as their families.

Concerning the achievement of SPED students, most observers agree that educational outcomes for SPED students were inadequate before the new policies were implemented; and the current situation reveals that their achievement is still far below the average for the population at large. The SPED population must be engaged and enriched in the educational process. Many in the SPED population are dependent on “real-world” engagement to broaden the learning that takes place in the typical SPED classroom. The National Association of Agriculture Educators reports that in addition to many career opportunities in the field, vocational classes allow students to practice real applications of math, science and English concepts, and is among the reasons why high schools are embracing the CTE philosophy. It can play a key role in providing a strong mix of all school programs—academic, functional, occupational—carefully linked to each

other and to work experience, delivered with customized accommodations to meet SPED students' individual needs, and embodying the same high expectations they have of all students (Rutkowski & Riehle, 2001).

CTE deserves a place in any discussion of how schools can better support SPED high school students. How SPED students transition from high school to a meaningful career or even post-secondary education is no matter of small concern for educators. The questions arise. How do we know the preference for the SPED student population, academia or CTE? How do SPED students choose certain career paths? These questions must be explored. CTE may only be a minor preference in a SPED student's academic career or perhaps one that provides a major change in the course of their life. This educational renewal may be the last attempt of public education to help a SPED individual be a more productive, happier, and contributing member of their community [Dougherty & Hehir, 2013).

Concerning the academic educational sphere, the connection between SPED students and CTE can form a powerful bond that provides realism to the current educational practices that engulf the SPED student. SPED students were long left out of state testing procedure, but it is now a vital part of their educational experience. Providing the Least Restrictive Environment (LRE) to SPED students is crucial to ensure their academic needs will be met (Ward et al., 2003). However, LRE may become a lesser concern due to the compelling nature of the standardized testing. The "hands on" process of teaching promotes the understanding and application of concepts and theories of math, science and writing. They can become real to the SPED students who have difficulty comprehending theories and concepts in a traditional classroom. Recent reforms have spurred a rapid increase in changes, but the effectiveness of

accountability as an educational reform will depend on the extent to which it improves student achievement among their target SPED population.

There has been an increase in momentum of inclusive education in recent years (Giffing et al., 2010). When one considers the ever-evolving rate that SPED students are included in the CTE classroom, there is a continuing need to understand what these students are gaining from their experiences in the program including the learning environment and educational experiences offered to these students and how the SPED students are benefiting from them.

### **Purpose and Objectives**

The purpose of this study was compare the achievement of special education (SPED) students enrolled in Career and Technical Education (CTE) courses with special education (SPED) students who were not enrolled in Career and Technical Education (CTE) courses. The study was designed to determine whether or not SPED students enrolled in CTE improved on the academic scores as measured by the Graduate Exit Exam GEE standardized test. All of the students were participants in the public school educational system in the state of Louisiana.

This study involves four research objectives:

1. Describe 10th and 11th grade special education (SPED) high school students in Louisiana completing the GEE by the following characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

2. Determine the achievement, as measured by the scores on the ELA, Math, Social Studies and Science portion of the GEE, of SPED high school students in Louisiana.

3. Compare achievement, as measured by the score on the four primary scores (ELA, Math, Science, Social Studies) of the GEE, of 10th and 11th grade SPED students in Louisiana by whether or not they are identified as a CTE student.

4. To determine if a model exists explaining a substantial portion of the variance in achievement (as measured by the GEE- ELA, Math, Science and Social Studies overall scores) from the following demographic characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

### **Definition of Terms**

The following definitions of terms are provided for clarity.

American College Test (ACT)-The ACT is a curriculum and standards-based educational and career planning tool that assesses student 's academic readiness for college. The test is considered the capstone of the College and Career Readiness System.

America's Promise-This foundation was developed by Colin Powell in 1997 to help children and youth from all socioeconomic sectors in the United States working with hundreds of companies, non-profit organizations, faith-based organizations, educational institutions, as well as government agencies to achieve its goals.

The Alliance for Excellent Education- a Washington, DC–based national policy and advocacy organization dedicated to ensuring that all students, particularly those who are traditionally underserved, graduate from high school ready for success in college, work, and citizenship.

Vocational Education-The 1990 Perkins Act defines vocational education as "organized educational programs offering a sequence of courses which are directly related to the preparation of individuals in paid or unpaid employment in current or emerging occupations requiring other than a baccalaureate or advanced degree.”

Career and Technical Education (CTE)- This is a term applied to schools, institutions, and educational programs that specialize in skilled trades, applied sciences, modern technologies and career preparation.

Graduate Exit Exam (GEE) –Students in 10<sup>th</sup> grade must take the GEE in English language arts and math while 11<sup>th</sup> grade students take the GEE in science and social studies. Students must pass the GEE to graduate from high school.

End of Course Test (EOC)- In 2007, Louisiana began administering standards-based End-of Course tests, beginning with algebra 1, and then adding English II, Geometry, Biology, English III, American History.

Individualized Education Program (IEP) – An individualized legal contract prepared for every special education student. The IEP includes information that is specifically designed to meet his or her unique needs; it must include but is not limited to current performance, annual goals, special education and related services, participation with nonspecial education students, participation in state and district tests, transition needs, and discipline.

Individuals with Disabilities Education Act (IDEA) – Act that allowed for all students who have disabilities to receive a free and appropriate public education. Originally called the Education for

All Handicapped Children Act (EHA), that was signed into law in 1975. Today, EHA is known as IDEA.

National Association of Agriculture Educators (NAAE) -The National Association of Agricultural Educators is a federation of state agricultural educators associations. They are involved in school-based agricultural education at any level, from middle school through postsecondary, and state and national agricultural education leaders.

National Assessment of Vocational Education (NAVE) -The recently amended Carl Perkins Vocational and Applied Technology Education Act (Perkins III) directs the Secretary of Education to conduct an "independent evaluation and assessment of vocational and technical education programs under this Act" and appoint an independent advisory panel to advise the Secretary on the implementation of the assessment.

special education (SPED)- is the practice of educating students with special educational needs in a way that addresses their individual differences and needs. Ideally, this process involves the individually planned and systematically monitored arrangement of teaching procedures, adapted equipment and materials, and accessible settings. These interventions are designed to help learners with special needs achieve a higher level of personal self-sufficiency and success in school and their community, than may be available if the student were only given access to a typical classroom education.

Standardized Testing – a systematic sample of performance obtained under prescribed conditions, scored according to definite rules and capable of evaluation by reference to normative information.

Criterion-referenced tests- it is a style of test, which uses test scores to generate a statement about the behavior that can be expected of a person with that score. Most tests and quizzes that



are written by schoolteachers can be considered criterion-referenced tests. In this case, the objective is simply to see whether the student has learned the material.

LDE- Louisiana Department of Education

Least Restrictive Environment (LRE)- means that a student who has a disability should have the opportunity to be educated with non-disabled peers, to the greatest extent appropriate.

The National Association of State Boards of Education (NASBE) -is the only national organization giving voice and adding value to the nation's state boards of education. A non-profit organization founded in 1958, NASBE works to strengthen state leadership in educational policymaking, promote excellence in the education of all students, advocate equality of access to educational opportunity, and ensure continued citizen support for public education.

Stanford Achievement Test (SAT)-This Test Series, the most recent version of which is usually referred to simply as the "Stanford 10," is a set of standardized achievement tests used by school districts in the United States and in American schools abroad for assessing children from kindergarten through high school.

### **Importance of the Study**

The goal of educators is to impart to their students as much knowledge as possible and to encourage them to be lifelong learners. When educating students in a minority group, such as SPED, there can be challenges, especially for those educators who are responsible for producing proficient test scores for these students on standardized tests. It is imperative that learning be incorporated in every avenue possible- both academic and vocational. CTE is a great tool to reinforce the academic skills needed for success. And the reverse is also as relevant, classroom academics is a great tool to reinforce vocational skills needed for success.

Teachers feel an immense pressure regarding standardized testing, even those teaching SPED students. State standards and academic standardized testing have become the dominant focus schools in the state of Louisiana and across the nation. The No Child Left Behind Act (NCLB) stipulates statewide accountability systems based upon challenging academic content and achievement standards (Ward et al., 2003, p. 4).

The students Individual Education Plan (IEP) team is responsible to make prudent decisions when determining the best placement of instruction for SPED students. The IEP Team should include the parents, the student, teacher(s), administrator(s), parish representative and other necessary personnel involved with the student. The decision may involve deciding to include CTE programs. Regardless of the setting, the team should focus on providing the SPED student with a “learning map” that will ensure success both in the academic, vocational arena as well as provide for the transition of the SPED student beyond the high school stage. Therefore, the question must be asked, “Where will the SPED high school student receive the instruction needed for academic and personal achievement?” It is essential for someone on the IEP Team to have the knowledge to effectively gather and analyze the data to ensure proper educational placement.

If the results of this study reveal that there is a significant difference in scores of SPED high school students enrolled in CTE course on the GEE test scores, this study would provide valuable information to justify the need for SPED students to enroll in CTE courses. This result would support the decision to include additional courses and programs in the CTE programs for SPED students. It would also justify the student’s hard work in the vocational experience and learning arena.

If the results of this study reveal that there is not a significant difference in scores of SPED high school students enrolled in CTE on the GEE test scores, this study would provide valuable information to cause an educational discussion of how to ensure that valuable learning does take place in the CTE programs for its SPED students. Also, a study should ensue that targets how CTE can aid the SPED student in their academic pursuits. This study will help address the present dearth of research in that area.

It is imperative that this special population of students and those who serve them be given information in which to make one of the most important decisions in the SPED students' academic career. The question necessitates an answer- How does enrollment in Career and Technical Education courses influence the achievement of high school SPED students?

## CHAPTER 2: LITERATURE REVIEW

### **Introduction**

As far back as recorded history allows examination, the topic of how best to educate special education (SPED) individuals has been an emotionally charged and controversial topic. This is still true today. There exist divergent views concerning educational placement of SPED students. Understanding the history, differences of perspective and the heterogeneity of the population can assist in gaining an understanding of the issue (Luckner, J., 2004). However, the process for educating SPED students can be very complex given the considerations that must be drawn into focus.

SPED students are considered a low-incidence population in the educational arena. Historically, many SPED students were educated in separate schools specially designed for their population. However, the educational placement for these students has drastically changed. Federal laws, such as No Child Left Behind (NCLB) and the Individuals with Disabilities Act (IDEA), have been passed which provide a more diverse learning environment for students who are identified as SPED.

With the passage of federal legislation, SPED students have full rights to participate in the regular education and vocational process. With this evolution of educational opportunities brings a challenge to those professionals and parents who are responsible for their education. It is they who determine one of the most important educational decisions (for the students) in which to enroll the student for academic instruction. This placement decision will provide the student with educational opportunities and choices and will determine their future academic and vocational success.

The transition from high school to adult life for the special education population has dominated the field of special education for well over a decade (Phelps & Hanley-Maxwell, 1977). The central theme in special education transition has been an emphasis on productive post-school outcomes, primarily focused in the area of employment. The interest in transition is multi-faceted, but the most compelling reason is economic. Being gainfully employed and functionally independent is the "expected" post-school adult outcome in American society.

Also, never before has there been more accountability in American public schools for the academic performance of SPED students. NCLB makes it clear that public schools will be held accountable for the students with disabilities, limited English proficiency, and those from other subgroups performing at or above level in academic subjects as other students. The expectation that Career Training Education (CTE) contributes to the academic performance of their students, including their SPED students, is at an unprecedented high (Dormody et al., 2006).

### **History of Career and Technical Education (CTE)**

President George Bush has stated, "The bedrock of America's competitiveness is a well-educated and skilled workforce" (ACTE, 2007). Strong CTE programs are critical to preparing this well-educated and skilled workforce. CTE, formerly known as vocational education, has its roots in the beginning of the United States education system. The right to a free public education for children was stressed early in the United States educational system, as there was a need to educate future leaders. Formal education was turning to certain trades to educate the masses for economic purposes. In the early 19th century, public education combined with the workforce to create workers for different jobs. Schools arose which specialized in training students to enter a specific area of the workforce. This created the basic framework for CTE. The first manual training school, established in St. Louis, Missouri, in 1879, set the foundation for modern career

and technical education (CTE Trends and Issues, 2016). The original CTE program combined classroom learning with hands-on learning, a foundation from its earliest conception. In 1881, trade schools began to open their door, the first being in New York. The mass acceptance of CTE came after World War I as the movement began to spread. CTE enlarged its area of influence to include training individuals to re-enter the workforce. World War II brought the need to educate citizens for technical skills needed for defense purposes. The existence of CTE had made a lasting influence on the educational culture.

In modern times, the 1990 Perkins Act defined vocational education as organized educational programs offering a sequence of courses which are directly related to the preparation of individuals in paid or unpaid employment in current or emerging occupations requiring other than a baccalaureate or advanced degree (Mykerezi, P., 2003). Secondary vocational courses were classified into three types: (1) consumer and homemaking education; (2) general labor market preparation; and (3) specific labor market preparation. Specific labor market preparation courses teach students the skills needed to enter a particular occupational field. (U.S. Department of Education Institute of Education Sciences National Center for Education Statistics, Vocational Education in the United States: The Early 1990s. <http://nces.ed.gov/pubs/web/95024-2.asp>, 2004).

Such courses were grouped into the following occupational program areas:

- Agriculture;
- Business and office;
- Marketing and distribution;
- Health;
- Occupational home economics;

- Trade and industry (including construction, mechanics and repairs, and precision production); and technical and communications.

The 1998 Perkins Act required equal access for special populations, including students with disabilities, to all vocational programs, services, and activities and prohibits discrimination based on special population status (Wonacott, M., 2001). Obviously the CTE programs can provide an invaluable source of training for students who are not interested in a four-year postsecondary degree. Tim Barfield, Executive Director of the Louisiana Workforce Commission, was quoted as saying, “When you look at the businesses that I’ve dealt with directly; their biggest concern is not necessarily the four-year degree and beyond type occupations, the biggest concern is can we get that skilled labor force, the craftsman; the technician” [(Louisiana Public Broadcasting, p.1 (2009))]. The CTE program can provide the training to its participants and assist in transitioning students from high school to meaningful employment and beyond.

In the CTE classrooms in 2016, the career choices have become more diverse and present an array of opportunities for the participants. They offer a variety of avenues for learning clusters,

1. Agriculture, Food & Natural Resources;
2. Architecture & Construction;
3. Arts, A/V Technology & Communications;
4. Business Management & Administration;
5. Education & Training;
6. Finance;
7. Government & Public Administration;

8. Health Science;
9. Hospitality & Tourism;
10. Human Services;
11. Information Technology;
12. Law, Public Safety, Corrections & Security;
13. Manufacturing;
14. Marketing;
15. STEM;
16. Transportation, Distribution & Logistics.

The diversity of training opportunities can focus on the specific interest and abilities of the modern high school student from all abilities and backgrounds.

### **History of Standardized Testing**

Testing has changed drastically since its beginning in the public educational system. Standardized testing is the most commonly used method of evaluation in the United States as in many other countries in the world. Determining student achievement, growth, and progress is the stated purpose of the use of standardized testing. However, it was not always used for the same purposes nor was it so heavily relied on by our school systems as it is in today's educational arena.

The earliest record of standardized testing comes from China, where individuals hopeful for government jobs had to fill out examinations testing their knowledge of Confucian philosophy and poetry (Fletcher, D. 2009). In the Western world, the concept of essay testing was more formidable. Then came the Industrial Revolution that changed the educational landscape among the US. School age kids who were removed from the farms and factory jobs



and put behind desks. Along came standardized examinations that tested large numbers of students, a quick and easy method of evaluation and standardization testing which became standard practice. The early-standardized tests were also used in the military. Aptitude quizzes, which were called Army Mental Tests, were used to assign U.S. servicemen jobs during the war.

The first standardized tests used in the US educational market were the Scholastic Aptitude Test (SAT) and the American College Test (ACT). The SAT was founded in 1926 and designed by a nonprofit group of universities and other educational organizations. The earliest test lasted 90 minutes and tested knowledge of vocabulary and basic math. In 1959, Everett Franklin Lindquist, developed the ACT as a competitor to the SAT. In addition to math, reading and English skills, the ACT assessed students on their knowledge of scientific facts and principles and included a section that guided students toward a course of study by asking questions about their interests. The SAT is geared toward testing logic, while the ACT is regarded as a test of accumulated knowledge. Interestingly, their names no longer have any official meaning. They're now simply the ACT and SAT.

