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The influence of computer user knowledge and selected demographic characteristics the academic achievement of high school seniors

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THE INFLUENCE OF COMPUTER USER
KNOWLEDGE AND SELECTED DEMOGRAPHIC
CHARACTERISTICS ON THE ACADEMIC
ACHIEVEMENT OF HIGH SCHOOL SENIORS

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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ABSTRACT

The primary purpose of the study was to identify the influence of computer user knowledge as measured by the Computer User Knowledge Survey (CUKS), and the personal demographic characteristics of Gender, Age, and Race on academic achievement as measured by the Graduation Exit Examination-21 (GEE-21), among high school seniors in public schools in a parish in South Louisiana.

The CUKS and the Gender and Race data were collected from the self-perceived CUKS survey administered to 295 seniors registered in English IV classes at a school in South Louisiana. The academic achievement data and the Ages of the student subjects were retrieved from the Louisiana Department of Education GEE-21 data base.

Each of the six CUKS sub-scales, Basic CUKS, Windows CUKS, Word Processing CUKS, Internet CUKS, Multimedia CUKS, and Computer Games CUKS, and the overall CUKS score were correlated with each of the four GEE-21 academic achievement categories, Math, English, Science, and Social Studies. The results showed that Multimedia CUKS ($r = .16$; $p = .018$) and Basic Knowledge CUKS ($r = .04$; $p = .037$) were significantly related to English scores. No other significant relationships were found among the CUKS sub-scales and the GEE-21 scores.

Regression analysis was used to determine if models existed which explained a significant portion of the variance in academic achievement scores. The regression models showed that Multimedia CUKS explained 2.3% of the variance in English scores; Gender explained 3.8% and Hispanic explained 1.9% of the variance in Science scores; and Gender 5% and multimedia CUKS 1.9% of the variance in the Social Studies scores.

Conclusions included: 1) the racial make-up of the sample was very atypical for public schools in south Louisiana; 2) there was little or no correlation between computer user knowledge and academic achievement; 3) the scores of the student participants were exceptionally high on the self-perceived CUKS; 4) sample students typically scored in higher achievement levels than students statewide, and outstandingly so in Math.

Recommendations included finding and using more objective computer knowledge assessments in future studies to reduce the possibility of student response error in similar studies.

CHAPTER ONE: INTRODUCTION

Rationale

Education in the United States has served many purposes over the last 200 years. Early education efforts centered on religiously based education designed to spread the various Christian churches across the New World. During the colonial period education was a creature of the church designed to serve the privileged wealthy and the clergy. Children of the wealthy were often educated in church schools while the literacy levels of the general population were not addressed (Saari, 2000). In the 17th century, Roman Catholic priests in the Spanish and French areas of the New world and ministers of various protestant denominations in the English and Dutch sections began educating Native Americans and European children in what was collectively called mission schools. In the 18th century, English schools were still emphasizing religious education but were offering more secular courses. This trend continued into the 19th century. An example of this religious influence can be seen in 1861 in the opening of an early Freedmen's school operated by a freed Negro named Mary Peake. The sponsoring agency for the school was the American Missionary Association (Morris, 1981). A larger influence in education during the mid-19th century was the expansion of the Freedmen's program to help transform recently freed slaves into educated citizens. One of the Freedman's early leaders, John Eaton, was appointed by Ulysses S. Grant in November, 1862 (Morris, 1981). Exhibiting the moderating influence of religion in education, only four of his first seven superintendents of state-level educational districts were ministers or army chaplains (Morris, 1981).

A surge of public and political interest in agriculture and manufacturing in the first half of the 19th century culminated with the Morrill Act of 1862, which provided for the Land Grant College program (Duemer, 2007). This demonstrated the rise in public interest in agricultural and manufacturing education and a shift toward more secular education. In the late 1800's the American educational system, now under the United States Department of Education created in 1867, had to transform and expand from the classical religiously based program and evolve into an agent of change helping to transform the displaced agrarian workers and freedmen into the work force of the emerging industrial nation the United States was becoming (Duemer, 2007). On December 2, 1850, President Millard Fillmore stated that three-fourths of the American population was engaged in agriculture and that most of the manufacturing of the period was also involved in agricultural products (Duemer, 2007). Only 70 years later, in a research laboratory in Menlo, New Jersey, Thomas Edison was beginning the industrialization research processes that would lead to Henry Ford's groundbreaking assembly line (Roman, 2004).

In the national atmosphere that produced the Land Grant Colleges established by the Morrill Act of 1862 and the agricultural and mechanical colleges of the 1890 act, education moved on. It progressed through the early 1900's with the rivalry of the vocationally oriented Prosser proselytes and the holistically oriented Dewey disciples. The Dewey-Prosser discussions helped keep educators involved in the evolution of education, and no major educational catastrophes were apparent on the horizon. The schools that had helped facilitate the industrialization of the United States and produced the soldiers that had been victorious in the two great world wars, seemed adequate and

acceptable. On October 4, 1957 that complacency evaporated. The educational system that had transformed America and produced the workers and soldiers was suddenly cast into doubt. How could the Russians have launched a space satellite before the United States? The National Defense Act of 1958, passed primarily due to the public outcry after Sputnik 1, initiated a new trend in American education focusing on providing better trained teachers and improving math, science, and foreign language curricula in American schools. Today, science, technology, engineering, and mathematics programs, collectively called STEM programs, continue that emphasis (Brainard, 2007; Garrett, 2008). This emphasis on academic achievement is still a primary goal of the American educational system.

More recently, another threat, more subtle and internal to the United States, is causing concern. The dropout rate for secondary schools in the United States is alarming across all demographic components of the American society. Only 70% of secondary students in the United States graduate on time (Wise, 2008). The racial breakdown of this number indicates that 49% of Native American students, 53% of Black students, 58% of Hispanic students, and 76% of white students are graduating on time. With the minority groups mentioned rapidly increasing their percentages of the overall population of the United States combined with their low retention rate in secondary schools, there is concern about the number of high school graduates available to enter the work force in the future (Wise, 2008).

Since the states bear the primary responsibility for setting minimal requirements for obtaining high school diplomas, the requirements can vary from one state to another. Under the “No Child Left Behind” program, only 38 states required three years of

mathematics and 35 states required three years of science (Garrett, 2008). Different states focus on slightly different goals and objectives for their high school curricula establishing a wide range of math and science courses to fill those requirements. After the states set the requirements, it is the responsibility of the school districts to offer a curriculum which meets those academic requirements. With basic skills in the academic areas, especially math, science, and reading, young people can enter the workforce and successfully complete additional more specific training for their selected careers. A rigorous high school curriculum enhances both college and workforce potential (ACT, I. 2006). The federal government, mostly through its purse strings, is working to standardize these goals and objectives. These federal efforts also emphasize teaching and testing for successful academic achievement.

Evaluating Secondary Education

Evaluation is a beneficial part of any ongoing program. Education is no exception. Important areas of evaluating secondary education include program evaluation and student evaluation. Program evaluation is more diverse and more complex than individual evaluation. Major components of program evaluation in Louisiana include Southern Association of Colleges and Schools (SACS), teacher qualification standards including the “highly qualified” standards set by the “No Child Left Behind” program, teacher performance evaluation, and the school performance scores (SPS) (Louisiana Department of Education, B, 2004). Today, in Louisiana, a great deal of public attention is being directed toward the SPS results and the “Recovery School Districts” that arise from them. This program involves a composite score derived from the grade level Louisiana Educational Assessment Program (LEAP)

testing program and the trends in achievement areas that can be identified as weak areas by consistent unexplained low LEAP scores (Louisiana Department of Education, Office of Student and School Performance, ... *School Level Table*, 2008; Louisiana Department of Education, Office of Student and School Performance, ...*User Guide*..., 2008).

Important areas of individual evaluation in Louisiana schools include LEAP scores, the Graduation Exit Examination (GEE-21) scores, end of course tests, norm referenced tests, and Carnegie units (Louisiana State Department of Education, 1990; Louisiana State Department of Education, 2002). The most publicized forms of student evaluation generally revolve around subject mastery, how well the student has learned the required course material and achieved the grade level expectations (GLE's). In Louisiana, these are specific objectives developed by the Louisiana Department of Education to be taught by subject and grade level for elementary and middle schools and by subject in high schools. From these the state's exit examination has been developed for secondary schools. The GEE-21 is a state-required tool that verifies each student has successfully mastered a minimal level of required GLE's. Similarly, LEAP tests are used in Louisiana to determine if a student has mastered the subject matter at specific grade levels and can be passed on to the next grade. Another individual evaluation tool is the norm referenced standardized test, which measures student proficiency against a national average of student proficiency on the same tool (Rugurt, Ellet, & Kennedy, 2002). End of course tests are administered by the parish and measure student achievement in specific courses. In Louisiana they are often administered by computer.

Why Evaluate?

In recent years, ever increasing pressure has been exerted on the education programs of the United States to quantitatively demonstrate performance. During the 1980's and 1990's many evaluation programs were directed toward teachers with the apparent belief that if the teachers were adequately trained and fulfilling their teaching duties, the educational programs would successfully execute their responsibility. In Louisiana, some evaluation programs had the overall result of causing contention when many teachers perceived the programs negatively rather than as a method of improving education (Chauvin, 1994). Many teachers and teacher organizations opposed early programs like the Louisiana Teaching Internship Program (LTIP) and the Louisiana Teaching Evaluation Program (LTEP) as attempts to revoke lifetime certificates and, in some cases tenure rather than attempts to improve education (Chauvin, 1994). Today, mentoring and collaboration programs within the teaching community as well as more intense focus on certification requirements, such as the Highly Qualified status outlined in the "No Child Left Behind" program, are striving to improve teaching from within (Shaul & General Accounting Office, 2006). The quantitative evaluation focus is now on the learner.

Various testing programs are used to determine serious issues for the students. LEAP testing can prevent promotions for fourth and eighth graders, and the GEE-21 is a requirement for graduation (Louisiana Department of Education, Office of Student and School Performance, 2008). The previously mentioned SPS, which identifies Recovery School Districts, uses test scores among other criteria to calculate changes in achievement levels from year to year (Louisiana State Department of Education, B.,

2004). Publication of high stakes testing scores and changing achievement levels add transparency to the effectiveness of schools and school districts. It must be made clear to the public however that all schools will never be brought up to the “average.” Tax issues supporting education are difficult to pass in school districts where schools have been identified as underperforming. Even in districts identified as performing adequately, test scores can be used to identify areas of the curriculum in need of more attention or funding during tax elections.

Factors That Influence Test Scores

Factors that influence test scores are various and numerous. Highly studied factors included but were not limited to gender, restricted English proficiency, race, individual education plans, and diverse socio-economic situations (The Minnesota Basic Skills Test, 2002). Additionally, classroom environments, study skills, motivation, individual differences in test taking abilities, and reading skills can also be important factors. According to Kim Albin (personal communication, February 20, 2009), one high school administrator responsible for testing in a high school in South Louisiana, home environmental factors such as students living in various alternative family situations due to being “kicked out” of their homes are high on administrator’s worry lists. Students in this situation can have nutritional and sleep issues immediately prior to taking high stakes tests as well as the stress and distraction of their family problems. A concern of this researcher is that in cases where computers are used to deliver tests, students without basic computer skills are at a disadvantage. Since more and more tests, such as end of course tests (EOC), are being given via the computer as well as many of the

programs designed to teach and remediate test materials include the use of computers, knowledge and confidence in using computers can also be a factor in test scores.

Use of Technology in Secondary Schools

Increased use of technology in secondary schools can affect many of these factors. Both students and teachers benefit by using and observing various technology applications today (Carnevale, 2007; Tracey & Young, 2005; Warschauer, 2004; Whitney, 2007). Computer projectors are becoming more common and more valuable in the classroom. PowerPoint presentations, objective specific videos, and virtual labs can be obtained from the Internet, from textbook support software, and independent software sources. Teacher websites such as On-Course by Novell allow for daily and weekly agendas, calendars of events including homework and work sheets, and valuable e-mail communication such as class notes and study guides for students are becoming common. These websites as well as others such as Power Teacher can inform parents of grades, attendance, and important schedules. The computer is rapidly becoming a foundation tool for many varied applications. Even digital cameras, laboratory equipment such as probes, and some graphing calculators, which have uses of their own, often work with computers as classroom demonstration tools.

Improving the curriculum, identifying and addressing individual learning styles, and improving educational techniques and practices, are typical approaches to improving test scores in secondary schools (Bahar, 2009; Ngwudike, 2009; Wraga, 2009).

Technology is steadily increasing its scope and importance in academic success as well as in addressing many of the factors that influence test scores (Carnevale, 2007; Davis, 2009; Johnson & Brett, 2009; Owens, Demana, Abrahamson, Meagher, & Herman,

2002; Tracy & Young, 2005; Warschauer, 2004; Whitney, 2007). Among other things, many end of course tests (EOC's) are administered through internet sources coupled with school system servers such as Novell. Louisiana is in the process of changing from the current Exit Examinations to computer delivered and assessed EOC testing to assess students in specific courses. Many test remediation programs and alternative academic programs, such as PLATO, are provided through computers and the same Internet servers (Hannafin, 2002; Sugar, 2000). Within the normal curricula of modern schools, technology tools such as Smart Boards and subject-based programs are becoming more widespread (Campbell & Mechling, 2009; Ludwig, 2000; Mechling, Gast, & Thompson, 2009). Computers are the launching platform for much of the modern educational technology used in secondary schools today such as those previously mentioned. Most new technology destined for secondary schools in the near future will be designed around current computer use and design. Therefore, assessing student's computer knowledge and ability and relating it to their academic achievement would provide valuable information in determining future technology curriculum and technology application. Does computer user knowledge and ability have a measureable effect on academic achievement in high schools today?

Purpose and Objectives

The primary purpose of this study will be to determine the influence of self-perceived computer user knowledge and selected demographic characteristics on the academic achievement of high school seniors in a parish in South Louisiana.

Specific Objectives

The following specific objectives were formulated to guide the researcher in accomplishing this purpose:

1. To describe high school seniors in a parish in South Louisiana on the following personal demographic characteristics:
 - a. Gender,
 - b. Age,
 - c. Race.
2. To describe high school seniors in a parish in South Louisiana on academic achievement as measured by the scores on the Graduation Exit Examination-21.

These scores included the overall scores in each of the following areas:

- a. Mathematics,
 - b. English Language Arts,
 - c. Science,
 - d. Social Studies.
3. To describe high school seniors in a parish in South Louisiana on self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey.
4. To determine if a relationship exists between the academic achievement as measured by the scores on the Graduation Exit Examination-21 and self-perceived computer user knowledge as measured by the overall and sub-scale scores of the Computer User Knowledge Survey among high school seniors in a parish in South Louisiana.

5. To determine if a model exists explaining a significant portion of the variance in academic achievement as measured by the scores on the Graduation Exit Examination-21 from self-perceived computer user knowledge as measured by the overall scores of the Computer User Knowledge Survey and the following personal demographic characteristics among high school seniors in a parish in South Louisiana:
 - a. Gender,
 - b. Age,
 - c. Race.

Explanation of terms:

1. Technology – “...the practical application of knowledge especially in a particular area: Engineering 2 *medical technology* ...a capability given by the practical application of knowledge *a car’s fuel-saving technology...a manner of accomplishing a task especially using technical processes, methods, or knowledge *new technologies for information storage* ...the specialized aspects of a particular field of endeavor *educational technology*” (Merriam-Webster, 2009).
2. Flex cams - cameras used to capture images for computer recording or transmission.
3. Senteo - student operated remotes used to input information into a computer for interactive white board use.
4. Alpha Smart - information storage device.
5. Dream Weaver - information storage device.

6. Promethean Activ - computer based information projection system.
7. Novell – a web-based provided service school districts.
8. Power School – a web-based grade book provider.

CHAPTER TWO: LITERATURE REVIEW

Academic Achievement

What is Academic Achievement? The definition given by the electronic version of the 11th edition of the Merriam-Webster dictionary for academic, when used as an adjective, included; “1 a: of, relating to, or associated with an academy or school especially of higher learning b: of or relating to performance in academic courses <academic excellence>” (Merriam-Webster, 2009). The same dictionary defined achievement as; “the act of achieving: accomplishment” or “a result gained by effort...” and “the quality and quantity of a student's work” (Merriam-Webster, 2009). Academic achievement is then the quality or quantity of a student's performance gained by effort while working in the area of learning at an academy or school, especially of higher learning. In one report all of the following were listed as indicators of academic achievement: increased high school graduation, more credits earned, higher GPA's, more college prep and AP courses taken, increased enrollment in higher mathematics and science courses, more college entrance exams taken with higher scores, fewer college remediation courses needed, higher levels of college enrollment, higher levels of retention and graduation from colleges, and continuation in science-related majors or professions (James, Jurich, & Estes, 2001). The term and its twin, academic performance are used frequently in most discussions of any aspect of education in America today (Ngwudike, 2009; Scott & Ingels, 2007).

In its usual application today, academic achievement describes how well students are succeeding at learning specific components of subject matter identified as

mathematics, science, English, social studies, information technology, electives, and others. These components and their subdivisions such as chemistry, algebra I, and English II, are organized and taught according to a curriculum that has been painstakingly selected and ordered by the state departments of education and the school districts. Since academic achievement is based on mastery of these discrete components of the curricula, it cannot be evaluated isolated and insulated from these curriculum components (Wraga, 2009). Discussions of student achievement can include various specifics, but all of them include two consistent components; 1) the subject area, which is defined by the curriculum, and (2) the mastery of that part of the curriculum, this is being evaluated by some method. These measurements are compared to similar measurements taken from different students on the same component of the curriculum to compare academic achievement. In 1983 the National Commission on Excellence in Education produced its final report, *A Nation at Risk* (Craig, 1985; Finn & others, 1983; Hogan & ERIC Clearinghouse, 1985). This report recommended standardization of high school curricula across the nation as one method of improving academic achievement. The “5 New Basics” listed in the report as the core curriculum courses are four years of English, three years each of science, mathematics, social studies, and one semester of computer science (Association for Supervision and Curriculum, 1985; Finn & Others, 1983; Gardner, 1983). More recent terminology groups some of these core courses and some other non-core courses into groups such as career and technical education (CTE) (Hudson & Laird, 2009) and science, technology, engineering, and mathematics (STEM) (Garrett, 2008). Parents judged the effectiveness of their schools and the

quality of their children's educations by the academic achievement and performance scores of their children and the schools their children attend (Reimann, Lee, Donahue, & Michigan State University, 2004). Government at all three levels local, state, and federal, used academic achievement scores as bases for judging schools, school districts, and school programs (Shaul & General Accounting, 2006). Within school districts and across the nation, performance scores were used to measure achievement gaps among ethnic groups, gender groups, socio-economic groups, and students with disabilities (Minnesota Basic Skills Test, 2002; Shaul & General Accounting, 2006). Academic achievement has become a by-word among most Americans whenever education is discussed.

The focus on academic achievement has become an international issue. Since Sputnik I in 1957 and the public reaction that followed, it has been a common practice to publically compare American students' achievement scores with students of other nations. Since that time, the American public has been reminded that the security of

the nation in an ever smaller and more technological world is strongly related to the educational success, the academic achievement, of American students. Comparing the academic achievement scores of American student's with those of other nations will remain as one metric for measuring national security.

"The shrinking of the world into a global village and the opening of international borders for free trade had combined to engineer the drive for an unprecedented economic and technological competition among nations. Nations have come to realize that economic and political survival will depend largely on competitive advantage a nation commands over others. Sustaining a competitive edge will be dependent on the availability of a skilled and efficient workforce that a nation has at its disposal (Ngwudike, 2009, p. 3).

Academic achievement is critical to maintaining and improving economic stability and national security through a trained efficient workforce. Cross-national comparisons used to judge academic achievement hence national security and future economic competitiveness are becoming so important that international assessment organizations are being formed to furnish data on these topics. The International Association for the Evaluation of Educational Achievement is one such organization based in Amsterdam, Netherlands. It "...is an independent international cooperative of national research institutions and governmental agencies..." (Ngwudike, 2009, p.3) that provides data for cross-national comparisons. One of the IEA's programs is the Trends in International Mathematics and Science Study (TIMSS). This program is an ongoing international assessment designed to gather data in order to compare student achievement among different countries. During the 2002-2003 school year more than 360,000 fourth and eighth grade students from over 30 and 45 countries respectively were assessed in this effort. Fourth grade students from Singapore, Hong Kong, Japan, Chinese Taipei, and Belgium-Flemish led in assessment scores. At the eighth grade level Singapore, Korea, Hong Kong, Chinese Taipei, Japan and Belgium-Flemish were the leaders (Ngwudike, 2009). The study found that teacher quality, new teacher induction and support, and teacher professional development were among the important factors that influence student achievement (Ngwudike, 2009).

The arrival of Sputnik in 1957 began the new trend in focusing on academic achievement and comparing American students with those of other nations and relating these comparisons to national security. The opinions of "A Nation at Risk" in 1983 added economic prosperity to the concern for improved academic achievement (Craig,

1985). With just these two factors as concerns, the need to improve academic performance is validated. How then can academic achievement be improved? In study after study two areas continue to emerge as possible solutions: improve the curriculum and improve the teacher (Craig, 1985).