Before the arrival of the 21st century, the SAT and the ACT were just part of an array of tests students faced before entering college. In 2001, President George W. Bush ushered in his No Child Left Behind (NCLB) education reform that mandated an increase of state-mandated standardized testing as a means of assessing school performance. With the mandate came new academic evaluation tools and a variety of tests that have been administered to public school students. More recent standardized tests include the Graduate Exit Exam (GEE), and the End of Course Test (EOC).

The current ACT assessment measures high school students' general educational development and their capability to complete college-level work. It includes multiple-choice

questions covering four skill areas: English, mathematics, reading, and science. ACT states that its scores provide an indicator of college readiness. Currently, Louisiana students in the 11th grade are given the ACT, students in the 10th grade take the PLAN ACT standardized test and students in the 9th grade take the EXPLORE ACT standardized test. According to a research study conducted by ACT, Inc., in 2003, a relationship was found between a student's ACT composite score and the possibility of him or her earning a college degree.

The Stanford Achievement Test Series (SAT) is the most recent version of what is usually referred to simply as the "Stanford 10." It is a set of standardized achievement tests used to measure academic knowledge of elementary and secondary school students. The original was first published in 1926 and is now in its 10<sup>th</sup> version. A wide variety of subjects such as reading comprehension, mathematics problem-solving, language, spelling, listening comprehension, science, and social science are included in the testing procedure. The purpose of the test is to help teachers receive specific information to support instructional planning for individual students and to improve their teaching. However, in many states it is being replaced by state-created tests (mandated by the No Child Left Behind Act of 2001). The Stanford Achievement Test is not to be confused with the SAT college admission test published by the College Board in the United States.

The End-of-Course (EOC) standardized tests are given to high school students. EOC tests include six subjects: Algebra I, Geometry, English II and III, Biology and U.S. History. Student scores are categorized into the following achievement levels on the End-of-Course tests and are evaluated as follows:

- Excellent: A student demonstrates superior performance of the course content;

- Good: A student demonstrates mastery of course content and is well prepared for the next level of coursework in the subject;
- Fair: A student demonstrates only the fundamental knowledge and skills needed for the next level of coursework in the subject;
- Needs Improvement: A student does not demonstrate the fundamental knowledge and skills needed for the next level of coursework in the subject.

End-of-Course tests comprise between 15% and 30% of the student's final grade in the subject. School districts determine the percentage.

### **Graduate Exit Exam (GEE)**

For the purpose of this study, the focus will center on the Graduate Exit Exam (GEE). This test is an assessment program designed to evaluate a student's abilities in the core curriculum areas of science, social studies, mathematics, language and written composition based on a standard of measure. The GEE is developed for students in the 10th grade to take the GEE in English language arts and math. Students in 11th grade are required to take the GEE in science and social studies. Students must pass the GEE to graduate from most high-schools. Students receive one of five scores for each of the subject areas evaluated:

- Advanced;
- Mastery;
- Basic;
- Approaching basic;
- Unsatisfactory.

## **Graduation Rates and Enrollment in Career and Technical Education (CTE)**

Most careers in the 21st century will require students to engage in some type of postsecondary education, yet too many students leave school without even earning a high school diploma. The first step toward ensuring that each individual is able to contribute to the success of the American economy is making sure that every student is fully engaged in the educational process and completes high school. Too many students leave school without the skills and knowledge necessary to be successful in the 21st century workplace. Several decades ago, students who did not complete high school could still find good jobs paying family-supporting wages, but that is no longer the case without completion. High school dropouts are 15 % less likely to be employed, and earn almost 30% less than their diploma- or GED-holding peers (Career and Technical Education's Role in Dropout Prevention and Recovery, ACTE (2007)).

In the 2005 report "Dropping Out of High School and the Place of Career and Technical Education" by the National Research Center for Career and Technical Education found that students who entered high school at a normal or younger age had a decreased risk of dropping out of high school as they added CTE courses to their curriculum. The report suggests that this mix of CTE and academic courses lowers the dropout rate for students because the course balance offers them a broader array of experiences that can identify and encourage pathways to success (Plank et al., 2005). Another study conducted in 1998 by the University of Michigan found that high-risk students are eight to 10 times less likely to drop out in the 11th and 12th grades if they enroll in a CTE program instead of a general program (Kulik, J., 1988). The same study also reported that a quality CTE program can reduce a school's dropout rate by as much as six percent, and that CTE students are less likely than general-track students to fail a course or to be absent. Through its research, The National Dropout Prevention Center/Network has identified

15 strategies that have the most positive impact on the dropout rate. These strategies include:

- Systemic renewal;
- Safe learning environments;
- Family engagement;
- Early childhood education;
- Early literacy development;
- Mentoring/tutoring;
- Service-learning;
- Alternative schooling;
- After-school opportunities;
- Professional development;
- Active learning;
- Educational technology;
- Individualized instruction;
- CTE.

Not only does The Dropout Prevention Center/Network note CTE specifically as one of its 15 strategies, but also many of the other strategies are important components of CTE programs, such as individualized instruction, service learning, community collaboration, mentoring, active learning, and educational technology. According to their report, *Effective Strategies for Dropout Prevention Center* from Clemson University, states, “A quality CTE program and a related guidance program are essential for all students” (<http://dropoutprevention.org/effective-strategies/#CTE>, 2009).

## **Special Education (SPED)**

Special education (SPED) is any academic program or initiative aimed at serving students who have mental, physical, or emotional disabilities. The federal Individuals with Disabilities Education Act (IDEA) regulates most aspects of the practices that involve the special education programs. In the special education arena, it is acknowledged that every student's ability level is different. The IDEA groups students broadly into fourteen disability categories. They are:

- Autism;
- Deaf-blindness;
- Deafness;
- Developmental delay;
- Emotional disturbance;
- Hearing impairment;
- Mental retardation;
- Orthopedic impairment;
- Specific learning disability (e.g., dyslexia);
- Speech or language impairment;
- Traumatic brain injury;
- Visual impairment;
- Multiple disabilities;
- Other health impairments.

The majority of SPED students have mild to moderate learning disabilities. Most do not have severe to profound disabilities. For example, more than 40 % of all students who receive special services under IDEA are classified as having "specific learning disabilities." This

category is defined as “an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculation” (U.S. Department of Education, 2015). In practical terms, it includes any student with a discrepancy between his or her achievement and intellectual ability. It includes mild disabilities, such as dyslexia.

Many have the false assumption that the SPED population is comprised of low-functioning individuals who are unable to engage. But when one examines this special population of students a much different picture evolves. It is true that the special education students are highly diverse. However, the vast majority is not acutely disabled, either physically or mentally. Most are diagnosed with disabilities that do not necessarily mean reduced mental ability, which has led many to argue that, with special accommodations and support services, the majority of students with disabilities should be able to perform at grade level and graduate from high school with a regular diploma. Of course, this would require that the mandated standardized tests be passed for graduation to occur, or without some modification.

Many in the special education community argue that the majority of special education students can be expected to perform just as well as their general education classmates. For example, the National Center for Learning Disabilities argues that approximately 8 out of 10 students who receive services under IDEA could be expected to perform just as well as their non-disabled counterparts. “Simply put, the vast majority of students receiving special education in our nation’s schools...are found eligible under a disability category that in no way precludes them from—with appropriate services and supports—functioning at or above grade level or from achieving proficiency on a state’s academic content standards in reading and math,” the report concluded (Cortiella, p. 4, 2007). Other analysts such as Education Sector’s Erin Dillon have come to very similar conclusions (Dillon, 2007).

Understanding the makeup of the special education population helps to understand what can be expected of them to achieve. Because the special education population is varied, every student will be able to achieve at a different level. That's why special education requires Individualized Education Plans (IEP). The IEP mandated by IDEA draws on the results of a comprehensive evaluation of the student's educational needs at least once every three years (Smith, 2000). The IEP is used to identify the student's current level of educational performance; measurable goals and objectives; special education, related services, and other accommodations to be provided; and the extent of participation with nondisabled students. The SPED student's progress is measured, how parents will be informed of progress, and the extent of modification in state- and district-wide tests are also specified. Beginning at age 14, the IEP must include a statement of transition services the student will need to reach post school goals. Then, beginning at age 16, the IEP must include a statement of transition services to help the student prepare for graduation. There, individual post-school goals are developed and instructional activities and modifications, accommodations and supports appropriate to the SPED student's post-school goals are identified. Much of the discussion is based on transition from high school. A variety of individuals must work together in an effective IEP team, including special education, CTE, and academic teachers, program support staff, guidance counselors, and school administrators as well as employers or postsecondary education representatives. The larger the group, the greater the SPED student's connection to the broad educational resources needed for academic/vocational success.

It has been said that it is time to redefine, rethink and redesign education, especially SPED. Already changes have been made in the majority of students with disabilities now being served in regular education classrooms. This practice is known as "inclusion." There must be



continued conversations regarding the SPED students and how and where they can be best served. There is now a stronger call for SPED educators to provide greater accountability on key performance indicators that support successful academic and post-school outcomes for students with disabilities. This shift gained impetus with Chester E. Finn's publication, "Rethinking Special Education for a New Century." Finn recommended sweeping changes in federal special education policy. His report helped shape discussion of the next reauthorization of IDEA and identified the problems, analyzed their causes, and suggested solutions to the many issues that face SPED population of learners (Finn, 2001).

### **Individuals with Disabilities Education Act (IDEA)/ No Child Left Behind (NCLB)**

In the past, children with disabilities were left out of the state and district level assessment and accountability systems. In many cases they also did not have access to the general curriculum on which these assessments are based. One of the main issues with testing students with disabilities is the challenge students have in showing what they know on a standardized assessment (Lollis et al., 2009). SPED students have historically poor education outcomes and there were no external measures to indicate whether SPED students were learning. It seemed that no educational organization was held accountable. No Child Left Behind (NCLB) and the Individuals with Disabilities Act (IDEA) were two pieces of federal legislation that had a significant impact on the education of SPED students. These legislative actions have created new avenues for SPED students involving school enrollment choices where students are involved in educational courses, which can expand their abilities, stimulate their interests as well as provide skills needed to improve academic achievement.

The first major legislation was the implementation of the NCLB and its goal was for all students to attain a rating of minimum proficiency or better in reading and mathematics. The

responsibility for student achievement rests on the academic institution, the school system, and the state. NCLB focuses on the accountability for student progress and the standards-based education for every student, even those special populations (National Center on Educational Outcomes, 2003).

The second major legislation is Individuals with Disabilities Education Act (IDEA). The IDEA legislation required that all students up to age 21 must be provided with free appropriate public education in the least restrictive environment. Following IDEA guidelines, students must be evaluated, and an IEP must be established to ensure proper accommodations are being used for educational purposes. The main goal of IDEA is to ensure a least restrictive environment for all students. The “special education” these children receive aims to help them achieve not only in school, but also in work and other life settings. Therefore, the education includes everything from academic tutoring to teaching students life skills, like balancing a checkbook or cooking a meal. They may also receive other related services, such as an aide to help them during the school day, if needed. For a child to be eligible for SPED under IDEA, he or she must have a physical or mental impairment that affects academic performance or major life activity (Boser, 2009).

In summary, Congress enacted the Education for all Handicapped Children Act (EHA) in 1975. The purpose of this act was to ensure children with disabilities would receive a free and appropriate public education like all the other students (Yell et al., 2007). This was the initial legislation that held educators responsible for educating students with disabilities. With the passing of time and the reauthorizations of educational legislation, great strides have been made to ensure the students who have disabilities will make progress academically (Thurlow & Wiley,

2006). However, the effectiveness of accountability of this educational reform will depend on the extent to which it improves student achievement.

### **Special Education (SPED) Enrolled in Career and Technical Education (CTE)**

Research shows that students with disabilities in secondary CTE programs were less likely to drop out and more likely to be employed, to have paid competitive jobs, and to work full time after high school (Cobb et al., 1999 & Colley et al., 1998). SPED students who had paid or unpaid work experience in high school had better employment outcomes—higher wages, more hours, and more continuous employment. Furthermore, SPED students mainstreamed into regular CTE or academic classrooms obtained paid competitive jobs more often and felt better prepared to keep their jobs.

Qualitative studies reviewed by L.T. Eisenmann in his article “Characteristics and Effects of Integrated Academic and Occupational Curricula for Students with Disabilities”, “implies that integration of academic and vocational curricula promoted meaningful engagement and inclusion of students with disabilities by increasing persistence, academic achievement, and postsecondary engagement.”

Efforts were being made to integrate academic and vocational education to improve the quality of both academic and vocational education. The 1990 Perkins Act encourages secondary schools and postsecondary institutions to integrate these curricula to ensure an impact on their learners.

### **Achievement in Academic Areas (ELA, Math, Science, Social Studies)**

Achievement as defined by Merriam Webster (2015) is a result gained by effort and it implies hard-won success in the face of difficulty or opposition. As stated by Smith and Adams (1996) achievement can occur in five basic ways:

1. Physical skills (such as cutting metal or welding);
2. Increased knowledge (such as learning the reproductive system of bovine species);
3. Increased understanding (such as predicting outcome of adding fertilizers to a garden);
4. Increased appreciation for fine arts (such as fabricating a metal flowerpot stand);
5. Developing a new interest (such as care of a livestock animal may spark interest in veterinary medicine).

When addressing the development of the young minds of high school students thrown in today's educational culture of measuring achievement, the task can become daunting. The question educators face in today's educational arena is how to find avenues to measure the variety of ways that students can achieve in the classroom.

The measurement of achievement is of great consequence both for the educational system and for the individual student. When achievement is measured it informs the educator of the students' abilities and opens up avenues for meaningful instruction. It allows the student to be placed in courses that can maximize the student's learning environment. Providing input for instructors concerning the effectiveness of their teaching style helps to maximize learning for all students.

Through the integration of traditional academic and technical skills, CTE programs can serve to greatly enhance students' exposure to and mastery of important math, science and literacy skills. As the international PISA results showed, American students must not only increase their math and science knowledge, but also be able to apply this knowledge to the world around them. By teaching core academic content in the context of careers, students gain the essential skills that will help them achieve success in their futures.

Elevated levels of knowledge and skills in academic content areas are entirely essential, however leaders in the field of education will err if only more challenging courses are added without changing the approach to learning. However, many students who take college preparatory classes in high school still need college level remedial classes after graduation. There has been a rise in college preparatory course taking being offered to high school students. And even with the increase of these classes being taken the reading and mathematics performance by high school students taking the National Assessment of Education Progress has remained flat (National Center for Education Statistics. (2004), It can be deduced that the achievement problem is not just one of students only taking low-level courses. The dilemma goes much deeper. It seems related to unfocused curriculum and unconvincing instructional methods that are not reaching all students. Students need to be provided with opportunities to gain critical math, science and literacy skills in a relevant context (ACTE, 2006). They need to be encouraged to utilize principles of inquiry-based learning and exploration. In a study conducted by the National Research Center for Career and Technical Education entitled, “Building Academic Skills In Context: Testing the Value of Enhanced Math Learning in CTE,” it was discovered that when educators combine professional development with a pedagogic framework to teach mathematics that is inherent in CTE curricula, students who received the enhanced instruction scored significantly higher on standardized math tests than students who received their regular curriculum (Stone et al., 2006). In states like Arizona, where academic content has been made explicit in CTE courses and CTE teachers understand and teach to the state’s academic standards, CTE students have outperformed the general high school population.

## **Achievement in Special Education**

Taking the knowledge and skill sets that were aimed at preparing students for the workforce and combining adjustments necessary to accommodate SPED students is crucial for educators to understand about the learning environment (Pirtle, 2012).

While public schools are enhancing the programs to engage students in meaning and valuable learning experiences, there is also the need for evaluation and assessment of educational and CTE programs and curriculum. Therefore, standardized testing became a tool to assess school programs, public school teachers and students. Standardized tests, designed and administered by the Louisiana Department of Education have been given to the high school programs for decades. In theory, these standardized tests assure that all students in the public school arena are receiving a quality education.

Yet the achievement of SPED students lags far behind their non-disabled counterparts. Only half of all students with disabilities leave high school with a standard diploma. In some states, the achievement gap on the state achievement test between students with disabilities and those without is more than 45 percentage points (Boser, 2009).

There has been growth in a student being identified as special education, and since NCLB has promoted accountability measures, the achievement of these students cannot be disregarded. While specific solutions are elusive due to the lack of research, when schools and districts target resources and support, the achievement of students with disabilities does increase (Center for Public Education, 2009).

## **Summary**

CTE has a long-standing role in the education of the SPED student. The hands-on experience and the diversity of content can provide students many avenues to connect and

sustain learning. The use of CTE programs in high schools can also provide a significant approach to addressing the nation's high school graduation crisis by imparting relevant learning experiences, which keep participants engaged in the learning process.

With the onset of educational reform involving standardized testing and achievement, SPED students need avenues to enhance students' academic achievement. By increasing SPED student engagement and helping students apply core academic skills, CTE programs can generate paths to assist in their academic achievement. Exposure to this array of learning opportunities during their formative education years will benefit the SPED student in their academic and vocational endeavors

There is a necessity to provide the SPED population with an educational experience that reaches into all areas of learning, combining the academic classroom environment and CTE hands-on setting. A true partnership could be created in which the SPED student could learn and succeed in the classroom and beyond. It is essential that there to be an enhanced understanding that all human beings are diverse and have particular needs that must be met for optimal development to occur. Hopefully, the future will be filled with less controversy and increased successes for the SPED population of learners.

## CHAPTER 3: METHODOLOGY

### **Purpose of the Study**

The purpose of this study was to compare the achievement of special education (SPED) students enrolled in Career and Technical Education (CTE) courses with special education (SPED) students who were not enrolled in Career and Technical Education (CTE) courses. The study determined whether or not SPED students enrolled in CTE improved on the academic scores as measured by the GEE standardized test. All of the students were participants in the public school educational system in the state of Louisiana.

### **Objectives**

This study involved four research objectives:

1. Describe 10th and 11th grade Special education (SPED) high school students in Louisiana completing the GEE by the following characteristics:
  - a. Age;
  - b. Gender;
  - c. Race;
  - d. Socioeconomic Status;
  - e. CTE program participation.
2. Determine the achievement, as measured by the scores on the ELA, Math, Social Studies and Science portion of the GEE, of SPED high school students in Louisiana.
3. Compare achievement, as measured by the score on the four primary scores (ELA, Math, Science, Social Studies) of the GEE, of 10th and 11th grade SPED students in Louisiana by whether or not they are identified as a CTE student.



4. To determine if a model exists explaining a substantial portion of the variation in achievement (as measured by the GEE- ELA, Math, Science and Social Studies overall scores) from the following demographic characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

### **Population and Sample**

The target population for this study was defined as all SPED students enrolled in Louisiana public high schools. The accessible population was defined as all 10<sup>th</sup> and 11<sup>th</sup> grade SPED students enrolled in Louisiana public schools who had taken part in the state mandated Graduate Exit Examination (GEE) at secondary schools in the spring of the 2008-2009 school year. It should be noted that this was the last year that the GEE was available for this population. The students for this study were a census of the defined accessible population. The sample was defined as 100% of the accessible population.

### **Instrumentation and Data Collection**

The instrument for this research was a computerized recording form. The variables of the investigation were copied directly from the archival data source, developed by the Louisiana State Department of Education's Division of Student Standards and Assessments, into the study's recording forms. The variables transferred and studied included:

- a. Age;
- b. Gender;

- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

Data for this study were collected by retrieval of information from an archival data set established by the Louisiana State Department of Education. Permission was sought to acquire a copy of the information needed to accomplish the objective of this study by contacting the Louisiana State Department of Education's Division of Student Standards and assessments.

### **Data Analysis**

1. Objective 1 was to describe 10th and 11th grade Special education (SPED) high school students in Louisiana completing the GEE by the following characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

This objective was accomplished using descriptive analyses for the variables measured. Those measured on a categorical scale were described using frequencies and percentages. These included age, gender, race, socioeconomic status, CTE program participation and test scores. The variable measured on a continuous scale (age) was described using means and standard deviations.

2. Objective 2 was to determine the achievement, as measured by the scores on the ELA, Math, Social Studies and Science portion of the GEE, of SPED high school students in Louisiana.

These achievement measurements were on an interval scale; therefore they were described using means and standard deviations.

3. Objective 3 was to compare achievement, as measured by the scores on the four primary areas (ELA, Math, Science, social Studies) of the GEE, of 10th and 11th grade SPED students in Louisiana by whether or not they are identified as a CTE student.

Since the dependent variables (achievement on ELA, Math, Science and Social Studies) were measured as interval variables comparisons were made using t-tests (if the independent variable is dichotomous) or ANOVA (if more than 2 categories).

4. Objective 4 was to determine if a model exists explaining a substantial portion of the variance in achievement (as measured by the GEE- ELA, Math, Science and Social Studies overall scores) from the following demographic characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

A series of Multiple Regression Analysis (MRA's) were conducted with each overall achievement score (ELA, Math, Science and Social Studies) used as the dependent variable and the demographics entered as the independent variables. The analyses were conducted using stepwise entry of variables since the study is exploratory. Additionally, variables were entered into the explanatory model that added 1% or more to the explained variance as long as the overall model remained significant.

## CHAPTER 4: FINDINGS

The purpose of this study was to compare the achievement of special education (SPED) students enrolled in Career and Technical Education (CTE) courses with special education (SPED) students who were not enrolled in Career and Technical Education (CTE) courses. The primary dependent variable for this study was the academic achievement of 10th grade and 11<sup>th</sup> grade students as measured by the GEE Test. Findings of the study are presented by objective.

### **Research Objective One**

The first objective of the study was to describe 10th and 11th grade Special education (SPED) high school students in Louisiana completing the GEE on the following characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

#### Age

One variable on which subjects were described was age. Of the 6,027 students in the study, data regarding age were available on all subjects. Of these, the largest group (n=2245, 37.2%) was identified as 16 years old. About one-fourth were each of the ages 15 and 17 (n=1528, 25.4% and n=1369, 22.7% respectively). There were only three subjects that were 21 (See Table 1). The mean age of the study group was 16.5 (SD= 1.029).

Table 1 Age of 10<sup>th</sup> and 11<sup>th</sup> Special Education Students in Louisiana Completing the GEE

Age	Frequency	Percent
Fourteen	369	6.1
Fifteen	1528	25.4
Sixteen	2245	37.2
Seventeen	1369	22.7
Eighteen	424	7.0
Nineteen	77	1.3
Twenty	12	.2
Twenty-one	3	0

*Note.* Mean age=16.5 years SD=1.029

### Gender

Another variable on which subjects were described was gender. Of the 6,027 students in the study, data regarding gender were available for 6013 students. Of these 3,513 (58.4%) were male and 2,500 (41.6%) were female (See Table 2).

Table 2 Gender of 10<sup>th</sup> and 11<sup>th</sup> Special Education Students in Louisiana Completing the GEE Test

Gender	Frequency	Percent
Male	3,513	58.4
Female	2,500	41.6
Total	6013	100.0

*Note.* Data regarding Gender were unavailable for 14 study subjects.

### Race

A third variable used to describe the subjects in the study was race. The total number of subjects for which data were available was 6020. The racial group that was identified by the largest number of subjects was Caucasian (n= 2978, 49.5%). There were 2,802 African Americans in the study population that constituted 46.5% of the data. The smallest group in the study was the Native Americans who numbered only 50 or .8% (See Table 3).

Table 3 Race of 10<sup>th</sup> and 11<sup>th</sup> Special Education Students in Louisiana Completing the GEE

Race	Frequency	Percent
Caucasian	2978	49.5
African American	2802	46.5
Hispanic	124	2.1
Asian	66	1.1
Native American	50	.8
Total	6020	100.0

*Note.* Data regarding Race were unavailable for seven study subjects.

#### Socioeconomic Status

For this study, Socioeconomic Status was measured by school lunch status. There were three categories that described the status - paid lunch, free lunch, and reduced lunch. Of the 6000 students in the study for whom data were available, 2573 or 42.9% were classified in the paid lunch group. Additionally, 2997 or 49.9% of the students were classified in the free lunch group. Four hundred thirty subjects (7.2%) paid a reduced price for their lunch. The lunch status was not identified for 27 of the study subjects (See Table 4).

Table 4 Socioeconomic Status as Measured by School Lunch Status of 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Lunch Status	Frequency	Percent
Paid lunch	2573	42.9
Reduced lunch	430	7.2
Free lunch	2997	49.9
Total	6000	100.0

*Note.* Data regarding lunch status were unavailable for 27 study subjects.

#### CTE program participation

Another variable on which students were described was the CTE program participation. Of the 6,027 SPED students in the study, examination of the data revealed that 1,307 or 21.7% of the subjects participated in CTE. The other 4720 or 78.3% of the subjects did not participate in CTE (See Table 5).

Table 5 Career and Technical Education Participation by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

CTE Participation	Frequency	Percent
Participated	1307	21.7
Did Not Participate	4720	78.3
Total	6027	100.0

Students were also described on the specific CTE programs in which they participated. There were six CTE programs that were available for participation. They involved Agriculture, Food and Natural Resources; Business, Management and Administration; Family Consumer Science; Health Science; Marketing Sales and Services; and Technology Information. Among the CTE programs, the area in which the largest group of SPED students participated was Business, Management and Administration with 547 subjects (41.9%). Family Consumer Science was the second most populated CTE area with 262 subjects (20.1%). The area with the fewest SPED students was Marketing Sales and Services with 14 subjects (1.15%) (See Table 6).

Table 6 Level of Participation in Specific CTE Areas by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

CTE Area	Frequency	Percent <sup>a</sup>
Agriculture, Food and Natural Resources	167	12.8
Business, Management and Administration	547	41.9
Family Consumer Science	262	20.1
Health Science	107	8.2
Marketing Sales and Services	14	1.1
Technology Information	142	10.9
Trade and Industry	137	10.5

<sup>a</sup>Percentages do not total 100 due to participation in multiple CTE programs.

Extent of participation in CTE programs was also examined as a proportion of the total number of SPED students in the study (See Table 7).

Table 7 Level of Participation in Specific CTE Areas by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

CTE Area	Participated in CTE	
	N	Percent
Business Management and Administration	547	13.0
Family Consumer Science	262	6.2
Agriculture Food and Natural Resources	167	4.0
Technology Information	142	3.4
Trade and Industry	137	3.3
Medical/Health Science	107	2.5
Marketing Sales and Services	13	0.3

*Note.* The total numbers of subjects in the study was 6027.

### **Research Objective Two**

The second objective of the study was to determine the achievement, as measured by the scores on the English Language Arts, Math, Social Studies and Science portion of the GEE, of SPED high school students in Louisiana.

Tenth graders are required to take the English/language arts and the mathematics sections of the GEE. Eleventh grade students must take the science and social studies components of the GEE. Each of the sections of the 10<sup>th</sup> and 11<sup>th</sup> Grade GEE Test is given a scaled-score and a raw score. The scaled-score is then used to establish which category of achievement the students have attained (GEE 2009 Interpretative Guide, 2009, p. 1) and each of these scaled scores has a possible range of 100 to 500. The Advanced level recognizes that the student “has demonstrated superior performance beyond the level of mastery” (GEE 2009 Interpretative Guide, 2009, p. 1). Scoring “Mastery” means that student ‘demonstrated competency over challenging subject matter and is well prepared for the next level of schooling’ (GEE 2009 Interpretative Guide, 2009, p. 1). The “Basic” level includes student who “demonstrates only the fundamental knowledge and skills needed for the next level of schooling” (GEE 2009 Interpretative Guide, 2009, p. 1). “Approaching Basic” scores mean the student “partially demonstrated the



fundamental knowledge and skills needed for the next level of school” (GEE 2009 Interpretative Guide, 2009, p. 1). The “Unsatisfactory” category signifies student scores in which the student “has not demonstrated the fundamental knowledge and skills needed for the next level of schooling” (GEE 2009 Interpretative Guide, 2009, p. 1).

Each academic section of the 10<sup>th</sup> and 11<sup>th</sup> Grade GEE Exam is different, but there are some common factors to all of the sections. Each of the sections has a scaled-score used to determine the five achievement levels. A raw score is given to each test and is based on the number of points earned for correct answers to questions. The English Language Arts (ELA) section of the GEE Exam consists of a general ELA section, Reading and Responding section, seven ELA Standards, four subtests, six Writing sections, a Constructed Response section and a Multiple-Choice section.

The data for ELA includes scaled-scores, raw score, achievement category, standards and subtests. It also provides a raw score, scaled-score, and achievement level for the reading section. The writing section is divided by writing standards. The Mathematics, Science and Social Studies do not have as much diversity of scoring as the ELA.

#### English Language Arts (ELA)

Research question two begins with the data gathered from the ELA portion of the GEE Exam. Data were available for 3084 subjects for this portion of the exam. The mean scaled-score in ELA was 268.9 with a standard deviation of 61.86 (See Table 8). This score would be in the Approaching Basic category.

On the 10<sup>th</sup> Grade GEE ELA Exam, students who score at the Basic Level or higher are not required to complete remediation or further testing. The largest number of students (n=1359 or 44.1%) scored at the Unsatisfactory Achievement Level.

Table 8 English Language Arts Scores on GEE by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

ELA Scores	Mean	Std. Deviation	Minimum	Maximum
ELA Scaled Score	268.9	61.86	100	464
<i>ELA Raw</i>	35.2	11.96	.0	65.5

*Note.* ELA complete data were available for 3,084 subjects.

The scoring category with the second highest number of subjects was Approaching Basic with 753 subjects or 24.4 %. The category with the fewest subjects was Advanced with 22 or .7% (See Table 9).

Table 9 English Language Arts Achievement Scores by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Achievement Category	Frequency	Percent
Advanced	22	.7
Mastery	200	6.5
Basic	750	24.3
Approaching Basic	753	24.4
Unsatisfactory	1359	44.1
Total	3084	100.0

*Note.* Data regarding ELA GEE achievement scores were unavailable for 2943 study subjects.

## Reading Section

Another component of the ELA GEE Exam that was studied was Reading. This portion was presented as both a raw and scaled-score and is based on both the Reading and Responding subtests. The total number of study subjects for whom data were available was 3074. The mean scaled-score for reading was 282.6 with a standard deviation of 52.54. The Reading Raw score mean was 18.4 and the standard deviation as 7.64. This falls into the Below category (See Table 10).

Table 10 Reading Scores on GEE by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Reading Scores	Mean	Std. Deviation	Minimum	Maximum
Reading Scaled Score	282.6	52.54	100	495
Reading Raw	18.4	7.64	.0	38.5

*Note.* Data regarding ELA GEE achievement scores were unavailable for 2953 study subjects.

A unique aspect of the ELA Reading portion of the exam is that it has only three achievement categories. This is unique for the test because all other sections have five achievement categories. On the Reading portion of the exam, the largest group (n=1903 or 61.7%) scored in the Below category on the Achievement Level. The next highest level was Basic with 29.3%. The smallest number of subjects (9.0%) scored Above on their Achievement Level (See Table 11).

Table 11 Reading Achievement Scores by 10<sup>th</sup> and 11<sup>th</sup> Grade Special Education Students Completing the GEE

Achievement Category	Frequency	Percent
Above	277	9.0
Basic	904	29.3
Below	1903	61.7
Total	3084	100.0

*Note.* Data regarding Reading GEE achievement scores were unavailable for 2953 study subjects.

Another set of data examined were the ELA standards used to develop this specific section of the 10<sup>th</sup> and 11<sup>th</sup> Grade GEE Test. The number of possible points earned was different for each standard. The ELA portion of the GEE test consisted of scores for seven content standards and scores for four subtests. Regarding the content standards, the standard that had the highest percent of correct responses, was “Standard 2-Write Competently” with a mean of 5.0 (SD = 1.26) and with 62.7 % correct responses. The second highest score was Standard 3- Use of Conventions of language with a mean score of 6.9 (SD = 2.69) and 57.5% correct responses. The standard with the lowest percent of correct responses was Standard 6, Read, analyze and respond to literature with a mean score of 4.5 (SD = 2.56) and 37.9% correct responses (See Table 12).