The Traditional Curriculum

The traditional curriculum of American schools can trace its roots back to the colonial era when schools were creatures of the church and taught some secular subjects among its religious teachings (Morris, 1981; Saari, 2000). By the mid-1800's, the curriculum in schools in the United States had changed to meet the needs of the evolving American population. Aside from the Civil War, agriculture became the central focus of American schools as demonstrated by the Morrill Act of 1862 (Duemer, 2007). Like the American population, however, education continued to evolve and by the early 1900's was addressing the newly emerging industry of the United States as shown by the second Morrill Act of 1890, which established the agricultural and mechanical colleges (Duemer, 2007; Roman, 2004). During the early 1900's the curriculum produced engineers and industrialists who kept American industry on the cutting edge.

In 1958, the curriculum was influenced by the National Defense Act of that year. In response to national pride and security, the curriculum evolved again, this time in the direction of increasing requirements in math, science, and foreign language (Brainard, 2007; Garrett, 2008). Many traditional areas in earlier curricula have changed their names, been grouped differently, and are now called "new." They fit into what has become the traditional curriculum of the last 50 years-math, English, science, social studies, foreign language, and, since 1983, computer technology (Brainard, 2007;

Craig, 1985; Finn & Others, 1983; Garrett, 2008). “The abundance of a skilled and efficient workforce at the disposal of a nation is dependent on the quality of students produced through K-12 pipeline, especially in the core area of math and science...” (Ngwudike, 2009, p. 3). There are many reasons given by various stakeholders in the attempt to explain declining indicators of academic achievement. Four common ones center around; 1) lack of adequate resources including qualified teachers, 2) inadequate coursework for graduation, 3) lack of funding for science, technology, and math, and 4) inadequate course requirements in teacher preparation programs in science, technology, and math (Garrett, 2008).

With *America 2000* in 1991 more attention was focused on high school curricula to improve academic achievement. The No Child Left Behind Act of 2001 called for “challenging academic content standards” (p. 1441 from Wraga, 2009 p. 89) and said that “core academic subjects’ means English, reading or language arts, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography” (p. 1958 from Wraga, 2009, p. 89). Wraga used these as demonstrations of the separate subject curricula. He, however, professed the benefits of a connected curriculum to improve academic achievement. He pointed to the period from 1982-83 to 2004-2005, a period of increasing curriculum separation, wherein appreciation for, interest in, and relevance to subjects taken fell significantly, while the average number of credits earned during this period rose from 21.7 to 25.8 (NCES, “Special Analysis 2007: High School Course Taking,” from Wraga, 2009) . He used this as evidence that separating the curriculum into separate subjects produced, in the students, a growth of disinterest and an attitude of non-relevance (Wraga, 2009).

Three alternative methods of curriculum organization that might combat this growth of disinterest and non-relevance are the correlated curriculum, the fused curriculum, and the integrated core curriculum (Wraga, 2009). The correlated curriculum separates the subjects but uses subject organization and instruction to explore explicit connections between different components of the curriculum. These connections might be within one subject area, such as physical science in the ninth grade and chemistry in the eleventh grade, a vertical connection, or between science and social studies as in a discussion of air pollution and laws to control the pollution, a horizontal connection. The fused curriculum takes two separate subjects such as U. S. history and American literature and combines them into one subject. The integrated core curriculum uses common personal and social problems and introduces subject matter from more than one subject area to discuss and study the problem (Wraga, 2009).

Regardless of the level of connection, the type of curriculum, or the level of challenge inherent in the subject matter, the traditional American educational program is evolving and maybe more rapidly than ever before. The current trend favors more demanding curricula with higher student expectations (Act I., 2006; Garrett, 2008; James et al, 2001; Ngwudike, 2009; Wraga, 2009). In 1983, it was recommended that one semester of computer science be added to the American high school curriculum. Today, computer science has been divided into several different courses the teaching of which begins in the elementary schools (Lefever-Davis, Johnson, & Pearman, 2007; Tracey & Young, 2005)). Studies in the success of e-tutoring programs, which pair college undergraduate technology students with elementary students needing tutoring,

demonstrated that independent computer user knowledge is an expected skill in elementary schools (Johnson & Bratt, 2009). The International Standards for Technology Education (ISTE) published the National Educational Technology Standards (NETS) in 1998, which have been adapted to some degree, by many states. The standards specify performance indicators for technology literate students at four levels of education: grade 2, grade 5, grade 8, and grade 12. Although the higher levels of NETS deal with concepts such as evaluation, analysis, ethics, and research, basic computer user skill emphasized at the lower grade levels are still required (International Society for Technology in Education, 2007).

There is a downside to the modern method of curriculum development that has evolved over the last 50 years. Teachers today are required to teach the grade level expectations (GLE's) of their specific subject. Louisiana publishes a pacing chart that indicates to the teachers what weeks of the school year specific GLE's are to be taught. There is no traditional emphasis on interconnecting the core subjects. Maintaining this discrete subject concept often fails to demonstrate in a meaningful way the connections between subjects, fails to relate the subject matter to the world outside of the school environment, and develops an attitude of learning for the sake of passing a test mentality among high school students (Wraga, 2009).

Continually increasing the level and possibly the challenge of the high school curriculum also produces, within many students, a practice of scheduling easier courses rather than harder courses. For example, 75% of United States high school graduates from the year of 2005 entered college within two years of graduation. Yet, only 56% of

those students who took the ACT test indicated that they took a core curriculum described as a college preparatory core curriculum (Act I, 2006).

Improving the Teacher

“Teacher quality may be the most important factor that promotes student achievement,” (Ngwudike, 2009, p. 9). In 2005, the *National Governor’s Association* released a report, “An Action Agenda for Improving America’s High Schools.” Its introductory statement said, “America’s high schools are failing to prepare too many of our students for work and higher education” (Conklin, Curran, Gandal, Achieve 1, & National Governor’s Association, 2002, p. 1). This statement is interesting because it comes from prominent business and political leaders outside of the field of education. In another section it says, “Effective teachers and principals are critical to helping all students meet higher standards and leave high school ready for college and work” (Conklin et al, 2005). Attention to improving high school curricula has improved and will continue to improve student achievement in American high schools. Attention must also be given to improving the quality of teachers and teacher practices in the classroom. Among the many suggestions for improving teachers are improved recruiting and retention practices; improved preparation practices including teacher training curricula and certification requirements; and better support for teachers in the classroom, including in-service training and professional development.

Teacher Recruitment

The first step in increasing the number of effective teachers is to increase the number of teachers. “Most states *are* actively pursuing an assortment of strategies to alleviate teacher shortages” (Jimerson & Rural School and Community Trust, 2003 p.

15). Teacher recruitment must be actively addressed by government and teacher preparation institutions (Conklin et al, 2005; Garrett, 2008; Sykes, Dibner, & Policy, 2009; Thompson & Price, 2002). The beginning of government-sponsored teacher education, a tool of recruitment, goes back to the GI Bill of Rights in 1944, which subsidized college education for prospective teachers among other professions and careers. Loan forgiveness and service payback are incentives for teachers who work in special education courses, special needs schools such as urban area schools, and high need subject areas such as math, science, and foreign languages. Between 1972 and 2005 over \$524.8 million in loan forgiveness for Perkins loans has been awarded (McCallion, 2005, p. 6 from Sykes, 2009). Currently the *Federal Family Education Loans (FFEL)* and the *Stafford Loans*, officially entitled the *William D. Ford Direct Loan Program* are part of loan forgiveness programs. Loan forgiveness has been expanded, under a limited plan, since 2004 for math and science teachers. Other financial incentives include plans like the *Paul Douglas Scholarship Program* and *Teach Grants*. Newer programs, such as the *Teacher Education Assistance for College and Higher Education (TEACH)* administered through the reauthorized Higher Education Act (HEA) offer \$4,000 per year to education candidates willing to teach in low areas or shortage area subjects (Sykes et al, 2009).

Other financial recruitment incentives include higher salaries, incentive or merit pay, and pension programs. Salaries have been rising steadily over the past several decades. One teacher, who started teaching in Florida in 1970 at a salary of \$9,500, is now teaching in Louisiana at \$56,000. Seniority and higher education levels are part of the increase, but changes in the salary schedules are responsible for most of the

difference. These figures come from this researcher's personal experience. According to one article, the hourly pay for a public school teacher in the US in 2005 was \$34.06 according to the US Bureau of Labor Statistics (BLS). Data for these figures were collected in 66 urban areas (Greene, Winters, & Manhattan Inst, 2007). This average teacher's salary compares to the following professions as listed: the teacher made 11% more than the average professional specialty and technical worker; 24% more than editors and reporters; architects made 11% less; psychologists made 9% less; chemists, 5% less; mechanical engineers, 6% less: and economists made 1% less than the average teacher's hourly wage. The professions listed that earned more than the average teacher were, airplane pilots, physicians, lawyers, nuclear engineers, actuaries and physicists (Greene et al, 2007). Other general but notable factors that affect teacher salaries include the part of the country you live in, such as the "southern average teacher salary." Similarly, teachers in rural areas are paid significantly less than their urban and suburban colleagues. Many urbanites and suburbanites do not realize that more than eight million children attend rural public schools, with 2.5 million of these children living in poverty, and that 32% of all teachers in the US teach in these rural schools (Jimerson & Rural School and Community Trust, 2003).

Merit and incentive pay are other methods of recruitment and placement. The Professional Compensation for Teachers (ProCom), one such incentive pay plan in Denver, Colorado has become contentious in that city's school district (Honawar, 2008). The plan, once considered a model for other school districts, was originally hammered out through collaboration between the teacher union and the school board. Recent proposed changes have questioned its success. The funds voted for its inception in

2004 were dedicated to raising starting teacher salaries from \$35,000 to \$44,000 and to adding incentive pay for teachers who taught in high needs schools and in math and science. The union wanted to change the disposition of the funds to a 3.5% across the board pay raise (Honawar, 2008). The school district maintained that this is not what the voters approved in 2004. Many school districts across the US are offering salary incentives of \$1,500 to \$4,000 to teachers who accept positions in high needs schools or in hard to fill math and science positions. With the advent of standards-based curricula and evaluation, more districts and governmental agencies are considering merit pay based on student achievement. Standards-based evaluation tends to eliminate the subjective bias and align merit pay guidelines (Makkonen, Arnold, & WestEd, 2005; Sykes et al, 2009). Teacher pensions are yet another tool used to recruit teachers; or is it? Teacher pensions and retirement systems are designed to benefit those long-term retirees who stay in the system for 20 years or more. Even 10-year teachers can vest their retirements for later collection. Teachers who teach for less than 10 years in one state cannot benefit from teacher pension plans. With the majority of teachers today from the “baby boomer” generation, this retirement structure discourages many possible teachers who want to teach for less than 10 years or move from one state to another (Sawchuk, 2009, April 22).