Table 12 English Language Arts Standard Scores by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

ELA Standards	Mean <sup>a</sup>	SD	Minimum	Maximum	Percent
ELA Standard 1-Read, comprehend, and respond	5.3	2.11	0	10	52.7
ELA Standard 2- Write competently	5.0	1.26	0	8.0	62.7
ELA Standard 3-Use conventions of language	6.9	2.69	.0	12.0	57.5
ELA Standard 5-Locate, select, and synthesize information	4.9	2.07	0	9	54.3
ELA Standard 6- Read, analyze, and respond to literature	4.5	2.56	0	12.0	37.9
ELA Standard 7-Apply reasoning and problem-solving skills	8.6	3.79	0	18	47.7

*Note.* Standard Four data was not collected. N=3084 total subjects.

The ELA Exam is organized into four Subtests each of them having a different possible highest score. The tests were recorded as Subtest One-Writing, Subtest Two- Using Information Resources, Subtest Three-Reading and Responding and Subtest Four-Proofreading. Of these subtests, Subtest One, Writing, with a mean score of 7.9 (SD = 2.13) had the highest percentage of correct responses (65.9%). The subtest with the lowest percent of correct responses was Subtest Three, Reading and Responding, with a mean score of 18.4 (SD = 7.64) and 47.8% correct responses (see Table 13).

Table 13 English Language Arts Subtests Table by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

ELA Subtest	Mean <sup>a</sup>	SD	Minimum	Maximum	Percent
ELA Subtest 1-Writing	7.9	2.13	0	12.0	65.9
ELA Subtest 2- Using Information Resources	4.9	2.07	0	9	54.3
ELA Subtest 3- Reading and Responding	18.4	7.64	0	38.5	47.8
ELA Subtest 4- Proofreading	4.0	1.99	0	8	50.0

*Note.* Data regarding ELA GEE achievement scores were unavailable for 2943 study subjects. N=3084 total subjects.

The Writing subtest was further divided into six Writing Standards scores. They consisted of Composition, Style and Audience Awareness, Sentence Formation, Usage,

Mechanics and Spelling. The writing standard score that was found to have the highest percentage of correct responses was Mechanics with a mean score of .86 (SD = .30) and 85.6% correct responses. The second highest score was Spelling with a mean score of .82 (SD .34) and 81.5% correct responses. The standard that had the lowest percentage of correct answers was Usage with a mean score of .58 (SD = .44) and 58.0% correct answers (See Table 14).

Table 14 English Language Arts Writing Standards by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

ELA Writing Standards	Mean	SD	Minimum	Maximum	Percent
ELA Write 1- Composition	2.5	.64	.0	4.0	62.9
ELA Write 2- Style and Audience Awareness	2.5	.66	.0	4.0	62.4
ELA Write 3- Sentence Formation	.65	.42	.0	1.0	64.8
ELA Write 4- Usage	.58	.44	.0	1.0	58.0
ELA Write 5- Mechanics	.86	.30	.0	1.0	85.6
ELA Write 6- Spelling	.82	.34	.0	1.0	81.5
ELA Writing Total	7.9	2.13	.0	12.0	65.9

*Note.* Data regarding ELA GEE achievement scores were unavailable for 2943 study subjects. N=3084 total subjects.

There were two item types, Multiple Choice and Constructed Response, as presented in Table 16. Students' percentage of correct responses for multiple choice test items was 56.2% whereas the percentage of correct responses for the constructed-response items was 32.3% (See Table 15)

Table 15 English Language Arts Multiple Choice/Constructed Response Scores by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

ELA Subtest	Mean	SD	Minimum	Maximum	Percent
ELA Multiple-Choice Items	18.5	6.35	.0	33	56.2
ELA Constructed- Response Items	8.8	4.77	.0	23.5	32.3

*Note.* Data regarding ELA GEE achievement scores were unavailable for 2943 study subjects. N=3084 total subjects.

## Math

The second academic subject described in Objective Two was Mathematics. The test questions were created using six strands. In the Louisiana mathematics framework, each of six

mathematics strands is associated with a single standard. Following is the complete text of the mathematics strands:

Strand N=Standard One: Number and Number Relations Standard: In problem-solving investigations, students demonstrate an understanding of the real number system and communicate the relationships within that system using a variety of techniques and tools.

Strand A=Standard Two- Algebra Standard: In problem-solving investigations, students demonstrate an understanding of concepts and processes that allows them to analyze, represent, and describe relationships among variable quantities and to apply algebraic methods to real-world situations.

Strand M=Standard Three- Measurement Standard: In problem-solving investigations, students demonstrate an understanding of the concepts, processes, and real-life applications of measurement.

Strand G: Standard Four= Geometry Standard: In problem-solving investigations, students demonstrate an understanding of geometric concepts and applications involving one-, two-, and three-dimensional geometry, and justify their findings.

Strand D: Standard Five= Data Analysis, Probability, and Discrete Math Standard: In problem-solving investigations, students discover trends, formulate conjectures regarding cause-and-effect relationships, and demonstrate critical-thinking skills in order to make informed decisions.

Strand P: Strand Six= Patterns, Relations, and Functions Standard: In problem-solving investigations, students demonstrate an understanding of patterns, relations, and functions that represent and explain real-world situations. (GEE 2009 Interpretive Guide, 2009, p. 3-4).

The mean Mathematics scaled-score on the 10<sup>th</sup> and 11<sup>th</sup> Grade GEE Exam was 295.4 with a standard deviation of 52.60. The minimum score was 100 and the maximum score was 500. The raw score had a mean of 38.0 and a standard deviation of 15.12 (See Table 16).

Table 16 Mathematics Scores by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Math Subtest	Mean	SD	Minimum	Maximum
Math Scaled Scores	295.4	52.60	100	500
Math Raw	38.0	15.12	2.0	76.0
Total				

*Note.* Data regarding Math GEE achievement scores were unavailable for 2899 study subjects. N=3128 total subjects.

The achievement categories used the classified scaled scores to form the Achievement category. The Unsatisfactory achievement category had the largest number of subjects with 1274 (40.7%). Basic had the next largest number with 901 (28.8%). The smallest group was the Advanced Level with 154 subjects (4.9%). See Table 17

Table 17 Mathematics Achievement Scores Attained by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Achievement Category	Frequency	Percent
Advanced	154	4.9
Mastery	234	7.5
Basic	901	28.8
Approaching Basic	565	18.1
Unsatisfactory	1274	40.7
Total	3128	100.0

*Note.* Data regarding Math GEE achievement scores were unavailable for 2899 study subjects. N=3128 total subjects.

In addition to the overall scores on the Mathematics section of the exam, the data also included six Mathematical Standards. The standards were Number and Number Relations, Algebra, Measurement, Geometry, Analysis, Probability and Discrete Math and Pattern, Relations and Functions. Students were most successful on Strand One-Number and Number Relations with a mean score of 3.5 (SD = 1.64) and 59.0% correct answers. The second highest

standard score was Standard Five-Data Analysis, Probability and Discrete Math with a mean score of 8.9 (SD = 3.42) and 55.8% correct answers. The lowest score was for Standard Three – Measurement with a mean score of 5.7 (SD = 2.89) with 43.9% correct answers (See Table 18).

Table 18 Mathematics Standards/Sub Scores by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Math Standards	Mean	SD	Minimum	Maximum	Percent
Math Standard One- Number and Number Relations	3.5	1.64	0	6.0	59.1
Math Standard Two- Algebra	4.6	2.29	0	9.0	51.1
Math Standard Three- Measurement	5.7	2.89	0	13.0	43.9
Math Standard Four- Geometry	7.6	3.62	0	16.0	47.5
Math Standard Five- Data Analysis, Probability, and Discrete Math	8.9	3.42	0	16.0	55.8
Math Standard Six- Patterns, Relations, and Functions	7.6	3.47	0	16.0	48.0

*Note.* Data regarding Math GEE achievement scores were unavailable for 2899 study subjects. N=3128 total subjects.

There were two item type subtests as presented in Table 19. Two Subtests are also included on the Mathematics GEE Exam, including 60 Multiple-Choice Items and 16 Constructed-Response Items. The mean score on the Multiple-Choice subtest was 33.7 with a standard deviation of 11.99. On the Constructed-Response Test the mean score was 4.3 and a standard deviation of 3.57. The results reveal that the Constructed Response mean and percentage scores are very low when compared to Multiple Choice mean and percentage scores (See Table 19).

Table 19 Mathematics Multiple Choice/Constructed Response Scores Table by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Math Subtest	Mean	SD	Minimum	Maximum	Percent
Math Multiple-Choice Items	33.7	11.99	2	60.0	56.1
Math Constructed-Response Items	4.3	3.57	0	16.0	27.1

*Note.* Data regarding Math GEE achievement scores were unavailable for 2899 study subjects. N=3128 total subjects.



## Science

The third academic subject examined in Objective Two was Science. The GEE Science tests require that students use their content knowledge to explain, connect, and apply concepts to new situations. Students must display an array of experiences using inquiry-based learning in all science content strands. On the Science tests, students are required to select responses in the multiple-choice section as well as to generate their own responses in the short-answer and the science task sections in the constructed response items.

Students taking the Science portion of the Eleventh Grade GEE Test could score a maximum of 39 from the multiple-choice questions and a maximum of 18 for the short answer section. The questions come from five different strands of science information. The strands of the Science Test are: Strand SI: Science as Inquiry; Strand PS: Physical Science; Strand LS: Life Science; Strand ESS: Science and the Environment (GEE Interpretive Guide, 2009, pp. 4-5)

The mean overall scaled-score on the Science portion of the 11<sup>th</sup> Grade GEE was 280.1 (SD=47.90). The minimum score was 100 and maximum score was 435. The mean raw science score was 42.3 (SD = 14.12). The minimum score was 2.0 and the maximum was 73.0 (See Table 20).

Table 20 Overall Science Scores by Tenth and Eleventh Grade Special Education Students Completing the GEE

Science	Mean	SD	Minimum	Maximum	Percent
Science Scaled-Scores	280.1	47.90	100	435	64.3
Science Raw	42.3	14.12	2.0	73.0	58.0

*Note.* Data regarding Math GEE achievement scores were unavailable for 3468 study subjects. N=2559 total subjects.

In Science Achievement, the largest number of subjects (n=969, 37.9%) scored in the “Unsatisfactory” category. The second largest number of subjects (n=724, 28.3%) scored in the “Basic” category. Only 58 subjects (2.3%) scored in the “Advanced” category (See Table 21).

Table 21 Science Achievement Attained by Tenth and Eleventh Grade Special Education Students Completing the GEE

Science Achievement Category	Frequency	Percent
Advanced	58	2.3
Mastery	257	10.0
Basic	724	28.3
Approaching Basic	551	21.5
Unsatisfactory	969	37.9
Total	2559	100.0

*Note.* Data regarding Science GEE achievement scores were unavailable for 3468 study subjects. N= 2559 total subjects.

The Science test measures five content standards that are grouped into three test sections or subtests. The Science performance of SPED students is presented in two categories, by content standard (Table 22) and by subtest (Table 23).

The Science standards are Science by Inquiry, Physical Science, Life Science, Earth and Space Science and Science and the Environment. Subjects scored the highest mean percentage, 55.8%, on Strand Five-Science and the Environment. Students scored the second highest percentage on Strand Four-Earth and Space Science with a mean percentage of 55.2%. Strand Two, Physical Science, had the lowest scores with students only getting 43.4% of questions in this strand correct (See Table 22).

Table 22 Science Standard Scores by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Science Standards	Mean	SD	Minimum	Maximum	Percent
Science Standard One- Science as Inquiry	7.4	3.00	0	14	52.6
Science Standard Two- Physical Science	7.0	3.17	0	16.0	43.4
Science Standard Three- Life Science	6.3	2.69	0	12	52.1
Science Standard Four- Earth and Space Science	4.4	2.10	0	8	55.2
Science Standard Five- Science and the Environment	4.5	1.95	0	8	55.8

*Note.* Data regarding Science GEE scores were unavailable for 3468 study subjects. N=2559 total subjects.

The Science subtests included Multiple Choice, Short Answer Questions and Comprehensive items. The subjects achieved the highest score of 60.2% on the multiple-choice questions. Students scored lowest on the Comprehensive Science subtest (33.1%). (See Table 23)

Table 23 Science Subtests Table by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Science Subtests	Mean	SD	Minimum	Maximum	Percent
Science Subtest 1–Multiple Choice	23.5	7.45	4	39	60.2
Science Subtest 2- Short Answer Questions	2.7	2.18	0	8	33.6
Science Subtest 3- Comprehensive Science Task	3.3	2.30	0	10.0	33.1

*Note.* Data regarding Science GEE achievement scores were unavailable for 3468 study subjects. N=2559 total subjects.

Science achievement was also described in the test formats of Multiple Choice and Constructed Response. Concerning the Multiple-Choice items on the Science GEE Exam, subjects received the highest scores of 60.2% and the lowest score of 33.3% on the Constructed Response items (See Table 24).

Table 24 Science Multiple-Choice/Constructed Response Table by 10<sup>th</sup> and 11th Grade Special Education Students Completing the GEE

Science	Mean	SD	Minimum	Maximum	Percent
Science Multiple-Choice Items	23.5	7.45	4	39	60.2
Science Constructed- Response Items	6.0	4.125	0	18.0	33.3

*Note.* Data regarding Science GEE scores were unavailable for 3468 study subjects. N=2559 total subjects.

## Social Studies

The fourth area on which students' achievement was described is in the Social Studies portion of the Tenth and Eleventh Grade GEE Test. The test consisted of 60 multiple-choice questions that assess knowledge, conceptual understanding, and application of skills in all four social studies strands (Geography, Civics, Economics, and History) and four open-ended items

(or tasks) calling for a constructed response answer. The constructed response questions require higher-order thinking in a Social Studies context, such as grasping a concept, analyzing information, evaluating a principle, or applying a skill (GEE 2009 Interpretive Guide, 2011, p. 5).

Each of the four Social Studies strands is associated with a single standard describing what students should know and be able to do. Following is the text of the Social Studies strands and standards:

Strand G: Standard One-Geography;

Strand C: Standard Two- Civics;

Strand E: Standard Three= Economics;

Strand H: Standard Four= History, Time, Continuity, and Change

The mean scaled score for the Social Studies portion of the Eleventh Grade GEE test was 280.1 (SD = 47.89). The mean raw score was 42.3 (SD = 14.12) (See Table 25).

Table 25 Social Studies Scores by Tenth and Eleventh Grade Special Education Students Completing the GEE

Social Studies	Mean	SD	Minimum	Maximum
Social Studies Scaled Score	280.1	47.89	100	435
Social Studies Raw	42.3	14.12	2.0	73.0

*Note.* Data regarding Social Studies GEE scores were unavailable for 3473 study subjects. N=2554 total subjects.

When subjects were described on their Social Studies achievement, the largest group, 984 (38.5%). scored “Unsatisfactory.” Nine hundred and two (35.3%) scored in the “Basic” category. Only six (.2%) scored in the “Advanced” category (See Table 26).

Table 26 Social Studies Achievement Attained by Tenth and Eleventh Grade Special Education Students Completing the GEE

Achievement Category	Frequency	Percent
Advanced	6	.2
Mastery	141	5.5
Basic	902	35.3
Approaching Basic	521	20.4
Unsatisfactory	984	38.5
Total	2554	100.0

*Note.* Data regarding Social Studies GEE scores were unavailable for 3473 study subjects. N=2554 total subjects.

The Social Studies were also grouped in four strands of content:

Strand One – Geography;

Strand Two- Civics;

Strand Three- Economics;

Strand Four- History

Subjects scored the highest percentage, 61.9%, on Strand One-Geography. Students scored the second highest percentage on Strand Three-Economics with a percentage of 57.8% items answered correctly. The Strand Four, History, showed the lowest percentage with subjects only getting 52.6% of questions related to this strand correct (See Table 27).

Table 27 Social Studies Standard Scores by Tenth and Eleventh Grade Special Education Students Completing the GEE

Standards	Mean	SD	Minimum	Maximum	Percent
Social Studies Standard One- Geography	8.0	2.96	0	13.0	61.9
Social Studies Standard Two- Civics	10.3	3.70	0	19.0	54.0
Social Studies Standard Three- Economics	9.3	3.48	0	16.0	57.8
Social Studies Standard Four- History	14.7	5.63	0	28.0	52.6

*Note.* Data regarding Science GEE scores were unavailable for 3473 study subjects. N=2554 total subjects.