Teacher recruitment from the ranks of college graduates outside the field of education is a growing recruitment practice in education today (Conklin et al, 2005; Gimbert, Bol, & Wallace, 2007; Sykes et al, 2009). No Child Left Behind mandates that highly qualified teachers be placed in all classrooms by the 2006-07 school year. “...in order to be considered a highly qualified teacher, an educator must hold a minimum of a

bachelor's degree, pass state tests of competency in the subject he or she is teaching, and hold state licensure or certification" (Linn, Baker, & Betebenner, 2002 from Gimbert et al, 2007). These requirements compound the already problematic situation of teacher shortages around the nation. The practice of recruiting college graduates, often retirees from business or industry, who have the knowledge to pass the mandated state examinations and offer them a reasonable program to earn certification or licensure, seems appropriate (Constantine, Player, Silva, Hallgren, Grider, et al, 2009). One study using algebra and the standards and processes outlined by the National Council of Teachers of Mathematics (NCTM) established in 2000 found that the use of the NCTM standards significantly improved the student achievement levels. Further, it indicated that the alternative and traditionally trained teachers who used the content standards similarly had no significant difference in student achievement (Gimbert et al, 2007). A very extensive study compared not only alternatively certified (AC) teachers with traditionally certified teachers (TC), but also the amounts of coursework required among the AC teachers. In summary, there was no significant difference between AC and TC teachers and no significant difference between those taking the high and low amount of coursework among the AC teachers (Constantine, et al, 2009). Studies indicate that good alternative certification programs are viable.

Teacher Preparation

After good teacher candidates are recruited they must be properly educated and prepared for the classroom. A lack of properly trained, educated, and prepared teachers is a major problem in today's education landscape (Garrett, 2008; Conklin, 2005). The Trends in International Mathematical and Science Studies (TIMSS) listed

five recommendations for improving education in some countries. The first three are: 1) "...make their teacher education admission, curriculum, graduation, and certification requirements more challenging to teacher education candidates." 2) "Teacher education programs should be designed with a fifth year post certification internship." and 3) "Teacher education systems should establish new teacher induction and support programs" (Ngwudike, 2009). Number three deals with recruitment and support and numbers one and two with teacher preparation and training. Although this study was conducted in an international environment, the recommendations are fundamental and sound. Higher performing countries have higher and more rigorous standards. In Hong Kong and Japan, teacher candidates must pass National Subject Area Examinations prior to entering teacher preparation programs (Ngwudike, 2009). Japan also has a high-stakes testing program in place in some college teacher preparation programs. In Korea, admission into teacher preparation programs is based on Scholastic Assessment Test score as well as attitude and ethics assessment (Ngwudike, 2009).

In today's standards-based high school environment, high performing teachers must be proficient in their subject area. The emphasis on subject matter courses such as math and science during the preparation process is growing. Even in the alternative preparation areas there is less emphasis on methodology and pedagogy courses exemplifying the willingness to trade these for higher content knowledge (Constantine et al, 2009). In Korea, prospective teachers must take more than 40 credits in their teaching area, and in Hong Kong they must have a minor in math or science (Ngwudike, 2009). One justification for these changes in requirements is expressed in the concept that education systems should provide mechanisms for upgrading teacher skills in

response to student needs. As curricula move student requirements higher, such as four years of mathematics and science, more students are directed into higher levels of math and science, such as pre-calculus and physics, in greater numbers. More teachers with the knowledge to teach these higher level courses will be required and a program of "...challenging content standards..." (Wraga, 2009) will be needed to produce these teachers. In the United States, programs such as the Holmes program, so named after the Holmes Group Inc. who proposed an extended teacher preparation program in 1986, used a Professional Development School model requiring a fifth year of preparation to gain certification (Armstrong, D., & Others, A. 1991; Conkling, S. 2007; Lefever-Davis et al, 2007). The teacher candidate takes coursework in three categories, general academic foundation courses, academic major courses, and professional education courses taken over five to six years. Much of the extended time is spent in situational learning opportunities. These programs lean toward the idea that teaching is learned in the classroom, not in teacher preparation programs.

Education leaders should work together to establish the standards of skill and knowledge that today's high school teachers need in order to adequately prepare today's students for work and college . Nations with higher performing educational systems consistently have more rigorous teacher preparation programs (Ngwudike, 2009). A nationwide set of guidelines for preparation standards should be put into place in the United States while still allowing the individual college programs the flexibility to establish both traditional and alternative certification programs that meet these standards (Conklin et al, 2005). More effective assessment and evaluation processes should be developed and used to ensure that teachers have the required tools to be

effective teachers. These knowledge standards and assessment evaluation programs should be reviewed periodically to make sure they continue to reflect what students need in order to be prepared for work or college. Finally, teacher licensure and certification processes should be tied to these meaningful actions (Conklin et al, 2005).

Teacher Retention

“The transition from pre-service teacher education to actual classroom teaching can be challenging and difficult” (Ngwudike, 2009 p. 10). After teachers have completed their preparation programs, obtained their licenses or teaching certificates, and entered the classroom, keeping them there becomes the problem. In the School District of Philadelphia 73% of first-year teachers did not complete their first year of teaching during the school year of 2002-2003. Through an in-depth focused effort by the school district, the number that failed to complete their first year of teaching fell to 71% in 2003-2004 (Useem, & Neild, 2005). There are many advantageous reasons for retaining teachers:

1. School improvement works better in an environment of staff stability. It is difficult to create change if the staff is new and inexperienced.
2. Uncertified teachers are often used to fill vacancies in high teacher turnover districts especially with the requirements of No Child Left Behind.
3. It is expensive to replace new teachers. According to one study, it costs nearly \$11,000 to do so (Benner, 2000 from Useem & Neild, 2005).

Through the efforts of a new Philadelphia School District CFO, Paul Villas, and his appointed special assistant Tomas Hannah, a new program of recruitment and retention has improved the situation considerably. They initiated a program that

embraced a large number of recruitment and retention concepts and made them work for the school district. Useem and Neild (2005) included the following in the list of recruitment activities:

1. Improving relationships with area colleges and universities for advice and aid in recruitment.
2. Contacting civic and business groups for aiding in recruitment programs.
3. Contacting external consultants to assist in designing recruitment and training programs.
4. Recruitment programs targeting qualified teachers with a high likelihood of remaining with the district over the long haul.
5. Seeking applicants through an aggressive multi-media marketing program.
6. Showing interest in applicants by intensifying follow-up actions.
7. A more efficient application process.
8. Financial aid for teachers pursuing master's degrees; \$2,400 for teachers in hard-to-staff schools and \$1,000 per year for other schools.
9. \$1,000 awards for teachers who brought other teachers into the district program.
10. Partial reimbursement for expenses and \$1,000 stipends for teachers who passed the praxis test.
11. A \$4,500 bonus for teachers who signed with the district for the first time. This stipend was paid out over three years in two installments.
12. Six alternative certification programs offered through local teacher preparation colleges and universities were established. District teachers who were seeking certification were eligible for these programs.

Five hundred teachers a year for 2004-05 and 2005-06 were hired through the certification program (Useem & Neild, 2005). The Philadelphia School District is an example of one district, which had serious staffing and retention problems, using a highly varied approach to solve a critical problem. Other retention efforts used today include establishing new teacher networks, furnish better staff development, provide mentoring programs where new teachers are paired with experienced teachers, and better needs assessment for new teachers (Swars, S., Meyers, B., Mays, L., & Lack, B., 2009).

The schools, districts, and states bear a responsibility to support and offer additional training programs as needed to maintain teacher effectiveness and, hopefully, increase teacher retention. Support for teachers in the classroom including in-service and professional development programs are examples of these types of supports. Educational systems, at all levels, should provide professional development dollars in a more efficient manner, ensuring that the development programs serves teachers who work in areas that require more specific training and higher levels of knowledge (Conkling, 2007; Ngwudike, 2009). These development opportunities should address student and teacher learning needs and provide teachers with specific knowledge such as how to use test data to improve teaching and identify student weaknesses (Conklin et al, 2005). Specific introductory support programs used in high performing TIMMS countries include in-school and out-of-school training programs, mentoring by more experienced teachers, team teaching, and higher levels of peer interaction (Ngwudike, 2009). Administrative support for new teachers in these countries can include classes with less challenging situations, less critical developmental grades, and lighter teaching

loads (Norman, 1997 from Ngwudike, 2009). Teacher evaluation in these higher performing countries makes an effort to seem as constructive and supportive rather than fault finding procedures (Ngwudike, 2009). Effective in-service classes can be as simple as offering appropriate workshops on *Word, Excel, PowerPoint, Reader Rabbit, Wiggle Works, Speaking Earobic, Dragon Naturally*, and *Read and Write Gold* (Davis, 2009).

Evaluation

School Evaluation

Continual evaluation of education, more accurately of its many important components and processes, is a requirement just as it is in any other major industrial process; education is after all the largest industry in the United States. With the myriad of nuances and nearly infinite variations among teachers, schools, and curricula, evaluation is conducted on major educational components with the belief that if the parts of the whole are working correctly the whole should be working well. Some areas of evaluation include traditional diverse curriculum, teacher recruitment, preparation, retention, and support, all of which have been discussed. Other important areas of evaluation within the process of education include accreditation standards and school effectiveness.

“Regional accreditation is an important and viable way for institutions to regulate themselves through standards development and their attainment as examined through peer review. Cycles of accreditation are useful in comparing and contrasting overall institutional effectiveness over time and against mutually agreed upon parameters” (Gill, 2006, p. 3).

The accreditation of schools is an important evaluation tool. The Board of Education of the state of Virginia adopted a list of regulations for the establishment of

standards of accreditation for the state on May 24, 2006 to be implemented on September 7, 2006. The five guiding regulations were:

1. Provide an essential foundation of educational programs of high quality in all schools for all students.
2. Encourage continuous appraisal and improvement of the school for the purpose of raising student achievement.
3. Foster public confidence.
4. Assure recognition of Virginia's public schools by other institutions of learning.
5. Establish a means of determining the effectiveness of schools (Gill, 2006, p. 4).

Accreditation standards are set, as the first quotation above indicates, according to regional requirements. Compliance with these required standards may be checked by organizations like the Southern Association of Colleges and Schools (SACS), which evaluates accredited schools in many parts of the Southeastern United States every 10 years. The SACS evaluations check compliance with existing accreditation requirements set by state and federal guidelines. At the five-year interim, SACS performs a cursory assessment ensuring that the school has and is complying with any deficiencies noted during the last major evaluation. These evaluations generally check what has been previously discussed; curriculum, teacher qualification, and also include facility compliance such as classroom facilities, physical education facilities, cafeteria facilities, and general site compliance (Florida Office of Institutional Research and Effectiveness, 1997). This evaluating organization is responsible for evaluating the schools concerning specific accreditation standards.