Concerning data for the portion including Multiple Choice items on the Social Studies GEE Exam, subjects received the highest scores of 59.5%. The lowest score of 48.0% was on the Constructed Response (See Table 28).

Table 28 Social Studies Standard Scores by Tenth and Eleventh Grade Special Education Students Completing the GEE

Social Studies	Mean	SD	Minimum	Maximum	Percent
Social Studies Multiple Choice	35.1	11.38	0	59	59.5
Social Studies Constructed Response	7.2	3.29	0	15.0	48.0

*Note.* Data regarding Science GEE scores were unavailable for 3473 study subjects.  
N=2554 total subjects.

### **Research Objective Three**

The third objective of the study was to compare achievement, as measured by the score on the four primary scores (ELA, Math, Science, social Studies) on the GEE, of 10th and 11th grade SPED students in Louisiana by whether or not they are identified as a CTE student. However, when data were examined in preparation for analysis, most of the subjects were missing all measurements in the areas of Science and Social Studies. This is likely the result of the state's position that the only critical measurements are in the area of ELA and Math. In the "age of accountability" and "high stakes testing," scores from statewide tests in English and math have been used to determine which schools are doing a good job of educating students and which are "failing." This may discourage teachers from offering the portion of the exam that are not mandated, including Science and Social Studies, to SPED students. This could also be caused by the age of students required to take the Science and Social Studies tests in the 11<sup>th</sup> grade, which consists of a smaller population of subjects.

To determine if relationships existed between CTE participation and achievement scores on standardized testing, ELA, and Math were used as dependent variables. The independent t-test procedure was utilized for the analysis to compare achievement in each of these areas by whether or not students were identified as a CTE student.

## CTE and ELA Achievement Scores by CTE Status

A total of 22 variables were compared in this analysis including Reading and ELA raw and scaled scores, ELA Standards and Subtests as well as Writing. When the Reading scores (both raw and scaled score) were compared by CTE status, the students who were identified as a CTE participant had significantly higher scores than those who were not identified as a CTE student (See Table 29).

Table 29 Comparison of Reading Achievement Scores by CTE Program Participants Status Among SPED Students Completing the GEE

Variable		n	m	SD	t	df	P
Reading Raw Score	Non CTE	1893	17.8	7.74	5.601	2621.088	<.001
	CTE	1191	19.4	7.37			
Reading Scaled Score	Non CTE	1893	278.3	53.95	5.813	2688.331	<.001
	CTE	1191	289.3	49.51			

Similarly, the CTE students had significantly higher scores on the overall ELA measures (raw and scaled) than non-CTE students (See Table 30).

In addition to the overall ELA scores, comparisons were also made on the ELA Standards (1-3 and 5-7) by whether or not the student was identified as a CTE student. The Standard that was found to have the highest degree of difference was Standard 7, “Apply Reasoning and Problem Solving Skills” ( $t_{2612.549} = 5.474$ ,  $p < .001$ ).

Table 30 Comparison of ELA Achievement Scores by CTE Program Participants Status Among SPED Students Completing the GEE

Variable		n	m	SD	t	df	p
ELA Raw Score	Non CTE	1893	34.2	12.22	6.030	2664.984	<.001
	CTE	1191	36.8	11.36			
ELA Scaled Scores	Non CTE	1893	263.1	64.95	6.872	2814.753	<.001
	CTE	1191	278.1	55.39			

The CTE students had a significantly higher mean score (mean=9.1) than the non-CTE students (mean=8.3). All six of the standards for which data were available were found significantly higher for the CTE students than for the CTE students (See Table 31).

Table 31 Relationship Between Career and Technical Education participation and English Language Arts Standard Scores as measured by Standardized Test Scores by Tenth and Eleventh Grade Special Education Students

Variable		n	m	SD	t	df	p
ELA St. 1 Read, comprehend, and respond	Non CTE	1893	5.1	2.16	5.318	2671.252	<.001
	CTE	1191	5.5	2.00			
ELA St. 2 Write competently	Non CTE	1893	4.9	1.29	4.673	2651.773	<.001
	CTE	1191	5.1	1.21			
ELA St. 3 Use conventions of language	Non CTE	1893	6.7	2.76	5.255	2673.929	<.001
	CTE	1191	7.2	2.55			
ELA St. 5 Locate, select, and synthesize information	Non CTE	1893	4.8	2.13	4.295	2676.796	<.001
	CTE	1191	5.1	1.97			
ELA St. 6 Read, analyze and respond to literature	Non CTE	1893	4.4	2.57	4.104	2556.295	<.001
	CTE	1191	4.8	2.53			
ELA St. 7 Apply reasoning and problem-solving skills	Non CTE	1893	8.3	3.84	5.474	2612.549	<.001
	CTE	1191	9.1	3.67			

*Note.* Standard Four data were not collected

Comparisons were also made on ELA Subtests (1-4) by whether or not the student was identified as a CTE student. The ELA Subtest found to have the highest degree of difference was ELA Subtest 3 “Reading and Responding” ( $t_{2621.088} = 5.601$ ,  $p < .001$ ). The CTE students had a significantly higher mean score (19.41) than the non-CTE students (mean=17.8). All four ELA Subtests for which data were available were found to be significantly higher for the CTE students than the non-CTE students (See Table 32).



Table 32 Relationship Between Career and Technical Education participation and English Language Arts Subtests as measured by Standardized Test Scores by Tenth and Eleventh Grade Special Education Students

Variable		n	m	SD	t	df	P
ELA Subtest 1 Writing	Non CTE	1893	7.8	2.18	5.427	2676.079	<.001
	CTE	1191	8.2	2.01			
ELA Subtest 2 Using Resources	Non CTE	1893	4.8	2.13	4.295	2676.796	<.001
	CTE	1191	5.1	1.97			
ELA Subtest 3 Reading and Responding	Non CTE	1893	17.8	7.74	5.601	2621.088	<.001
	CTE	1191	19.4	7.37			
ELA Subtest 4 Proofreading	Non CTE	1893	3.9	2.02	4.295	2620.642	<.001
	CTE	1191	4.2	1.93			

ELA Writing tests (1-6) were also compared by whether or not the student was identified as a CTE student. The ELA Writing test found to have the highest degree of difference was ELA Writing Total ( $t_{2675.079} = 5.427$ ,  $p < .001$ ). The CTE students had a significantly higher mean score (8.2) than the non-CTE students (mean = 7.8). All but one of the Writing tests were found to be significantly different, and all were found to be higher for the CTE students than the non-CTE students. The only variable that was not significant was “ELA Write 6- Spelling” (See Table 33).

Table 33 English Language Arts Writing Tests as measured by Standardized Test Scores by Tenth and Eleventh Grade Special Education Students

Variable		n	m	SD	t	df	p
ELA Write 1 Composition	Non CTE	1893	2.5	.65	4.503	2639.965	<.001
	CTE	1191	2.6	.61			
ELA Write 2 Style and Audience Awareness	Non CTE	1893	2.45	.67	4.571	2655.563	<.001
	CTE	1191	2.57	.63			
ELA Write 3 Sentence Formation	Non CTE	1893	.62	.43	4.475	2636.663	<.001
	CTE	1191	.69	.41			
ELA Write 4 Usage	Non CTE	1893	.55	.44	5.097	2590.773	<.001
	CTE	1191	.63	.43			
ELA Write 5 Mechanics	Non CTE	1893	.84	.31	3.278	2734.206	<.001
	CTE	1191	.88	.27			

(Table 33 continued)

Variable		n	m	SD	t	df	p
ELA Write 6 Spelling	Non CTE	1893	.81	.35	1.125	2600.287	<.261
	CTE	1191	.82	.33			
ELA Total	Non CTE	1893	7.8	2.18	5.427	2675.079	<.001
	CTE	1191	8.2	2.01			

#### Math Achievement Scores by CTE Status

A total of 10 variables were compared in this analysis, including math raw and scaled scores, Math Standards and Subtests as well as Multiple-Choice and Constructed Response.

When the Math scores (both raw and scaled score) were compared by CTE status, the students who were identified as CTE participants had significantly higher scores than those who were not identified as a CTE student (See Table 34).

Table 34 Relationship Between Career and Technical Education participation and Math Raw and Scaled Scores as measured by Standardized Test Scores by Tenth and Eleventh Grade Special Education Students

Variable		n	m	SD	t	df	p
Math Raw Scores	Non CTE	1893	36.6	15.36	6.641	2650.722	<.001
	CTE	1191	40.29	14.46			
Math Scaled Scores	Non CTE	1893	290.6	54.92	6.714	2800.351	<.001
	CTE	1191	303.1	47.64			

In addition to the overall Math scores, comparisons were made on the Math Standards (1-6) by whether or not the student was identified as a CTE student. The Standard that was found to have the highest degree of difference was Standard 5, “Analysis, Probability, and Discrete Math” ( $t_{2660.941} = 6.037, p < .001$ ). The CTE students had a significant higher mean score (9.4) than the non-CTE students (mean=8.6). All six of the Math standards for which data were available were found significantly higher for the CTE students than for the CTE students (See Table 35).

Table 35 Relationship Between Career and Technical Education participation and Math Standard Scores as measured by Standardized Test Scores by Tenth and Eleventh Grade Special Education Students

Variable		n	m	SD	t	df	p
Math Standard 1 Number and Number Relations	Non CTE	1931	3.4	1.67	5.714	2665.264	<.001
	CTE	1197	3.8	1.56			
Math Standard 2 Algebra	Non CTE	1931	4.4	2.36	5.520	2711.963	<.001
	CTE	1197	4.9	2.15			
Math Standard 3 Measurement	Non CTE	1931	5.5	2.87	6.284	2536.442	<.001
	CTE	1197	6.1	2.87			
Math Standard 4 Geometry	Non CTE	1931	7.3	3.63	6.029	2583.969	<.001
	CTE	1197	8.1	3.54			
Math Standard 5 Analysis, Probability, and Discrete Math	Non CTE	1931	8.6	3.48	6.037	2660.941	<.001
	CTE	1197	9.4	3.26			
Math Standard 6 Patterns, Relations and Functions	Non CTE	1931	7.4	3.53	5.379	2649.919	<.001
	CTE	1197	8.1	3.33			

Comparisons were also made on Math Subtests (Multiple-Choice and Constructed Response) by whether or not the student was identified as a CTE student. The Math Subtest found to have the highest degree of difference was “Multiple Choice” ( $t_{2675.297} = 6.850$ ,  $p < .001$ ). The CTE students had a significantly higher mean score (35.5) than the non-CTE students (mean = 32.6). Both Math Subtests for which data were available were found to be significantly higher for the CTE students than the non-CTE students (See Table 36).

Table 36 Relationship Between Career and Technical Education participation and Math Subtests (Multiple-Choice and Constructed- Response) Scores as measured by Standardized Test Scores by Tenth and Eleventh Grade Special Education Students

Variable		n	m	SD	t	df	p
Math Multiple-Choice	Non CTE	1931	32.6	12.23	6.850	2675.297	<.001
	CTE	1197	35.5	11.36			
Math Constructed Response	Non CTE	1931	4.1	3.56	5.518	2540.311	<.001
	CTE	1197	4.8	3.55			

### **Research Objective Four**

The fourth objective of the study was to determine if a model exists explaining a significant portion of the variance in achievement as measured by the GEE- ELA and Math overall scores from the following demographic characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

To accomplish this objective multiple regression analyses were performed. This was accomplished by using Standardized Test scores as the dependent variables. The other variables were treated as independent variables including the demographics of Age, Gender, Race, Socioeconomic Status (Full, Reduced and Free Lunch) and CTE program participation. Stepwise entry of the variables was used due to the explanatory nature of the study. In these regression equations variables were added that increased the explained variance by one percent or more as long as the overall regression model remained significant.

In conducting the multiple regression analyses, two of the variables to be treated as independent variables were categorical in nature and had to be prepared as dichotomous variables in preparation for entry into the analysis. These variables included Socioeconomic status and race.

Gender and CTE program participation were also categorical but since they were dichotomous, they did not need to be restructured.

Race was the first variable and had five categories: “Native American,” “Asian,” African American,” “Hispanic” and “Caucasian.” Each of these categories was established as a separate dichotomous variable with participants classified as either having or not having the trait. For example, the Race category of “Native American” became a separate variable with each subject classified as either “Native American” (coded 1) or not “Native American” (coded 0).

Socioeconomic Status was the next variable to be used. This variable had three categories: Lunch Paid, Lunch Free and Lunch Reduced. For “CTE program participation,” subjects were divided into those who participated in CTE and those who were non-CTE participants. This was used to create a dichotomous variable as being a participant or not.

The first step in conducting the regression analysis was to examine the overall bivariate correlations between the dependent variable (ELA overall score) and the 11 independent variables in the analysis. Examination of this data revealed that the highest correlation with ELA scores was the variable of age ( $r = -.532$ ,  $p < .001$ ). Overall eight of the 11 independent variables were found to be significantly related to ELA scores (See Table 37).

Results of the Multiple Regression Analysis are presented in the Table 38 utilizing ELA scores as the dependent variable. “Age” was the first variable that entered the regression model with an R square of .305 ( $p < .001$ ). “Age” explains just over 30% of the variance in the students’ ELA scores. The variable that entered the regression model second was the “race” category of “African American” with an R square change of 0.35 ( $p < .001$ ). Gender was the third variable with an R square change of .013 ( $p < .001$ ). Paid Lunch was the fourth variable in the predictor model with an R square change of .011 ( $p < .001$ ).

Table 37 Comparison of English Language Arts Raw Scores by Selected Demographic Characteristics Among 10<sup>th</sup> and 11<sup>th</sup> Grade SPED Students

ELA Raw Scores	r	n	p
Age-Years	-.552	3073	<.001
Race-African American	-.349	3073	<.001
Race- White	.334	3073	<.001
Lunch Paid	.294	3073	<.001
Lunch Free	-.286	3073	<.001
Gender	-.182	3073	<.001
CTE	.106	3073	<.001
Race- Asian	.060	3073	<.001
Lunch Reduced	.015	3073	.207
Race Native American	.015	3073	.210
Race- Hispanic	.000	3073	.497

These four variables explained the total of 36.4% of the variance in ELA overall scores.

The nature of the influence of these variables was such that younger participants tended to have higher ELA scores. On the other hand, participants that identified their “Race” as “African American” tended to have lower scores on the ELA test. Also, participants that identified their “Gender” as female tended to have higher ELA scores. It was also found that participants in the “Paid Lunch” category of Socioeconomic Status tended to have higher ELA scores.

Table 38 Multiple Regression Analysis of English Language Arts State Standardized Test Scores and Selected Demographics of Tenth and Eleventh Grade SPED Students

ANOVA					
Source of Variation	df	MS	F	p	
Regression	4	40025.254	439.306	<.001	
Residual	3068	91.110			
Total	3072				
Model Summary					
Model	R Square	R Square Change	F Change	Sig. F Change	Standardized Coefficients Beta
Age	.305	.305	1347.528	<.001	-.463
Race- African American	.340	.035	162.755	<.001	-.149
Gender	.353	.013	62.978	<.001	-.119
Paid Lunch	.364	.011	52.782	<.001	.118

(Table 38 continued)

Variables not in Equation		
Variables	t	p
CTE Total	4.256	<.001
Lunch Free	-1.250	.211
Lunch Reduced	1.903	.057
Race Native American	.156	.876
Race- Asian	1.134	.257
Race Hispanic	-1.786	.074
Race- Caucasian	.857	.391

## Math

Objective Four also involved a description of the statistics using the Math State Standardized Test scores for subjects in the study. To accomplish this objective multiple regression analysis was performed. This was accomplished by using Standardized Test scores as the dependent variables. The other variables were treated as independent variables including the demographics of Age, Gender, Race, Socioeconomic Status (Full, Reduced and Free Lunch) and CTE program participation. Stepwise entry of the variables was used due to the explanatory nature of the study. In the regression analysis variables were added that increased the explained variance by 1% or more as long as the overall regression model remained significant.

In conducting the multiple regression analyses, two of the variables to be treated as independent variables were categorical in nature and had to be prepared as dichotomous variables in preparation for entry into the analysis. These variables included Socioeconomic Status and race. Gender and CTE program participation were also categorical but since they were dichotomous, they did not need to be restructured.