Since 1958, the effectiveness of American schools and the academic achievement of the students attending them have been scrutinized ever more closely by the American news media and thereby the public. Programs like the state Accountability Program are replacing accreditation as the central focus of the American public where school effectiveness is concerned (Louisiana Department of Education, Office of Student and School Performance, *Accountability Results User Guide for the School Level Table*, (2008). The Accountability Program which produces an annual school performance scores (SPS) for each school is a fairly complex score that involves many school measures. These include but are not limited to school scores on major high stakes tests such as iLEAP, LEAP, and GEE-21, but are more attuned to the change in these scores from one year to the next. It is in response to the requirements of “No Child Left Behind” that schools and school districts make consistent improvements in their school scores. A school with low test scores can raise their scores and be graded more highly on that part of the SPS while a school with considerably higher scores can fall in their scores and be graded lower than the lower performing school. Other factors affecting the SPS are; Baseline SPS 2007 (column D), Growth SPS 2008 (column E), Growth, the difference between the 2007 and 2008 Baseline SPS’s for a school, (column F), Growth Target 2008 (column g), Eligible for Rewards (column H), Baseline SPS 2008 (column I), and Growth Target 2009 (column J) (Louisiana Department of Education, Office of Student and School Performance, *Accountability Results User Guide*, 2008). There are several items other than levels of current scores that are parts of calculating each school’s SPS. Factors including attendance, suspensions, expulsions, and drop-out rates also affect the SPS scores

(Louisiana Department of Education, Office of Student and School Performance, *Accountability Results School Level table, 2008*). This listing of items is included for the purpose of demonstrating the complexities involved in computing the SPS for each school.

Schools that cannot reach and maintain pre-established SPS scores can, through a prescribed process, be removed from the control of local educational systems and placed into “Recovery School Districts” under direct state control (Maxwell, 2008, April 9; Maxwell, 2008, June 4). In these programs, administrative organizations selected by the state assume operations of the schools with the intent of improving their SPS over a period of time. This is accomplished by adjusting faculty, changing some teaching practices, and hopefully improving student and community attitudes. Students also are offered the opportunity to transfer to other district schools creating a change in the school population. According to the NCLB, these RSDs are expected to complete their recovery program within five years and return to district control (Maxwell, 2008, April 9; Maxwell, 2008, June 4).

An unpredicted application of RSD’s is currently occurring in post-Katrina New Orleans (Maxwell, 2008, April 9; Maxwell, 2008, June 4). The number of public school students in New Orleans dropped from 60,000 pre-Katrina students to 33,000 in 2008. At that time, 60% of those students attended 40 charter schools. Paul G. Villas, the superintendent of the Louisiana Recovery School district, controls 33 of New Orleans schools. Under his authority, he has given their principals “charter-like” control over their hiring of teachers and controlling their budget. The RSD, though not designed to act in the face of immense natural disasters, provided a backstop for New Orleans

schools. The program is also raising student test scores in the area. A survey administered by researchers from Tulane University during the 2007-2008 school year indicated the schools were better at the time of the survey than before Katrina when the school district had 60,000 students. This indicated that the RSD program does have some potential to improve schools, even the difficult New Orleans post-Katrina environment (Maxwell, 2008, June 4). Although the fourth and eighth grade LEAP scores jumped 12% and 8% respectively, less than half of the stated grade level students scored passing scores. One promising occurrence is that the graduation rate in the RSD schools rose from 37% to an expected 65% from 2007 to 2008 (Maxwell, 2008, April 9). A disappointing occurrence is that the percentage of students graduating from any Louisiana high school in 2008 is only two out of three.

Student Evaluation

If education is an industrial process, it has, by definition, a product. The whole purpose of the industrial, or in this case the educational process, is to produce viable high school graduates. This can mean more than one thing. The two most obviously sought-after outcomes are prepared literate citizens for the workforce and the nation while the other is a body of students prepared for successful career and professional training at post-secondary institutions (Conklin et al, 2005; Hudson, 2009; Ngwudike, 2009). These can include two-year specialized career training and vocational training programs or four-year professional education programs. Regardless of the purposes the product, the students and their academic achievement, must be evaluated regularly with the intent of ensuring the level of desired attributes is being achieved. In addition

to assessing the students in order to evaluate their achievement levels, the student achievement scores are an important part of the program evaluation as indicated above.

Student assessment tools fall into two very broad categories; classroom testing for the purpose of monitoring student progress and producing the ever sought after grade, and the standardized testing programs used for assessing the overall student levels and progress of schools, districts, and states. The classroom testing is a program with two related goals. The goal of assessment is to measure the individual student's relative success in mastering the state-prescribed subject matter, the state's GLEs, thereby producing the basis for a grade. This also helps motivate the students through competition for grades. In this researcher's opinion, life is a competition; it begins early and continues throughout life and includes competition for grades, jobs, salaries, spouses, and social status among many other things.

The other broad category of testing, determining overall student, school, district, and state levels in comparison with each other, is becoming more publicized in this country daily. It includes the long-time practice of administering norm-referenced tests for the purpose of comparing achievement results among selected groups of schools and students. One example of using norm referenced tests as indicated occurred in 2002 in Louisiana when the Iowa Test of Basic Skills (ITBS) was used along with the Louisiana NRT's, a group of norm referenced tools, to measure the change in mathematics ability in Black students over three years. The use of the ITBS and the NRT's allowed the comparison of the accessible population to be compared with the full range of participants taking the ITBS and the NRT's nationwide (Rugurt et al, 2002). Norm-referenced tests are most useful when comparing selected groups and members

thereof with other groups for the purpose of evaluating program effectiveness. These are the types of scores that are used to indicate the relative effectiveness of educational programs, academic achievement, in one part of the United States with other parts of the nation.

The two categories of standardized tests are the norm-referenced tests and the criterion-referenced tests (CRT's). The norm-referenced tests have been discussed (Rugurt et al, 2002). The criterion-referenced tests, sometimes called mastery tests, make up the other group. In recent decades, CRT's have become extremely important. In 1986, the Louisiana Legislature mandated a testing program based on CRT's to measure the proficiency of Louisiana students. The Louisiana Educational Assessment Program (LEAP) was established (Louisiana State Department of Education, 1990). The LEAP and GEE-21 tests are the high stakes tests for the state of Louisiana. The GEE-21, the Graduation Exit Examination for the 21st Century, replaced the GEE-21, which had been used since 1989. The GEE-21 changes the pass/fail marks on the old test to Advanced, Mastery, Basic, Approaching Basic, and Unsatisfactory achievement levels. Beginning in 1989, the GEE-21 and the GEE-21 have been the determining factors in graduating from high school and obtaining a diploma in the twelfth grade (Louisiana State Department of Education, 2002). The creation of the high stakes testing program is due in large part to the need for the public in America to regain the trust it once had in the quality of the high school graduates of the nation. As belabored earlier, the confidence in the educational programs in the United States began as a result of the Sputnik flight (Brainard, 2007: Garrett, 2008). The first backlash of the nation was an effort to quickly improve the American high school graduate by improving

the educational process as a whole through curriculum changes and graduation requirement changes (Wraga, 2009). More recently, the quality of the graduates of American high schools has become the center of attention in this discussion and rightly so. They are the product of the educational process (Wise, 2008). Studies like the TIMSS report indicated that the economic future of all nations including America depends, to a large extent, on the quality of the student streaming from our educational systems (Ngwudike, 2009). "Nations have come to realize that economic and political survival will depend largely on competitive advantage a nation commands over others. Sustaining a competitive edge will be dependent on the availability of a skilled and efficient workforce that a nation has at its disposal" (Ngwudike, 2009, p. 3). Therefore the debate should not be whether or not we assess high school graduates but rather how we should assess them.

Currently, the accepted assessment model is the criterion-referenced test. In Louisiana, the LEAP-21 test has replaced the original LEAP test used since 1989. It is composed of four parts English Language Arts, Mathematics, Science and Social Studies with five levels of test competency used for reporting results. The LEAP-21 English Language Arts and the Mathematics tests were first administered in the spring of 1999 and the Science and Social Studies in the spring of 2000. The GEE-21, the new high school Graduation Exit Exam was first administered in the spring of 2001. The new CRT's differ from the older version in the following ways:

1. They are directly aligned with the state content standards. They must be as rigorous as the National Assessment of Educational Progress (NAEP) tests.

2. There are longer reading passages and more item types including written constructed response questions. An essay is required at each grade level.
3. The Mathematics test has a greater range of problem types and a higher degree of difficulty.
4. Science inquiry and comprehension of science concepts are tested in a multiple choice format on the Science test.
5. The Social Studies test covers all four disciplines of social studies, which are geography, civics, economics, and history. Some questions require cross-discipline understanding to answer.
6. The grades are no longer pass/fail and are reported as Advanced, Mastery, Basic, Approaching Basic, and Unsatisfactory.

“...the goal of the GEE-21 is to ensure that students graduate from high school with basic skills knowledge in English, Mathematics, Science, and Social Studies” (Louisiana State Dept. of Education, B., 2004, p. 4-37).

Technology in High Schools

Using Technology

Doubtlessly, technology has rapidly evolved over the last 25 years, creating a drive to increase the scope and the amount of technology in the classroom as well as a need to increase the level of organizational technology used in the school districts. Much of today's educational technology is not classroom or student-based, rather it is accounting-based, student record keeping, and reporting such things as attendance and lunch, much of which is important in funding programs (Villano, 2008). Some of the many uses for technology both among students and the general population are “...to communicate; make decisions; reflect, gain, synthesize, evaluate, or distribute

information...” (Whitney, J., 2007, p. 2). Students often use technology more outside of the classroom for entertainment and communication than they do within the classroom. They never make the connection that the technology could be as useful within their educational programs as in their social lives (Whitney, J., 2007).

Technology in the classroom can be a process delivered through appropriate hardware just as easily as it can be the hardware itself. One such process was studied and described in “An Internet-Delivered, Individually Differentiated Reading Program: Effects on Students’ Literacy Achievement and Technology Skills” (Tracy & Young, 2005). In this program, computers were used to deliver differentiated and undifferentiated reading passages to two experimental groups of fifth grade students and a control group. The passages were followed by appropriate assessments to determine if either reading skills or computer literacy skills of the students were improved over the year-long study. The study exemplified the use of computers in providing a treatment which both improved one experimental group’s reading skills and another experimental group’s computer literacy skills over the control group (Tracy & Young, 2005).

Another interesting example of technology in the modern classroom involves the teaching of foreign language in the UK (Warschauer, 2004). This application showed that classroom technology can be used to aid in the teaching of higher order thinking skills, a current buzz word in the high school planning programs. The article indicated the four key actions involved in learning a foreign language are listening and speaking, and reading and writing. In the UK, the writing is generally limited to activities of the formal learning environment. As a result, the UK students tend to become more

proficient in the spoken skills of the foreign language than the limited formal writing skills. Modern technology has vastly increased the opportunity for and amount of computer-mediated communication (CMC) including e-mail and chat rooms (Warschauer, 2004). This increase in amount and diversity of written communication gives rise to a need for understanding and better use of the intricacies of the foreign languages involved. O'Brien spoke of four mental processes involved in writing in a foreign language (O'Brien, 2004, p. 3 from Taylor, Lazarus, & Cole, 2005). They are: 1) a proposer that sets up the pre-linguistic ideas; 2) a translator which translates phrases of the original language into phrases of the second language using proper phraseology and grammar; 3) a reviser which compares the original and the translated language; and 4) a transcriber which completes the translation. By using technology in the teaching of the extended writing of coursework, which requires the more intricate translations and which can be assessed more easily and precisely, the program is improving the writing skills of the UK students (Taylor et al, 2005).

Technology Hardware in Today's High School Classroom

As broad as the definition of technology is, so is the use and variety of technology hardware in today's high school classroom. The Louisiana State Department of Education requires all schools in the state to complete an on-line assessment to determine their levels of technology use each year. The High School Technology Survey 2006-2007, one of these assessments, required to be completed by the high school administrator or the in-school technology specialist in each school lists examples of modern hardware. Organizing this list into meaningful groupings without diminishing the importance of the individual devices produces this list of groupings:

1. Video projection (4)-flex cams, video projection devices, scan converters, computer projector devices.
2. One or two-way information transmission systems (5)-video conferencing connections, Senteo (information response system), TV production studios, Web Projection units, and wireless Internet connections.
3. Information storage and processing devices (6)-i-Pods, PDA's, digital still cameras, digital video cameras, Alpha Smart, and Dream Weaver.
4. Information display (5)-digital monitors, digital TV's, Smart Boards, Promethean Activ, and Document cameras.
5. PC peripherals (3)-printers, scanners, and speakers.
6. Scientific measurement devices (3)-computer based lab probes (cbl's), GPS devices, and graphing calculators.

Almost all of the items listed work in conjunction with others listed and most require a basic PC, not listed, to process or display their results. Computer-based lab devices are a group of laboratory tools usually consisting of a meter equipped with a probe or a laser-based timing device. These can measure such quantities as pH, temperature, and conductivity in a chemistry lab and volts, amps, ohms, velocity, and acceleration in physics labs. There are many other measurements available. In one study on classroom management in science classes, cbl's, and TI-83 graphing calculators were used as laboratory tools. It was shown that confidence levels of the students, independent capabilities of the students, student motivation, and student behavior improved with the use of these devices. In addition to the TI-83's and the

cbl's, a computer lab was used to download the cbl's and the calculator's data for demonstration and discussion (Owens et al, 2002).

One of the previously mentioned devices on the cutting edge of current technology in Louisiana is the interactive white board (IWB) (Campbell & Mechling, 2009; Mechling et al, 2009). In a personal communication (April 23, 2009) Sandra Brewer, the Technology Director for a school district in South Louisiana, commented that her parish in South Louisiana is currently in the midst of writing yearly grants and sending the teachers of one discipline per year to a summer work shop with follow-up weekend workshops in order for them to obtain a Smart Board, a mounted computer projector, and a lap top computer to operate them. One class room set of Senteo remotes are included for each school.

The Senteo student response system is a technology innovation that works with Smart Boards, which in turn work with computers and computer projectors (Mechling et al, 2009; Campbell & Mechling, 2009). Each student is given a small almost credit card sized remote that allows them to log on and input answers directly into the computer Smart Board via an infra red remote beam. The Senteo and Smart Board can be used as a testing device or as a discussion aid. As a testing device, the teacher projects a list of students onto the board in a predetermined format and can identify any students not logged in with their Senteo remotes. Questions can be asked via the Smart Board as a numbered list or a Power Point presentation or verbally as the teacher has prepared and the student multiple choice responses can be logged in as they are selected. As a testing tool, the Smart Boart can project the percentages of individual students on the student grid or the class as a running metric or the final percentage as

the teacher selects. The Senteo pad has true or false response keys, yes or no response keys, A-J multiple response keys, keys for numeric responses complete with decimal points, and forward and backward keys to move through the test questions. Another purpose of this type of system is to alleviate student non-response due to shyness or embarrassment during lectures and review sessions. Student responses are listed anonymously on the smart boards indicating whether or not the desired outcome has been achieved. Although this researcher is not personally familiar with this system, it is being used in at least one parish in South Louisiana with satisfactory results as reported by colleagues of this researcher.

Technology Availability and Funding

If technology has evolved over the last 25 years, the use of technology in high schools has at least kept pace. As indicated above, the diversity in available hardware, the variety and capabilities of modern software, and the infinite uses to which technology can be applied make the question of how technology decisions should be approached an important yet complicated one. The trend in educational systems today is the appointment of a Chief Information Officer (CIO) or a Chief Technology Officer (CTO). This position has evolved from the time when one person bought a few computers and tried to keep them running while programming them with Apple Works or early versions of Microsoft Office.

“Nowadays, many K-12 CIO’s have responsibility for technology that is mission-critical throughout the school district, including everything from applications software to networks, testing and reporting systems that transmit results to local government, and student information systems that capture attendance records upon which funding is based” (Whitney, 2007).

These important individuals are more business oriented than education oriented depending on information garnered from teachers, administrators, and other colleagues to help them make important decisions. They must balance available funding, educational needs, and business requirements of the school district in making important decisions.

One such individual, Sandra Brewer (personal communication, April, 23, 2009), Director of Technology for a South Louisiana parish school district indicated that there are several overlapping and non-overlapping funding sources available to her to maintain and add new technology to the schools of her parish. One of these is the Educational Equity Fund, which is related to the tobacco settlement. Another is the E-Rate program which provides a partial refund of bandwidth expenditures and telephone expenditures. This year for example, she indicated that the refund from the parish bandwidth payments amounted to around a quarter of a million dollars and the telephone refund was \$70,000. The percentage of the parish's total payments for bandwidth and telephone that is refunded to the parish is tied to the number of students who qualify for free and reduced lunches in the parish. Some money from the parish property taxes and sales taxes is also dedicated to the technology program for the parish schools. Additional funds from Title I and Title II programs are available for special programs that relate to those Federal programs. It is evident that technology, like the television, is probably here to stay.

Education is under the microscope, and that microscope might easily be linked to a cbl device that monitors its effects and benefits on education. Clearly, nearly all of the technology used in education hovers around the personal computer and its applications

to the student. The questions this study seeks to answer are; 1) what is the level of self-perceived basic computer user knowledge one group of high school seniors in a South Louisiana high school report, and 2) do these levels of basic computer user skills have a measureable effect on these student's levels of academic achievement as measured by the Graduation Exit Examination-21.

CHAPTER THREE: METHODOLOGY

The primary purpose of this study was to identify the influences of computer user knowledge, as measured by the Computer User Knowledge Survey (CUKS), and the demographic characteristics of gender, age, and race on the academic achievement of high school seniors, as measured by the Graduation Exit Examination-21 (GEE-21), among high school seniors in a parish in South Louisiana.

Limitations

The study was limited by several factors:

- 1) The accessible population from which the sample frame was selected came from one suburban high school in the target area;
- 2) The accessible population from the study school had an unexpected racial make-up from which the sample frame was selected (91.4% White, 5.4% Black, 1.8% Hispanic, and 1.4% Asian or Pacific Islander. This racial make-up was not typical for public school in South Louisiana;
- 3) The computer user knowledge information for the study students was collected on self-perceived student response forms. The attitudes and seriousness of the subject students was not taken into account.

Population and Sample

The target population for this study is defined as high school seniors in public schools in South Louisiana. The accessible population is the senior class of one high school in South Louisiana. The frame of the accessible population included all seniors in the selected high school who were enrolled in English IV. The sample included all of the seniors listed in the frame of the accessible population who were present on the day

that the instruments were administered. No students were excluded from the study on the basis of socioeconomic status or handicapping conditions except those who were housed in self-contained classrooms and not enrolled in English IV classes. The minimum sample size needed for the study was determined using Cochran's sample size determination formula (Snedecor & Cochran, 1980). The calculations for this determination included:

$$n_0 = t^2 s^2 / d^2$$

$$n_0 = (1.96)^2 (50)^2 / (6)^2$$

$$n_0 = (3.8416) (2500) / 36$$

$$n_0 = 267$$

$$n = 267 \div 1 + 267/380 = 157$$

In these calculations:

d^2 = the acceptable margin of error (2% of range of scores – 500-200, .02),

s^2 = estimated variance (range/6 standard deviations – 300/6),

t^2 = acceptable risk (.05 alpha level – 1.96),

n_0 = unadjusted sample size (267),

n = adjusted sample size (157).

The sampling plan for the study will include the following steps:

- 1) All English IV classes at the selected high school will be identified.
- 2) A random sample of classes will be selected to yield a minimum sample of 157 students.

Instrumentation

Computer User Knowledge Survey

The original instrument from which the Computer User Knowledge Survey was developed was a non-copyrighted survey used by a South Louisiana school system technology department as a self-evaluation tool. It was used to aid the teachers in that system in determining their own computer user knowledge and skill levels. The teachers and the school system used the results to request and design appropriate in-service training programs for the teachers of the parish. The original survey had 90 items and used a five-point Likert-type scale as the response measurement. Many items on the original tool were double-barreled and asked questions with two or more objects of concern. For example, one item asked, "Can you use printers and scanners?" Based on a review by a group of experts and field testing in two graduate classes, all items were changed to single specific subject questions and the response scale was converted to a dichotomous format for more effective use at the secondary level. For instance, the previous item has been changed into two items that read "Can you use printers?" and "Can you use scanners?" Currently, the number of items in the CUKS is 148, and they are divided into six categories (See Appendix B). These are:

1. Basic Knowledge CUKS,
2. Windows CUKS,
3. Word processing CUKS,
4. Internet CUKS,
5. Multimedia CUKS,

6. Computer games CUKS.

The survey has been field-tested by high school technology teachers, high school administrators, high school classroom teachers, and high school students. Each section of the survey includes several specific items dealing with appropriate functions for that topic. For the purposes of this study, the topic multimedia CUKS pertains to incorporating computer technology such as PowerPoint and audio and video downloads used by teachers or students in classroom presentations.

Academic Achievement Scores

The surveys were administered to the sample students and the subject responses were marked on scannable response forms. The properly completed response forms were scanned and the raw score data sheets were forwarded to a representative of the school system in which the high school was located. Data from the Louisiana Department of Education was accessed by the representative and the student's name and CUKS score were matched with and added to the standardized test scores kept in the state data base. The names of the sample students were deleted after the CUKS scores were added and then returned to the researcher. This data included the GEE-21 scores for the four scales, the CUKS scores, the scores of the six CUKS sub-scales, and the age, gender, and race of each sample student. The reliability of the CUKS instrument was calculated producing a Crombach's Alpha .98.

Data Analysis

The statistical procedures used to accomplish the purpose of the study were organized by research objective and included the following:

1. The first objective of the study was to describe high school seniors in a parish in South Louisiana on the following personal demographic characteristics: Gender, Age, and Race. The variables Gender and Race were nominal variables and the frequencies and percentages in each category were presented to describe participants on these characteristics. Age was measured as a continuous variable in the study; therefore, the mean and standard deviation were presented to describe participants on this variable.