Race was the first variable and had five categories: “Native American,” “Asian,” African American,” “Hispanic” and “Caucasian.” Each of these categories was established as a separate dichotomous with participants classified as either having or not having the trait. For example, the Race category of “Native American” became a separate variable with each subject classified as

either “Native American” or not “Native American.” Socioeconomic Status was the next variable to be used. This variable had three categories: Lunch Paid, Lunch Free and Lunch Reduced.

The first step in conducting the regression analysis was to examine the overall bivariate correlations between the dependent variable (Math overall score) and the eleven independent variables in the analysis. Examination of this data revealed that the highest correlation with ELA scores was the variable of “Age” ( $r = -.551$ ,  $p < .001$ ). Overall seven of the eleven independent variables were found to be significantly related to Math scores (See Table 39).

Table 39 Comparison of Math Raw Scores by Selected Demographic Characteristics Among 10<sup>th</sup> and 11<sup>th</sup> Grade SPED Students

ELA Raw Scores	r	n	p
Age- Years	-.551	3117	<.001
Race-African American	-.400	3117	<.001
Race- Caucasian	.376	3117	<.001
Lunch Paid	.320	3117	<.001
Lunch Free	-.300	3117	<.001
Gender	-.021	3117	.117
CTE	.118	3117	<.001
Race- Asian	.088	3117	<.005
Lunch Reduced	-.011	3117	.265
Race Native American	.017	3117	.169
Race- Hispanic	.005	3117	.381

Results of the Multiple Regression Analysis are presented in the Table 40 utilizing Math state standardized test scores as the dependent variable. “Age” was the first variable that entered the regression model with an R square of .304,  $r = -.551$  and  $p < .001$ . “Age” variable explains 30% of the variance. The variable that entered the regression model second was the “Race” category of “African American” with an R square of .304,  $r = -.400$  and  $p < .001$ . Socioeconomic Status of “Paid Lunch” was the third variable with an R square of .612,  $r = .320$  and  $p < .001$ .

The two other variables, African American and Paid Lunch, explained 7.2% of the variance in Math Overall scores. The nature of the influence of these variables was such that



participants that identified as “Age” reported that the younger the subject the more positive influence was shown on test scores. On the other hand, participants that identified as “Race” reported that “African American” race had a more negative influence shown on test state standardized test scores. Also, it was also reported that participants that identified their “Socioeconomic Status” in the Paid Lunch category had a more positive influence on test scores (See Table 40).

Table 40 Multiple Regression Analysis of Math Scores and Selected Demographics of Tenth and Eleventh Grade SPED Students

ANOVA					
Source of Variation	df	MS	F	p	
Regression	3	89070.507	622.538	<.001	
Residual	3113	143.076			
Total	3116				
Model Summary					
Model	R Square	R Square Change	F Change	Sig. F Change	Standardized Coefficients Beta
Age	.304	.304	1358.366	<.001	-.460
Race- African American	.361	.058	281.404	<.001	-.199
Paid Lunch	.612	.014	67.780	<.001	.131
Variables not in Equation					
Variables			t	p	
CTE Total			4.087	<.001	
Lunch Free			.500	.617	
Lunch Reduced			.343	.731	
Race Native American			.078	.938	
Race- Asian			2.606	.009	
Race Hispanic			-.2.182	.029	
Race- Caucasian			.212	.832	
Gender			1.199	.231	

## CHAPTER 5: SUMMARY

### **Summary of Purpose and Specific Objectives**

The purpose of this study was to compare the achievement of special education (SPED) students enrolled in Career and Technical Education (CTE) courses with special education (SPED) students who are not enrolled in Career and Technical Education (CTE) courses. The dependent variable was the Achievement Scores on Statewide Standardized Tests. The study determined whether or not SPED students enrolled in CTE improved on the academic scores as measured by the GEE standardized test. All of the students were participants in the public school system in the state of Louisiana.

With this stated, the following specific objectives were formulated to guide this research study:

1. Describe 10th and 11th grade special education (SPED) high school students in Louisiana completing the GEE by the following characteristics:
  - a. Age;
  - b. Gender;
  - c. Race;
  - d. Socioeconomic Status;
  - e. CTE program participation.
2. Determine the achievement, as measured by the scores on the ELA and Math portion of the GEE, of SPED high school students in Louisiana.
3. Compare achievement, as measured by the score on the two primary scores (ELA and Math) of the GEE, of 10th and 11th grade SPED students in Louisiana by whether or not they are identified as a CTE student.

4. To determine if a model exists explaining a significant portion of the variance in achievement (as measured by the GEE- ELA and Math overall scores) from the following demographic characteristics:

- a. Age;
- b. Gender;
- c. Race;
- d. Socioeconomic Status;
- e. CTE program participation.

### **Summary of Methodology**

The target population for this study was defined as all SPED students enrolled in Louisiana public high schools. The accessible population was defined as all 10<sup>th</sup> and 11<sup>th</sup> grade SPED students enrolled in Louisiana public schools who had taken part in the state mandated Graduate Exit Examination (GEE) at secondary schools in the spring of the 2008-2009 school year. The students for this study were a census of the defined accessible population. The sample is defined as 100% of the accessible population.

There were 6,027 SPED students who were subjects in the study. Those that participated in the CTE program numbered 1,307 or 21.7%. The remaining 4,720 or 78.3% did not have documented enrollment in the CTE program. The instrument used to collect data for this study was a computerized recording form. The variables of the investigation were copied directly from the archival data source, developed by the Louisiana State Department of Education's Division of Student Standards and Assessments, into the study's recording forms.

The first objective was accomplished using descriptive analyses for the variables measured. Those measured on a categorical scale were described using frequencies and

percentages. The variables measured on a continuous scale (age) were described using means and standard deviations. Concerning the second objective, the achievement measurements were on an interval scale; therefore they were described using means and standard deviations. Objective three consisted of the dependent variables (achievement on ELA and Math) and was measured as interval variables. Comparisons were made using t-tests (if the independent variable is dichotomous) or ANOVA (if more than 2 categories). For objective four, a series of MRA's were conducted with each overall achievement score (ELA and Math) used as the dependent variable and the demographics entered as independent variables. The analyses were conducted using stepwise entry of variables since the study was exploratory. Additionally, variables were entered into the explanatory model that added 1% or more to the explained variance as long as the overall model remained significant.

### **Summary of Major Findings**

The major findings of this study are discussed by objective.

#### **Objective One**

This objective was to describe 10th and 11th grade Special education (SPED) high school students in Louisiana during the 2008-2009 school year that completed the GEE. The objective dealt with certain demographic characteristics: Age, Gender, Race, Socioeconomic Status, and CTE program participation. Of the 6013 SPED students in the study, the overwhelming majority in the SPED population consisted of 16 years olds (n=2245, 37.2%) with 15 year olds (n=1528, 25.4%) being the second largest group. The mean age of subjects was 16.5 years old. There were more males (n=3,513, 58.4%) than females (n=2,500, 41.6%) in this SPED population. Caucasians (n=2978, 49.5%) accounted for the highest number of students with African Americans (n=2802, 46.5%) a close second among the racial groups. Of the SPED students who

were counted in socioeconomic groups the subjects in the Free Lunch category (n=2997, 50%) were in the majority. The students in the Paid Lunch (n=2573, 42.9%) were in the second largest group. SPED subjects who did not participate in CTE were in the majority (n=4720, 78.3%). Of those subjects who documented participation in a CTE program (n=1375, 21.7%), the largest number chose Business, Management and Administration (n=547, 13%). The second largest group in a CTE program were those subjects participating in Family Consumer Science (n=262, 6.2%). The smallest participation was in the Marketing Sales and Services CTE program (n=13, 0.3%).

## Objective Two

The second objective was to determine the achievement, as measured by the scores on the ELA and Math portion of the GEE, of SPED high school students in Louisiana. The ELA overall scores included 3084 subjects. The majority of subjects (n=1359, 44.1%) scored at the Unsatisfactory Achievement Level. The second largest group was the Approaching Basic category (n=753, 24.4%). On the Reading Standardized Test, the total number of students documented was 3074. The Below Achievement Level included the largest number of students (n=1903, 61.7%). The next largest group was in the Basic category (n=904, 29.3%). Regarding the ELA Content Standards, Standard 2-Write Competently had the highest marks with 62.7% correct responses. The second highest score was Standard 3- Use of Conventions of Language with 57.5% correct responses. Standard 6- Read, Analyze and Respond to Literature had the lowest number of correct responses with 37.9%. On the ELA Subtests, Subtest One- Writing had the highest percent of correct responses (65.9%). The Subtest with the lowest score was Subtest 3-Reading and Responding with 47.8% correct responses. On the Writing Standardized Test portion, Mechanics had the most correct responses with 85.6% with Spelling being a close

second with 81.5%. The Subtest generating the most correct responses was the Multiple Choice Items with 56.2%. Constructed Response had students in the lower range with 32.3%.

In the Math testing arena, the total of students numbered 3128. The Math overall mean score was 295.4 with a standard deviation of 52.60. For the Achievement Levels the largest number of subjects (N=1274, 40.7%) was in the unsatisfactory category. The Basic category had the second largest number (n= 901, 28.8%). On the Math Content Standards, subjects were most successful on Math Standard One-Number and Number Relations with 59.1% of correct answers. The second largest number of correct answers was associated with Math Standard Five- Data Analysis, Probability, and Discrete Math with 55.5%. The SPED subjects favored the Multiple-Choice format with the vast majority having the highest percent (56.1%) on these items. The Math Constructed Response Items had a much lower outcome (27.1%).

### Objective Three

The third objective was to compare achievement, as measured by the score on the two primary scores (ELA and Math) of the GEE, of 10th and 11th grade SPED students in Louisiana by whether or not they are identified as a CTE student. When the Reading scores were compared by CTE status, the students who were identified as CTE students (m=19.4) had significantly higher scores than those who were identified as non-CTE students (m=17.8). Similarly, the CTE students (m=36.8) had significantly higher scores on the overall ELA than non-CTE students (m=34.2). The ELA Standard that was found to have the highest degree of difference was Standard 7- Apply Reasoning and Problem Solving Skills with the CTE subjects having a mean of 9.1 and the non-CTE students having a mean of 8.3. All six of the standards showed significantly higher scores for CTE subjects. On the Subtests, Reading and Responding had CTE subjects with a mean score of 19.41 and non-CTE subjects had a mean score of 17.8. All four of

the subtests revealed significantly higher scores for CTE subjects. On the Writing portion of the standardized test, the Writing Total had the highest degree of difference with CTE subjects scoring a mean of 8.2 and non-CTE subjects scoring a mean of 7.8. All but one of the Writing tests was found to be significant and all were in favor of the CTE subjects.

#### Objective Four

The fourth and final objective of this study was to determine if a model exists explaining a significant portion of the variance in achievement (as measured by ELA and Math overall scores) from the following demographic characteristics: Age, Gender, Race, Socioeconomic Status and CTE program participation. There were four independent variables that entered into the model. The four variables were: Age, Race, Gender, and Socioeconomic Status.

Concerning the results of the Multiple Regression Analysis utilizing ELA and Math state standardized test scores, the dependent variable, “Age” was the first variable that entered the regression model. The variable that entered the regression model second was the “Race” category of “African American,” Gender was the third and Paid Lunch was the fourth variable. Of these, the three key factors that influenced the outcome were “Age,” “Race” and “Socioeconomic Status.” Younger subjects (15, 16 and 17 year olds) tended to have higher scores than older subjects. Non-African Americans (Asians, Native Americans, Caucasians, Hispanics) tended to have higher scores than African Americans. Subjects documented as Paid Lunch tended to have higher scores than either Reduced or Free Lunch subjects. “Age” explained 30% of the variance and the others explained an additional 5.9% of the variance in ELA Overall scores.

In the area of Math, the dependent variable “Age” was the first variable that entered the regression model. The variable that entered the model second was the “Race” category of “African American.” “Paid Lunch” was the third variable in the model.

### **Conclusions, Implications, and Recommendations**

Based on the findings from this study, the researcher has derived the following conclusions, implications, and recommendations:

1. The majority of SPED students did not participate in a CTE program.

This conclusion is based on the finding that only 1307 or 21.9% of SPED subjects participated in CTE programs while 4720 or 78.3% did not participate in a CTE program. It is clear in this study that the largest group of SPED students in the Louisiana public school system are not enrolled in CTE programs.

This is consistent with the findings of other studies including the Michigan Department of Education, “Bridging the Special Education –Career and Technical Education Divide: Planning for Success of Special Education Students” report. This document concludes that to increase student success among students with disabilities, the two educational fields of Special Education and CTE must form a connection; a working relationship. This relationship must strive to help all the stakeholders in the student’s education to more fully understand the student’s strengths and challenges. Through collaboration and understanding, the student is more likely to be recommended for appropriate placement in a CTE program (Michigan Department of Education, 2009).

These findings provide information to infer that there is a disconnect between the two educational fields of Special Education and CTE. Career and Technical Education instructors often are not taught effective ways to assist students with disabilities and may not be fully aware



of how to accommodate the students' needs. Conversely, SPED instructors may not understand the context and requirements of the CTE program for which a student may be considered. This leads to an unrealistic expectation of the possibility for success within the CTE program for SPED students.

Another issue is that the instructors, supervisors, parents and students may have never been informed of the benefits to the SPED students who participate in the CTE programs. Often SPED educators, parents and students have not been informed about the advantages to students who are enrolled in CTE. According to their report, *Effective Strategies for Dropout Prevention Center*, from Clemson University, "A quality CTE program and a related guidance program are essential for all students." (<http://dropoutprevention.org/effective-strategies/#CTE>, 2009). Not only does The Dropout Prevention Center/Network note CTE specifically as one of its 15 strategies that reduces risk of dropping out of school, but also many of the other strategies are important components of CTE programs, such as individualized instruction, service learning, community collaboration, mentoring, active learning, and educational technology.

The Transition process is also an avenue for SPED educators, parents and students to seek enrollment in CTE programs. All students begin development of the Individualized Student Transition Plan (ISTP) as Transition planning is a requirement of SPED services for all students age 16 and above as they prepare for post-school settings. In the booklet, "The Journey Continues with Educated Transition Choices-Standard and Career Readiness Graduation Options -A Resource Guide for Families and Youth with Disabilities," it is stated, "When making a transition plan, remember your VISION, but don't forget your child's DREAMS! Let them be your guiding star. Now ask a few questions: What are my child's DREAMS? Ask yourself... where will my child be at age 25? How are we going to get there? Who do we need to help us

achieve those DREAMS? Remember from this point forward everything counts! Time is precious. You cannot afford to waste a single minute of your child's education! Yes, it is the schools' responsibility to educate our children and help them realize their potential. The real truth is that schools don't live with the consequences. If a student isn't educated and doesn't reach his potential, it is the parents and student who live with the consequences. As parents, when our children reach age 25, we will ask those "what if" questions. What if I had done this? What if I had done that? Would the outcome be any different? With a good transition plan, you will have fewer questions concerning your child's public school experience." (The Journey Continues with Educated Transition Choices, 2010)

In the 2011 Key Education Issues: Changing Louisiana's Future, it was stated that for the 2007-08 year, more than 70% of Louisiana's high school students enrolled in at least one CTE course. The report also highlighted that CTE programs offer tremendous opportunity to bridge the skills gap and to give students a broad range of career options. It was stated that CTE offers a combination of academic rigor and real-world experiences that engage and motivate students (Key Education Issues: Changing Louisiana's Future, 2011). But it seems that the SPED population is not taking advantage of these resources offered in the CTE programs. The question that resonates, is "What can be done to educate the population of teachers/supervisors who work with the SPED population to promote the inclusion of CTE programs in their educational portfolio to ensure the student is receiving all that is needed to enhance their potential in all educational areas?"

The researcher recommends additional research that seeks to determine why there is the lack of involvement of SPED students in CTE programs. These research studies include surveying SPED educational personnel to inquire about their background knowledge of the CTE

programs in their school system, including what vocational areas are offered to the SPED students. Further research should be conducted involving student interviews to determine the vocational interests of the students and what they know about each program area offered at their schools. The results would be beneficial to all the participants in the IEP and Transitional Programs (parents, supervisors, SPED and CTE instructors) in an effort to learn what factors, if any, have been and/or would be effective in enrolling students in CTE programs that would be advantageous to the SPED students.