2. The second objective was to describe high school seniors in a parish in South Louisiana on academic achievement as measured by the scores on the Graduation Exit Examination-21. These scores included the scores in each of the following categories:

- a. Mathematics,
- b. English Language Arts (ELA),
- c. Science,
- d. Social Studies.

Since each of these academic scores were measured as continuous data on an interval scale, the researcher presented the means and standard deviations for each of the scales and corresponding sub-scales to describe participants on these items.

3. The third objective of the study was to describe high school seniors in a parish in South Louisiana on self-perceived computer user knowledge as measured by the scores of the Computer User Knowledge Survey (CUKS). Data used to accomplish this

objective included the participant responses to the 148 items on the CUKS instrument. Subjects were asked to indicate for each item whether or not they had the specified computer skill. Subjects received a score of “1” for each item they reported “Yes” and a score of “0” for each item they reported “No.” The CUKS was divided into six sub-scales of computer use knowledge skills. Participants received a score for each of the six sub-scales that corresponded to the total number of “Yes” responses in that section of the instrument. Additionally, the participants received an overall CUKS score which was the sum of the responses to all 148 items. Therefore, the total CUKS had a possible range of scores of from “0” (with no items receiving a response of “Yes”) to “148” (with all items receiving a response of “Yes”). From preliminary administrations of the CUKS, a descriptive scale was projected to serve as a platform to help interpret the grades (Davis, 1971). The scale was based on results from trial classes and feedback from selected IT teachers. The scale was: 139-148 = very high, 127-138 = high, 112-126 = moderately high, 98-111 = low, and below 110 = very low. The mean and standard deviation for each of the computed scores (six sub-scales and one overall scale score) were then reported.

4. The fourth objective was to determine if a relationship existed between the academic achievement as measured by the scores on the Graduation Exit Examination-21 and self-perceived computer user knowledge as measured by the scores of the Computer User Knowledge Survey (CUKS) among high school seniors in a parish in South Louisiana using Pearson Product Moment correlation coefficients.

5. The fifth objective was to determine if a model existed explaining a significant portion of the variance in academic achievement as measured by the scores on the

Graduation Exit Examination-21 from self-perceived computer user knowledge (as measured by the overall scale and sub-scales of the CUKS) and the following personal demographic characteristics among high school seniors in a parish in South Louisiana using multiple regression analysis.

- a. Gender,
- b. Age,
- c. Race.

CHAPTER FOUR: RESULTS

The primary purpose of this study was to identify the influence of computer user knowledge, as measured by the Computer User Knowledge Survey (CUKS), and the demographic characteristics of gender, age, and race on academic achievement as measured by the Graduation Exit Examination-21 (GEE-21), among high school seniors in a parish in south Louisiana. Findings of the study are presented in this chapter organized by objectives.

Objective One

The first objective of the study was to describe high school seniors in a parish in South Louisiana on the following personal demographic characteristics: Gender, Age, and Race. This information was obtained from two sources; Gender and Race were indicated on the scannable response forms completed by the study subjects, and Age was obtained from the Louisiana Department of Education GEE-21 data base. The variables gender and race are nominal variables and the frequencies and percentages in the categories of each of these variables are presented to describe participants on these characteristics. Age was measured as a continuous variable in the study; therefore, the mean and standard deviation was presented to describe participants on this variable.

Objective One Results

The first demographic variable on which participants are described is gender. Information on gender was obtained from the scannable response forms used in the survey. Of the 295 student participants in the study, information regarding gender was available on 281. Of these students, 161 (57.3%) reported their gender as female and

120 (42.7%) indicated that they were male. Fourteen reporting forms did not indicate gender of the student.

The second characteristic on which students in the study were described was age as of the date the CUKS was administered. Birth dates for the 295 subjects were obtained from the Louisiana Department of Education GEE-21 data base. These birth dates and the date of the administration of the CUKS instrument were used to determine the age of study participants. Age of students ranged from 15.03 to 21.58 with the mean age of 18.03 years ($SD = 0.58$). To further describe students on the variable age, the ages were divided into one year categories beginning with less than 16 and progressing through 20 or more. The majority of students ($n = 154$, 54.8%) who participated in the study were 17 (between 17.0 and 17.99 years) years old. Only two (0.7%) of the students were 20 or more years old (see Table 1).

The third demographic variable on which students were described was race. The information for Race was obtained from the scannable response forms used with the survey. Of the 295 surveys returned, 278 participants indicated race and 17 did not. Four racial groups were identified in the results. The "White" race was the most frequently reported race with a total of 254 participants (91.4%). The "Black" race was the next most frequently reported race with 15 participants (5.4%). Next was "Hispanic" with 5 participants (1.8%) reporting they were "Hispanic". The next most frequently reported race was "Asian, Pacific Islander" with four subjects (1.4%) indicating they were Asian or Pacific Islander.

Table 1. Age of Seniors Enrolled at a Suburban High School in South Louisiana

Age	n	%
Less than 16	1	.4
16.0-16.99	1	.4
17.0-17.99	154	54.8
18.0-18.99	106	37.7
19.0-19.99	17	6.0
20 or more	2	.7
Total	281	100.0

Note. Mean age = 18.03, SD = 0.58

Information needed to measure age was unavailable for 14 participants.

Objective Two

The second objective of the study was to describe high school seniors in a parish in South Louisiana on academic achievement as measured by the scores on the Graduation Exit Examination-21 (GEE-21). These scores include the overall scores in each of the following areas:

1. Mathematics,
2. English Language Arts (ELA),
3. Science,
4. Social Studies.

Since each of these academic scores was measured as continuous data on an interval scale, means and standard deviations were used to summarize each of the scales to describe participants on these items.

Objective Two Results

The first academic achievement measure that was used to describe the study participants was their math scores on the GEE-21. Data were available for 269 of the 295 participants in the study. Math scores for the 269 students ranged from 283 to 441 with a mean of 334.24 (SD=28.35). To further describe the participants on their math

achievement, the researcher grouped the scores according to the classification system used by the Louisiana Department of Education in describing the level of math achievement. The GEE-21 scores are divided into five achievement levels ranging from the highest achievement level of Advanced and ranging down through Mastery, Basic, Approaching Basic, and the lowest achievement level of Unsatisfactory. The lowest possible score in any achievement level is 100 and the highest possible score in any achievement level is 500. The ranges for the student scores in each of the four subject categories, Math, ELA, Science, and Social Studies vary in their ranges for each subject category (see Table 2). The number of participants scoring in each of the five categories and the corresponding percentages are presented in Table 3. The majority ($n = 146$, 54.3%) scored in the Basic category. The smallest number ($n = 1$, 0.4%) was in the Unsatisfactory category. Eighty-seven percent of the participants achieved Math scores on the GEE-21 in the Advanced, Mastery, and Basic categories compared to 73% of the students statewide in the same achievement categories.

The second academic achievement measurement that was used to describe the study participants was their English Language Arts (ELA) scores on the GEE-21. Scores of the 269 students for whom usable data was available ranged from 270 to 404 with a mean of 318.86 ($SD=26.03$). To further describe the participants on their ELA achievement, the researcher grouped the scores according to the classification system used by the Louisiana Department of the participants on their ELA achievement; the researcher grouped the scores according to the classification system used by the Louisiana Department of Education in describing the level of ELA achievement

Table 2. Range of Scores for the Five Achievement Levels on the Four- Subject Categories of the GEE-21

Achievement Level	Math Range	ELA	Science	Social Studies
Advanced	377-500	398-500	396-500	386-500
Mastery	346-376	347-397	349-395	344-385
Basic	305-345	299-346	301-348	297-343
Approaching Basic	286-304	271-298	267-300	275-296
Unsatisfactory	100-285	100-280	100-265	100-274

(see Table 2). The frequencies and percentages in each of the achievement categories are presented in Table 4. Seventy-six per cent of the students in the study scored in the three higher levels of the GEE-21 ELA category (Advanced, Mastery, and Basic) compared to 62% of the students statewide.

Table 3. Math Achievement Level of High School Seniors in a Suburban Parish in South Louisiana and Statewide Math Percentages for GEE-21 Test for 2009

Achievement Level	N	%	Louisiana Statewide %
Advanced (377-500)	19	7.1	11
Mastery (346-376)	69	25.6	14
Basic (305-345)	146	54.3	48
Approaching Basic (286-304)	34	12.6	16
Unsatisfactory (100-285)	1	.4	11
Total	269	100.0	100

Note: Mean math achievement score = 334.24, SD=28.34, range 283-441. Math scores on 26 participants were not available.

The third academic achievement measure that was used to describe the study participants was their Science scores on the GEE-21. The number of participants with

Table 4. English Language Arts Achievement Level of High School Seniors in a Suburban Parish in South Louisiana and Statewide ELA Percentages for GEE-21 Test for 2009

Achievement Level	N	%	^aLouisiana Statewide %
Advanced (398-500)	3	1.1	1
Mastery (347-397)	38	14.1	12
Basic (299-346)	163	60.6	49
Approaching Basic (271-298)	64	23.8	26
Unsatisfactory (100-270)	1	.4	12
Total	269	100.00	100

Note: Mean ELA achievement score =318.86, SD=26.03, range 270-404.

ELA scores were not available for 26 participants.

^a From the Louisiana Department of Education GEE-21 Data Base

usable data on the science test was 280. Science scores in the study ranged from 238 - 410 with a mean of 321.60 (SD=33.01). To further describe the participants on their science achievement, the researcher grouped the scores according to the classification system used by the Louisiana Department of Education in describing the level of science achievement (see Table 2). The frequencies, percentages, means, range, and standard deviation for this subject category (Science) are presented in Table 5.

Seventy per cent of the students in the study scored in the three highest levels of the GEE-21 test (Advanced, Mastery, and Basic) compared to 61% statewide.

The fourth academic achievement measure that was used to describe the study participants was their Social Studies scores on the GEE-21. Scores of the 280 students for whom usable data was available ranged from 260 to 403 with a mean of 315.64 (SD = 24.84). To further describe the participants on their Social Studies achievement, the

researcher grouped the scores according to the classification system used by the Louisiana Department of Education in describing the level of Social Studies achievement (see Table 2). The frequencies, percentages, mean, range, and standard deviation of the Social Studies scores are presented in Table 6. Seventy-seven percent of the students in the study scored in the three highest levels of the GEE-21 Social Studies test (Advanced, Mastery, and Basic) compared to 62% statewide.

Table 5. Science Achievement Level of High School Seniors in a Suburban Parish in South Louisiana and Statewide Science Percentages for GEE-21 Test for 2009

Achievement Level	N	%	^aLouisiana Statewide %
Advanced (396-500)	3	1.1	4
Mastery (349-395)	46	16.4	17
Basic (301-348)	148	52.9	40
Approaching Basic (266-300)	71	25.3	24
Unsatisfactory (100-265)	12	4.3	15
Total	280	100.00	100

^a From the Louisiana Department of Education GE 21 Data Base

Note: Mean Science Achievement Score =321.60, SD=33.01, range 238-410. Science scores were not available for 15 participants.