Since the IEP process requires transition instruction and support services to be documented on the IEP, the researcher recommends that all high school SPED IEP Transitional Teams include a CTE staff member. Also, SPED students should be given background knowledge about all CTE programs and provided options that support their educational goals. Team meetings involving the SPED and CTE faculty should be established within each high school system. These meetings should be established to encourage interaction and build a working relationship between these two instructional forces. Preliminary planning between CTE and SPED staff can alleviate concerns and issues prior to the IEP Team meeting. The team approach is vital to student success. Special education case managers and CTE instructors must coordinate the use of instructional strategies, such as differentiation or co-teaching, to maximize access to the curriculum for student success.

2. The largest group of SPED students was enrolled in the Business, Management and Administration CTE program.

The researcher's conclusion is based on the finding that 547 or 13% of SPED subjects participated in the Business, Management and Administration area. The findings revealed a mean writing score of 8.2 for CTE participants and a mean Writing score of 7.8 for non-CTE

participants. This conclusion has been confirmed in a study by Wilkerson entitled, “The Influence of Program Participation in Business Education Courses on Standardized Test Performance Among Secondary Students in Louisiana.” From the results of her study, she concluded that business education students performed better academically than non-business education students on English portions of the GEE (Wilkerson, 2010).

The writing process can be complex and difficult. In relation to all other academic activities, writing requires more basic skills than any other. Students need a wide range of skills to write logically, and in an organized manner. But, they must also invoke rules of grammar and syntax. This combination of requirements makes writing the most intricate and complicated use of language. Students are required to write nearly every day in a multitude of scenarios, and as students’ progress through school, writing requirements increase across the curriculum and involve every subject. High-stakes standardized tests require writing skills demonstrated through testing of Writing Standards as well as answers in the form of short paragraphs and essays.

A writing disability for a SPED student can be devastating to their education and self-esteem. A SPED student who struggles with a writing disability will find it difficult to express his knowledge in every area of learning. There is no doubt that inability to express by means of writing will stand firmly in the way of a SPED student learning in the academic classroom.

Sadly, this can also result in failure. And failure is one of the main causes of poor motivation for SPED students. Those who expect to fail at writing tasks will engage reluctantly, or perhaps not even try to participate in the process. The solution for failure is clear instruction and adequate practice so that the SPED student can develop mastery. The motivation to learn to write is seldom a problem when they work in an environment where they write for meaningful purposes and teachers provide understandable instruction on how to write effectively.

Business, Management and Administration can create an environment where the writing standards can be reinforced in the CTE setting. Sadly, Meeder and Suddreth found in their study ““Common Core State Standards & Career and Technical Education: Bridging the Divide between College and Career Readiness” that there are few, if any, innovative models of how to systematically integrate real-world CTE examples into English classes to enhance relevance and deeper student learning. Where models do exist mostly at the local level, they are often difficult to replicate or bring to scale without significant resources or planning time set-aside for educators to collaborate on integration strategies and materials (Meeder & Suddreth, 2012). This is a problem that can no longer be ignored. Writing skills and literacy instruction must be a focus for SPED and CTE instructors.

The researcher’s recommendation is that school supervisors/principals provide additional planning time to allow/encourage cross-curricular collaboration between ELA and Business, Management and Administration CTE instructors.

Ultimately, this researcher recommends that more SPED students be encouraged to enroll in CTE, specifically the Business, Management and Administration program.

### 3. SPED students perform poorly on the GEE

This conclusion is based on the finding that 1359 or 44.1% of SPED students scored Unsatisfactory in ELA and 1274 or 40.7% scored Unsatisfactory in Math.

As stated in the literature review, one of the main issues with testing students with disabilities is the challenge students have in showing what they know on a standardized assessment (Lollis & LaSasso, 2009). SPED students have historically poor educational outcomes and there are often no external measures to indicate whether SPED students are learning. Students with disabilities were previously left out of the state and district level

assessment and accountability systems. In many cases they also did not have access to the general curriculum on which these assessments were based. Many schools housed SPED students in separate buildings, and they were not offered the same academic resources as the non-SPED students. No Child Left Behind (NCLB) and the Individuals with Disabilities Act (IDEA) were two pieces of federal legislation that had a significant impact on the education of SPED students. Yet, the achievement of SPED students lags far behind their non-disabled counterparts. Only half of all students with disabilities leave high school with a standard diploma. In some states, there exists an achievement gap on the state achievement test between students with disabilities and those without. As Bozer reported in his 2009 study, “Special education: A better perspective,” in some states, the achievement gap on the state achievement test between students with disabilities and those without is more than 45 percentage points (Bozer, 2009). Obviously, this trend continues as evidenced by this study.

The legislation, mandating that SPED students take the state standardized tests, has made this population of students late arrivers in the “accountably game.” This late entry in the accountability system may be a cause for the SPED students’ scores, which lag unnecessarily behind those in regular placement.

As noted in the literature, there is a contradiction to what has been shown by state standardized tests scores. Many in the special education community argue that the majority of special education students can be expected to perform just as well as their general education classmates. For example, the National Center for Learning Disabilities argues that approximately 8 out of 10 students who receive services under IDEA could be expected to perform just as well as their non-disabled counterparts. “Simply put, the vast majority of students receiving special education in our nation’s schools...are found eligible under a disability category that in no way

precludes them from—with appropriate services and supports—functioning at or above grade level or from achieving proficiency on a state’s academic content standards in reading and math,” the report concluded (Cortiella, p. 4, 2007). Other analysts such as Education Sector’s Erin Dillon have come to very similar conclusions (Dillon, 2007).

One of the problems associated with low-test scores could be that too low expectations are placed on SPED students by teachers and administrators. The first psychologist to systematically study the phenomenon of expectation was a Harvard professor named Robert Rosenthal. In 1964, he did an experiment at an elementary school in California. The idea of the experiment was to consider what would happen if teachers were told that certain students in their class were destined to succeed. To make his point Rosenthal took a standardized IQ test, Flanagan's Test of General Ability and disguised it as a different test. On the cover of each test booklet he had printed “Harvard Test of Inflected Acquisition.” Rosenthal told the teachers that this special test was from Harvard University and it had the ability to predict which kids were special (Spiegel, 2012).

After the students took the test, Rosenthal randomly chose several students from every class. There was nothing at all to distinguish these chosen students from the other students in the classes. However, he told their teachers that the test predicted the students were on the verge of intellectual growth (Spiegel, 2012).

For the next two years, Rosenthal followed the students and discovered that the teachers' expectations of these students really did affect the students’ outcomes. It proved to him that if teachers had been led to expect greater gains in IQ, then increasingly, those students gained more IQ. In fact, they experienced a dramatic growth in their IQ (Spiegel, 2012).

As Rosenthal did more research, what he found was that expectations also affected teachers' interactions with the students. He found that teachers gave the students that they expected to succeed more time to answer questions, more approval as well as more specific feedback. The teachers consistently touched, nodded and smiled at the children who were expected to be high achievers much more than the other students (Spiegel, 2012).

This raises important issues when examining the educators' expectations of SPED students. Do teachers' expectations change the performance of SPED students? How are teachers encouraged to have the appropriate expectations of the SPED student population? And is it possible for a teacher to change low expectations?

Another issue which must be examined is whether low achievement on state standardized tests causes SPED students to drop out of school after receiving the results. The literature review focused on this issue. In America's Promise, Colin Powell (2009) reported that every 26 seconds, another student drops out of school in America – more than 1.3 million students per year (Powell, 2009). Present policies often dictate one-size-fits-all solutions and do not produce individual success in the “present day” classroom. Dropout rates and high-stakes testing receive their share of media attention, but the likely connection between the two is rarely discussed outside of education circles. Federal and state policy initiative, No Child Left Behind (NCLB), made schools accountable for the progress of all children. Yet much recent research and anecdotal evidence suggest at least a correlation between high-stakes testing, those mandated by the No Child Left Behind Act (NCLB), and dropout rates. Students appear to be dropping out of school earlier and in much greater numbers than previously believed, and high-stakes testing may be a leading cause [Shriberg & Shriberg, (2006)].



It was stated in the Literature that when achievement is measured it informs the educator of the students' abilities and opens up avenues for meaningful instruction. This knowledge should also provide input for instructors concerning the effectiveness of their teaching style, which should help to maximize learning for all students (Dietel et al., 1991). The achievement scores of the SPED population in Louisiana should motivate educators to make necessary changes to equip their students to succeed in the academic arena. This being said, the expectations of the teachers must be that the students are capable of achievement and be willing to make the changes necessary to provide an environment of academic success.

Clearly, there is a need for improvement in student's performance on these state standardized tests. Because there is evidence that the high school students taking CTE course have higher achievement scores than non-CTE students and because CTE provides a context for learning, in both ELA and math, therefore, this researcher recommends that administrators, SPED instructors and parents mandate enrollment of SPED students in CTE programs. Also it should be understood that only students who are assessed as being unable to benefit from enrollment in CTE could be exempt from this requirement.

The recommendation also includes that principals/supervisors/teacher coaches conduct workshops/training meetings that encourage necessary research concerning teacher expectations among SPED instructors both in the academic and CTE areas. At the conclusion of the research process, the trainings will provide SPED teachers in all areas techniques to prepare SPED students for state standardized testing.

It is also recommended by the researcher that SPED administrators provide workshops presenting SPED teachers with techniques to prepare for state standardized testing. This would be implemented in an attempt to improve SPED students' performance on tests. The researcher

also recommends that further study be done to determine how soon after reporting state standardized scores are SPED students dropping out of academic educational programs. This is imperative considering the high dropout rate of SPED students.

4. In all academic areas for ELA, CTE students scored higher on state standardized tests than non-CTE students.

This conclusion is based on the findings that on overall Reading scores CTE students scored 19.4 while non-CTE students scored 17.8. The t-test was 5.602. In ELA overall scores, CTE students measured 36.8 while non-CTE students measured 34.2. For this section, the t-test was 6.03.

Throughout history, efforts were being made to integrate academic and vocational education to improve the quality of programs. The benefits of CTE promoting academic achievement have been studied and results show improvement of scores. In the literature review, the qualitative studies reviewed by Eisenmann in his article "Characteristics and Effects of Integrated Academic and Occupational Curricula for Students with Disabilities," suggested that integration of academic and vocational curricula promoted meaningful engagement and inclusion of students with disabilities by increasing academic achievement (Eisenmann, 2000).

With the onset of educational reform involving standardized testing and achievement, SPED students need a multitude of avenues to enhance academic achievement. By increasing SPED student engagement and helping students apply core academic skills, CTE programs can generate paths to assist in their academic achievement.

Even though the results show improvement in scores on state standardized tests by students who participate in CTE programs, there are still issues that need to be resolved to make a continued push for success. Meeder and Suddreth, in their 2012 report, "Common Core State

Standards & Career and Technical Education: Bridging the Divide between College and Career Readiness,” interviewed some CTE state leaders, and they shared their current experiences and identified a number of common issues and challenges.

- Many CTE teachers are working to reinforce the academic content as they teach but have limited experience with the explicit integration of literacy and math into their CTE content areas.
- A need for innovative models of how to systematically integrate real-world CTE examples into mathematics instruction or English classes to enhance relevance and deeper student learning.
- ELA and mathematics teachers traditionally are responsible solely for the delivery of their content and typically have limited experience enhancing their subject through cross-disciplinary integration with other content areas.
- There should be more partnerships, common planning and training opportunities with academic and CTE teachers (Meeder & Suddreth, 2012).

Therefore, the academic community must further embrace the need for CTE to continue their learning avenues for the SPED population. Based on this conclusion and these findings, the researcher recommends further study be done examining techniques and methods that CTE programs use to equip SPED students to achieve in the area of ELA and Math. Also, the researcher recommends all SPED administrators and IEP committees enroll SPED students in a CTE program of student interest each year to further their academic quest for excellence and to enhance their achievement scores on state standardized tests.

Because of the need for planning to ensure success, the researcher recommends principals/supervisors offer school district-level workshops requiring CTE and SPED teachers to

work collaboratively as well as demonstrate teaching techniques in a school/classroom setting. Included in this recommendation are partnerships, common planning and training opportunities for academic and CTE teachers to promote bridges of learning opportunities.

On the statewide level, the researcher recommends that the state provide funding for the development of curriculum materials that help teachers to create an innovative model of how to systematically integrate real-world CTE examples into mathematics instruction or English classes to enhance relevance and deeper student learning. This could be used to demonstrate and provide workshops/conferences for teachers.

The final recommendation requires that the state establish a dual certification in the areas of CTE and English certificate. This action provides an avenue for Louisiana colleges and universities to follow-up with development of programs that offer degree for dual certification for CTE instructors.

5. Career and Technical Education SPED students have higher Math scores on the state standardized test.

This conclusion is based on the findings that on overall Math scores, CTE students scored a higher percent of correct answers (40.2%) than non-CTE students (36.6%). The Math Standards included: Number and Number Relations, Algebra, Measurement, Geometry, Analysis, Probability and Discrete Math and Patterns, Relations and Functions. The Standard that was found to have the highest degree of difference was Standard 5, “Analysis, Probability, and Discrete Math” ( $t_{2660.941} = 6.037, f < .001$ ). The CTE students had a significantly higher mean score (9.4) than the non-CTE students (mean=8.6). And, all six of the Math standards for which data were available were found significantly higher for the CTE students than for the non-CTE students.

The two issues that need to be addressed when considering these findings are the strength of math concepts and math theories encompassed in the CTE programs and secondly, SPED teachers not adequately qualified to teach Math.

In the literature, it was noted that the ACTE in 2006 reported that CTE provides students with opportunities to gain critical math, Science and literacy skills in a relevant context—utilizing principles of inquiry-based learning and exploration (ACTE, 2006). A study by the National Research Center for Career and Technical Education discovered that when combining professional development with a pedagogic framework to identify and teach the mathematics that is inherent in CTE curricula, students who received the enhanced instruction scored significantly higher on standardized math tests than students who received their regular curriculum. Through contextualized learning, students' core content knowledge is enhanced and augmented, and they can apply it to problem solving (Stone et al., 2006).

There is no doubt that meaningful instruction can increase learning. Academic scores can also increase and can be linked to the concrete /hands on approach of vocational instruction. Through the integration of traditional academic and technical skills, CTE programs can serve to greatly enhance students' exposure to and mastery of important math skills. This educational process can also provide academic skills that promote success on state standardized tests.

Math lends itself to learning activities. Project-based learning is a common instructional strategy in CTE courses and programs. Often, the projects are multidisciplinary, integrating multiple core academic areas. Classes that use project-based learning incorporate rigorous projects and that are carefully planned, managed, and assessed to help students learn key academic content, practice 21st Century Skills (such as collaboration, communication and

critical thinking), and create high-quality, authentic products and presentations (Ravitz et al., 2012).

Hands-on projects and demonstrations can often be the tool that students use to demonstrate their learning. Students often help order and design project-based learning activities, in cooperation with their teachers. The hands-on nature of this learning can keep SPED students interested and engaged. Projects that help create integrated CTE/academics and cross-curricular connections usually require core academic teachers and CTE teachers to review their respective content standards collectively and look for opportunities across the curricula to create alignments. Even though teachers and administrators often talk about the positive benefits of cross-curricular collaboration, this kind of collaboration rarely happens unless it is expected and supported by administrators and principals — by setting aside time and providing clear direction for the outcomes desired. While curricular integration and coordination is the specific task at hand in these types of activities and professional development, participating teachers often talk about ancillary benefits to the process.

The National Research Center for Career and Technical Education (NRCCTE) Math-in-CTE research study used group randomization techniques to test a model of curriculum integration to improve CTE student's mathematical understanding, the study included nearly 3,000 students and 200 teachers in nine states. Each of the CTE teachers participating was paired with a teacher from his or her local school, district or community. The teams were brought together for extended professional development. The teams processed by examining their CTE curricula in order to identify embedded mathematics concepts, a process known as curriculum mapping. Utilizing the Math-in-CTE model, they then developed math-enhanced CTE lessons to enhance the mathematics that existed within the occupational curricula.

Collaboration between academic and CTE teachers can contribute to a more positive, collaborative teaching culture within a school or across a district. If a state department of education, district leadership and/or principals create opportunities for curricular collaboration between the academic teachers and CTE, then a host of positive outcomes may result.

Considering the positive influence of collaboration, brought into focus is another issue when considering the lower math scores for the non-CTE students. What is the quality of math instruction in the SPED classroom? Douglas H. Clements, Professor of Mathematics, Early Childhood, and Computer Education at SUNY/Buffalo, noted that too often SPED students receive limited mathematics instruction. His studies credit this in part to special education teachers feeling uncomfortable teaching mathematics. This can lead the focus being on training skills. Mr. Clements believes that there are three misconceptions by SPED teachers in the area of mathematics. One is that skill learning is the bedrock of mathematics, upon which future instruction of mathematics, must be built. Another is that math skills are easier to measure and teach. Third, teachers often believe that students' perceived memory deficits imply the need for constant repetition and drill. These misconceptions limit the math skills being taught. For the students to have success on state standardized tests the bar must be raised and appropriate instruction must take place to prepare students for testing (Clements, 2000).

Louie, Brodesky, Brett, Yang and Tan found in their 2008 study entitled, "Math Education Practices for Students with Disabilities and Other Struggling Learners: Case Studies of Six Schools in two Northeast and Islands Region States," that teachers and administrators consistently identified several challenges in math educational practices. One of the four challenges was inadequate math content knowledge among many teachers (Louie et al., 2008). Many instructors are questioning, "What exactly is effective math instruction for SPED?" SPED

teachers are being asked to do what has never been done before: Make math work for nearly ALL kids and get nearly ALL kids ready for college. This task seems daunting; many want and need a road map, a how-to guidebook.

Based on information stated in the two concerns, the researcher recommends that research to be done in the area of Math instruction within the CTE program. The research should focus on examining the questions; “Are CTE teachers provided adequate support and materials to teach students in the area of math?” “What types of support do CTE instructors believe lead to the greatest math achievement gains for students?” The researcher also recommends that all public school system supervisors provide Math and CTE educators with planning periods/training sessions to collaborate with their peers across disciplines. These planning periods and training should be structured and meaningful according to data involving SPED students and achievement.

6. The greatest difference between CTE and non-CTE students in the area of ELA was on Reading and Responding.

This conclusion is based on the finding that the ELA Subtest degree of difference was ELA Subtest 3 “Reading and Responding” ( $t=2621.088=5.601$ ,  $p<.001$ ). The CTE students had a significantly higher mean score (mean 19.41) than the non-CTE students (mean=17.8).

In the literature, it states that students need to be provided with opportunities to gain critical literacy skills in a relevant context (ACTE, 2007). They need to be encouraged to utilize principles of inquiry-based learning and exploration. The CTE students performed higher on Reading and Responding scores than non-CTE. Technical Literacy is a part of the CTE program. One aspect of technical literacy is the ability to read, understand and communicate in the language involved in technical fields, which is important to workplace success. Today’s work



environment demands that employees read, gather and analyze information from many sources to solve problems. It is imperative that students learn how to use language processes to explore and construct meaning with texts to be literate in CTE classes. Students must put language to work for them in CTE classes, because then language can help them to discover, organize, retrieve, create and elaborate on what they are learning.

Rice, in her consulting handbook entitled, “How Do You Expect Me to Teach Reading and Writing?” states that when CTE teachers make frequent reading and writing assignments, students’ reading scores improve as does their technical knowledge and ability to become independent, continuous learners. Students who experienced moderate to intensive emphasis on reading and writing in their academic and CTE classes had reading scores significantly higher than students in classes with little emphasis. Rice notes that often reading assignments are just lessons involving parroting the information by answering questions by skimming a text, locating clues or vocabulary, and then copying pertinent details which follows. She acknowledges that reading in that manner is more to “get it done” than read to learn. These students are simply engaged in superficial reading. Important concepts and information wired into the student’s long-term memory that influences perception and understanding of the world should be the goal (Rice, 2008).

CTE Learning materials range from textbooks to technical manuals to actual documents used in the workplace. Usually CTE students read to follow directions and learn a procedure or a process. The texts used for CTE activities often follow a goal, action or outcome structure. Students also read to apply knowledge, to create work, to understand equipment operations or to make an item. The text requires reading and responding.

Activity or project-based learning is a necessary component of the CTE philosophy and begins the process of learning skills with reading. And from that point dissecting, inferring, creating and inventing in the areas of Food Science, Woodworking, and Business Education.

Considering these findings, the researcher recommends all CTE supervisors to provide professional development activities for CTE teachers to help strengthen their skills and self-confidence in using content-specific reading and responding strategies in their classrooms. Secondly, the researcher recommends CTE supervisors create the position of an instructional literacy coach to develop strategies for collaboration between ELA and CTE teachers as well, providing necessary resources to allocate all essential funds to support integration of academic skills.

7. The SPED students scored poorly on the Constructed Response portion of the state standardized test in both ELA and Math.

This conclusion is based on the finding that the mean score for Constructed Response was 8.8 with 32.3% correct answers. These scores are very low when compared to Multiple Choice mean score of 18.5 and 56.2% correct answers.

One implication of this conclusion and finding is that standardized tests may not be accurate measure to assess the results of the curriculum taught in the SPED classroom. In the literature, it was noted that measuring student progress is a fundamental part of any instructional program, but as stated by Sanders and Horn (1995) —standardized tests, whether the ubiquitous multiple choice test or other forms of standardized assessment, vary in their ability to fairly assess student knowledge (Sanders & Horn, 1995). Techniques of Constructed Response must be taught in the SPED classroom for students to achieve adequate test scores on state standardized

tests. The findings generate concern for lack of preparation or proper tutorial input available to prepare SPED students for state testing.

Wilkerson found in her study, “The Influence of Program Participation in Business Education Courses on Standardized Test Performance Among Secondary Students in Louisiana,” that Business Education students did not perform as well on ELA constructed-response items as they did on multiple-choice items. This conclusion was based on the findings that the business education students’ percentage of correct multiple-choice responses on the ELA portion of the test was 42.7% while the percentage of correct responses was 40.5% for constructed-response item (Wilkerson, 2010). Note the difference of mean scores on Constructed Response for regular education and the scores for SPED students. The contrast of scores is much greater for the SPED population of students. The results may imply that SPED students are lacking instruction within their classroom setting, which promotes higher level thinking skills, particularly as reflected in Constructed-Response test items.

Constructed-Response Item Format involves four constructed-response items that correspond to the four content domains. Each constructed-response item is designed to test the student’s knowledge of content defined in one of these four domains. Each constructed-response item is expected to have a typical written response time of approximately 15 minutes.

Each constructed-response item will typically include:

1. contextual or background information that presents the topic of the constructed-response item
2. One or more specific directions or assignments that advise of the elements expected to provide in a response.

The response to each assignment must demonstrate an understanding of the content of the field. Responses are scored on the extent to which they achieve the purpose of the assignment, are appropriate and accurate in the application of subject matter knowledge, provide high-quality and relevant supporting evidence, and demonstrate a soundness of argument and an understanding of the subject area. A response to a Constructed-Response item is designated "unscorable" if it is unrelated to the assigned topic, illegible, not in the appropriate language, of insufficient length to score, or merely a repetition of the assignment. If there is no response to a Constructed-Response item, it is designated "blank."

These skills must be taught to SPED students, and an understanding of what is expected must be explained. There is no possible way that most students are going to be successful on state standardized tests if the materials that will be delivered on the exams are not adequately taught. In what educational areas are these skills being taught to the SPED student?

It has been said that it is time to redefine, rethink and redesign SPED. Already changes have been made in the majority of students with disabilities now being served in regular education classrooms. This practice is known as "inclusion." There must be continued conversations regarding the SPED students and how and where they can be best served. There is now a stronger call for SPED educational leaders to provide greater accountability on key performance indicators that support successful academic and post-school outcomes for students with disabilities. This shift gained impetus with Finn's publication, "Rethinking Special Education for a New Century." He recommended sweeping changes in federal special education policy. His report helped shape discussion of the next reauthorization of IDEA and identified the problems, analyzed their causes, and suggested solutions to the many issues that face SPED population of learners (Finn et al., 2001).

After reading his work, the question arises, how do we know whether special education is working for the SPED population, and how do, and should, we define “working” in this context? The researcher believes that the only way to know is to investigate through study of the educational process itself. This is no easy task, but it must be done. The sad truth is that there is a lack of research to assist in this area.

Therefore, the researcher recommends that the State Department of Education provide a complete and accurate public record of what is being accomplished regarding the education of SPED students, in all educational settings, for research and examination. The record would provide timely information concerning state standardized tests and public data involving SPED student achievement in every academic area. Secondly, the researcher recommends that the state officials ensure that administrators are not misusing public funds projected into SPED programs. This is to ensure that allocated funds are being used to buy necessary materials, equipment and conduct teacher workshops, which enhance student achievement within the SPED population of students. Thirdly, it is recommended that Department of Education require all teachers who teach SPED students to attend paid workshops to expand their instruction into the area of Constructed-Response in classroom activities. These learning activities should include 1.) a description of the constructed-response item format; 2.) test directions for constructed-response items; 3.) a sample constructed-response item; 4.) the performance characteristics and scoring scale for the constructed-response item; and 5.) A strong response to the sample constructed-response item. These workshops will be used to encourage critical thinking in the SPED instruction and provide avenues for SPED students to have higher achievement score on state standardized tests.

8. There is a positive influence of younger subjects, who paid for their own lunch and Caucasians, as well as females on academic achievement on state standardized tests.

Four independent variables entered into the model. The four variables were: Age, Race, Gender, and Socioeconomic Status.

Concerning the results of the Multiple Regression Analysis utilizing ELA and Math state standardized test scores, the dependent variable, “Age” was the first variable that entered the regression model. The variable that entered the regression model second was the “Race” category of “African American,” Gender was the third and Paid Lunch was the fourth variable. Of these, the three key factors that influenced the outcome were “Age,” “Race” and “Socioeconomic Status.” Younger subjects (15, 16 and 17 year olds) tended to have higher scores than older subjects. Non-African Americans (Asians, Native Americans, Caucasians, Hispanics) tended to have higher scores than African Americans. Subjects documented as “Paid Lunch” tended to have higher scores than either “Reduced” or “Free Lunch” subjects. “Age” explained 30% of the variance and the others explained an additional 5.9% of the variance in ELA Overall scores.

Differences between the scores of students with different backgrounds (age, racial, income and disability) are evident on large-scale standardized tests. “Age” was the first variable that entered the model in this study. The younger the student, the higher the state standardized test scores. The negative influence on the scores was the older students (18, 19, 20 and 21 year olds) who took the test. Contreras, in his 2004 article entitled, “Some 11th-Graders Turned Test into a Game,” found that some of the older students raced to see who could finish the test first, not who could get the most correct answers. Some created Christmas trees and heart designs using the bubble patterns on the test answer forms. The study done in New Mexico showed that only half of the students are proficient in math and reading, but some students say few of them took those tests seriously. Many high school students reported there was no incentive to take the

test seriously. Former high school juniors interviewed reported many students blew off the tests after being told that the scores wouldn't count toward graduation (Contreras, 2004).

Others may have known they would not get a regular high school diploma, only a Certificate of Attendance. This is an issue that should be addressed if the standardized tests scores will be of value to the school system, the instructional faculty and parents.

Race was the second variable to enter the model. While non-African Americans had higher scores on the state standardized test, African Americans had the lowest scores. In the 1998 book, *The Black-White Test Score Gap*, Jencks and Phillips point out in their introduction that African Americans score lower than whites on vocabulary, reading and math tests, as well as on standardized tests. This gap appears before kindergarten and continues into adulthood (Jencks & Phillips, 1998).

Interestingly, The Education Trust, a Washington-based research and advocacy organization, considers itself a fierce, advocate for high academic achievement of all students—particularly those of color or living in poverty. They found that students in poverty and those who are members of racial minority groups are overwhelmingly concentrated in the lowest-achieving schools. They cited an example in California where black students are six times more likely than white students to attend one of the bottom third of schools in the state (The Educators Trust, 2010). It must be concluded from this information that minority students tend to have less access to the most effective teachers, which presents a problem when considering the mandate for achievement on state standardized tests.

Socioeconomic Status was the third variable to enter the model in the arena of “Paid Lunch.” This group scored higher on state standardized tests than either “Reduced or Free Lunch.” On the negative side “Free Lunch” variable accounted for a lack of achievement on

standardized tests. In research, achievement disparities are often attributed to socioeconomic factors. In their groundbreaking 2003 study, "The Early Catastrophe: The 30 Million Word Gap by Age 3," Hart and Risley entered the homes of 42 families from various socio-economic backgrounds. Their goal was to evaluate the ways in which daily exchanges between a parent and child shape language and vocabulary development. They found extraordinary disparities between the total numbers of words spoken as well as the types of messages communicated. In four years' time, these differences in parent-child exchanges produced significant discrepancies in not only children's knowledge, but also their skills and experiences. Children from high-income families were exposed to 30 million more words than children from families on welfare. Hart and Risley did follow-up studies, which showed these differences in language, and interaction experiences have lasting effects on a child's performance later in life (Hart & Risley, 2003).

Research has also shown that dropout rates tend to be higher for children who live in poverty. According to the U.S. Department of Education's 2011 Condition of Education report, about 68 % of 12th-graders in high-poverty schools graduated with a diploma in 2008, compared with 91 % of 12th-graders in low-poverty schools (National Center for Educational Statistics, 2004).

Another issue is test preparation. When the state standardized tests are mandated for success in school, teachers and parents seek help wherever they can find it. Companies profit by selling test-prep materials and services and some are tailored to state exams. Affluent families, schools, and districts are better able to afford such products evoking the inequity of such testing. This brings us to the predicament seen in high school performance on state standardized tests.



Due to the findings and literature surrounding these issues, the researcher recommends educational institutions communicate with SPED students emphasizing the value of the state standardized tests. Options could be to distribute a survey to explore or set up student focus groups in classroom settings to discuss and encourage achievement on standardized tests. These meetings should be used to create avenues to encourage students to do their best on the tests.

The researcher also recommends state test coordinators located at each public school conduct workshops focusing on test preparation for students through tutoring programs and for parents through yearly parent workshops. It is also recommended state educational agencies ensure each school receives materials needed for test preparation and that each teacher has access to them. CTE instruction has shown to provide SPED students with higher test scores on state standardized tests, and this is a resource that must be encouraged in the education of SPED students.

Because it is crucial for the SPED students to be involved in CTE programs, the research recommends each principal conduct yearly sessions with SPED students and CTE instructors to inform and promote the programs available to them. The sessions should allow for questions-and-answer times so that students can be confident when choosing a CTE program of study.

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## APPENDIX: INSTITUTIONAL REVIEW BOARD

### ACTION ON EXEMPTION APPROVAL REQUEST



**TO:** Melinda Partin  
SHREWD

**FROM:** Dennis Landin  
Chair, Institutional Review Board

**DATE:** August 21, 2015

**RE:** IRB# E9452

**TITLE:** Standardized Testing of Deaf and Hard-of-Hearing Students: A Comparison of Placement Settings and Test Scores

Institutional Review Board  
Dr. Dennis Landin, Chair  
130 David Boyd Hall  
Baton Rouge, LA 70803  
P: 225.578.8692  
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[irb@lsu.edu](mailto:irb@lsu.edu) | [lsu.edu/irb](http://lsu.edu/irb)

**New Protocol/Modification/Continuation:** New Protocol

**Review Date:** 8/21/2015

**Approved** X **Disapproved** \_\_\_\_\_

**Approval Date:** 8/21/2015 **Approval Expiration Date:** 8/20/2018

**Exemption Category/Paragraph:** 4a

**Signed Consent Waived?:** NA. All data will be aggregated, de-identified

**Re-review frequency:** (three years unless otherwise stated)

**LSU Proposal Number** (if applicable):

**Protocol Matches Scope of Work in Grant proposal:** (if applicable)

**By:** Dennis Landin, Chairman 

#### PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –

Continuing approval is **CONDITIONAL** on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects\*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE:**

*\*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>*

## VITA

Melinda Simoneaux Partin, a native of Baton Rouge, Louisiana, received her Master's Degree in Deaf Education from University of Tennessee (UT). She taught at Louisiana School for the Deaf for thirty-five years and worked with amazing co-workers to provide educational experiences for deaf students. She was accepted into the LSU Human Resources and Workforce Development majoring in Educational Leadership. She anticipates graduating with her Ph.D. degree in May 2016. She plans to write grants for small non-profit organizations, which serve the local community.