Objective Three

The third objective of the study was to describe high school seniors in a parish in South Louisiana on self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey (CUKS). Data used to accomplish this objective included the participant responses to the 148 items on the CUKS instrument. Subjects were asked to indicate for each item whether or not they

Table 6. Social Studies Achievement Level of High School Seniors in a Suburban Parish in South Louisiana and Statewide Social Studies Percentages for GEE-21 Test for 2009

Achievement Level	N	%	^a Louisiana Statewide %
Advanced (386-500)	5	1.8	1
Mastery (344-385)	32	11.4	9
Basic (297-343)	179	63.9	52
Approaching Basic (275-296)	53	19.0	2
Unsatisfactory (100-274)	11	3.9	16
Total	280	100.00	100

^a From the Louisiana Department of Education GEE-21 Data Base

Note. Mean Social Studies Achievement Score =315.64, SD=24.84, range 260-403. Social studies scores were not available for 15 participants.

had the specified computer skill. Subjects received a score of “1” for each item on which they reported “Yes” and a score of “0” for each item on which they reported “No.”

The CUKS is divided into six sub-scales of computer user knowledge and skills. Participants received a score for each of the six sub-scales that corresponded to the total number of “Yes” responses in that section of the instrument. Additionally, the participants received a total CUKS score which was the sum of the responses to all 148 items. Therefore, the total CUKS had a possible range of scores of from “0” (with no items receiving a response of “Yes”) to “148” (with all items receiving a response of “Yes”) (See Appendix A). The mean and standard deviation for each of the computed scores (six sub-scales and one overall scale score) were then reported (see Table 7).

Objective Three Results

The first subscale of the Computer User Knowledge Survey was “Basic Computer Skills.” This section included 19 items, and respondents were asked to

indicate for each of the items whether or not they possessed that computer skill. Valid responses were provided to the items in this subscale by 294 of the 295 study participants. The respondents received a score of “1” for each item that was marked “Yes” indicating that they had this skill and “0” for each item that was marked “No” indicating that they did not have this skill. Therefore, the possible range of scores for this sub-scale was from 0 (indicating that the participant possessed none of the skills in the sub-scale) to 19 (indicating that the participant possessed all of the skills in the sub-scale). The actual range of scores for this sub-scale was from 6 to 19 with a mean of 16.56 ($SD = 3.15$) (see Table 7). This mean score indicates that the average percentage of skills possessed in the Basic Computer Skills sub-scale was 87.16%.

The second sub-scale of the Computer User Knowledge Survey was “Windows.” This section included 39 items, and respondents were asked to indicate for each of the items whether or not they possessed that computer skill. Valid responses were provided to the items in this sub-scale by 294 of the 295 study participants. The respondents received a score of “1” for each item that was marked “Yes” indicating that they had this skill and “0” for each item that was marked “No” indicating that they did not have this skill. Therefore, the possible range of scores for this sub-scale was from 0 (indicating that the participant possessed none of the skills in the sub-scale) to 39 (indicating that the participant possessed all of the skills in the sub-scale). The actual range of scores for this sub-scale was from 4 to 39 with a mean of 34.78 ($SD = 6.43$) (see Table 7). This mean score indicates that the average percentage of skills possessed in the Windows sub-scale was 89.18%.

The third sub-scale of the Computer User Knowledge Survey was “Word Processing.” This section included 38 items, and respondents were asked to indicate for each of the items whether or not they possessed that computer skill. Valid responses were provided to the items in this sub-scale by 294 of the 295 study participants. The respondents received a score of “1” for each item that was marked “Yes” indicating that they had this skill and “0” for each item that was marked “No” indicating that they did not have this skill. Therefore, the possible range of scores for this sub-scale was from 0 (indicating that the participant possessed none of the skills in the sub-scale) to 38 (indicating that the participant possessed all of the skills in the sub-scale). The actual range of scores for this sub-scale was from 0 to 38 with a mean of 35.63 ($SD = 5.39$) (see Table 7). This mean score indicates that the average percentage of skills possessed in the Word Processing sub-scale was 93.76%.

The fourth sub-scale of the Computer User Knowledge Survey was “Internet.” This section included 22 items, and respondents were asked to indicate for each of the items whether or not they possessed that computer skill. Valid responses were provided to the items in this sub-scale by 294 of the 295 study participants. The respondents received a score of “1” for each item that was marked “Yes” indicating that they had this skill and “0” for each item that was marked “No” indicating that they did not have this skill. Therefore, the possible range of scores for this sub-scale was from 0 (indicating that the participant possessed none of the skills in the sub-scale) to 22 (indicating that the participant possessed all of the skills in the sub-scale). The actual range of scores for this sub-scale was from 0 to 22 with a mean of 19.29 ($SD = 4.02$)

(see Table 7). This mean score indicates that the average percentage of skills possessed in the Internet sub-scale was 87.68%.

The fifth sub-scale of the Computer User Knowledge Survey was “Multimedia.” This section included 23 items, and respondents were asked to indicate for each of the items whether or not they possessed that computer skill. Valid responses were provided to the items in this sub-scale by 291 of the 295 study participants. The respondents received a score of “1” for each item that was marked “Yes” indicating that they had this skill and “0” for each item that was marked “No” indicating that they did not have this skill. Therefore, the possible range of scores for this sub-scale was from 0 (indicating that the participant possessed none of the skills in the sub-scale) to 23 (indicating that the participant possessed all of the skills in the sub-scale). The actual range of scores for this sub-scale was from 0 to 23 with a mean of 18.74 (SD = 5.36) (see Table 7). This mean score indicates that the average percentage of skills possessed in the Multimedia sub-scale was 81.48%.

The sixth sub-scale of the Computer User Knowledge Survey was “Computer Games.” This section included 7 items, and respondents were asked to indicate for each of the items whether or not they possessed that computer skill. Valid responses were provided to the items in this subscale by 286 of the 295 study participants. The respondents received a score of “1” for each item that was marked “Yes” indicating that they had this skill and “0” for each item that was marked “No” indicating that they did not have this skill. Therefore, the possible range of scores for this sub-scale was from 0 (indicating that the participant possessed none of the skills in the sub-scale) to seven

(indicating that the participant possessed all of the skills in the sub-scale). The actual range of scores for this sub-scale was from 0 to 7 with a mean of 5.96 (SD = 1.61) (see Table 7). This mean score indicates that the average percentage of skills possessed in the Computer Games sub-scale was 85.14%.

The seventh sub-scale of the Computer User Knowledge Survey was “Overall”. Valid responses were provided to the items in this sub-scale by 286 of the 295 study participants. This section included all 148 of the items on the Computer User Knowledge Survey and combined the “Yes” responses and the “No” responses by totaling the “1” and “0” scores from all six of the previous sub-scales (see Appendix A). Therefore, the possible range of scores for this sub-scale was from 0 (indicating that the participant possessed none of the skills in the CUKS) to 148 (indicating that the participant possessed all of the skills in the CUKS). The actual range of scores for the CUKS was from 30 to 148 with a mean of 131.09 (SD = 20.66) (see Table 7). This mean score indicates that the average percentage of skills possessed on the CUKS was 88.57%.

Objective Four

The fourth objective was to determine if a relationship exists between the academic achievement as measured by the scores on the Graduation Exit Examination-21 and self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey (CUKS) among high school seniors in a parish in South Louisiana using Pearson Product Moment correlation coefficients.

Table 7. Computer User Knowledge Scale Scores of High School Seniors in a Parish in South Louisiana

Scale	N ^a	Mean	SD	Low	Hi	Mean % Yes
Word	294	35.63	5.39	0	38	93.76
Windows CUKS	294	34.78	6.43	4	39	89.18
Internet CUKS	294	19.29	4.02	0	22	87.68
Multimedia CUKS	291	18.74	5.36	0	23	81.48
Basic CUKS	294	16.56	3.15	6	19	87.16
Computer Games CUKS	286	5.96	1.61	0	7	85.14
Overall CUKS	286	131.09	20.66	30	148	88.57

^a Number of study participants for which complete scale responses were available.

Objective Four Results

The four sub-scores of the GEE-21 were Math, English Language Arts (ELA), Science, and Social Studies. The six subscales of the CUKS were Basic Computer Knowledge, Windows, Word Processing, Internet, Multimedia, and Computer Games. Each of the four GEE-21 sub-scores were correlated with each of the six CUKS sub-scales using Pearson Product Moment correlation coefficients. The alpha level was set at .05. Each of the GEE-21 academic achievement scores was examined with the CUKS sub-scale scores separately.

The Pearson Product Moment Correlations showing the relationships between the Math score of the GEE-21 and each of the six sub-scales of the CUKS are shown in Table 8. When the sub-scales of the CUKS were correlated with the Math scores of the GEE-21 for the senior students in the study, none of the relationships were found to be significant (see Table 8).

The Pearson Product Moment Correlations showing the relationships between the English Language Arts portion of the GEE-21 and each of the six sub-scales of the

CUKS are shown in Table 9. When the sub-scales of the CUKS were correlated with the ELA scores of the GEE-21 for the senior students in the study, the results showed two significant relationships (See Table 9). The correlation between ELA scores and Multimedia CUKS was $r = .16$ ($p = .018$) and the correlation between ELA scores and Basic Knowledge CUKS was $r = .14$ ($p = .037$). Both of these were significant at the .05 level. Additionally, both of these correlations were positive indicating that higher scores on the ELA GEE-21 test tended to be associated with higher scores on the Multimedia CUKS sub-scale and the Basic Knowledge CUKS sub-scales.

Table 8. Relationships Between Sub-Scale Scores of the Computer User Knowledge Survey and Graduate Exit Examination-21 Math Scores Among High School Seniors in a School in South Louisiana

CUKS Sub-Scale	r	N	P
Windows CUKS	-.09	232	.197
Word Processing CUKS	-.04	232	.566
Computer Games CUKS	-.04	225	.568
Multimedia CUKS	.04	229	.587
Internet CUKS	-.01	232	.917
Basic Knowledge CUKS	.01	232	.927
Overall CUKS	-.02	225	.719

The Pearson Product Moment Correlations showing the correlations between the Science portions of the GEE-21 and each of the six sub-scales of the CUKS are shown in Table 10. When the sub-scales of the CUKS were correlated with the Science scores of the GEE-21 for the participants in the study, none were shown to be significant (See Table 10).

The Pearson Product Moment Correlations showing the correlations between the Social Studies portion of the GEE-21 and each of the six sub-scales of the CUKS are shown in Table 11. When the sub-scales of the CUKS were correlated with the Social

Studies scores of the GEE-21 for the senior students in the study, no significant relationships were found (See Table 10).

Table 9. Relationship Between Sub-Scores of the Computer User Knowledge Survey and Graduation Exit Examination-21 English Language Arts Scores Among Seniors in a High School in South Louisiana

CUKS Scale	R	N	P
Multimedia CUKS	.16	229	.018
Basic Knowledge CUKS	.14	232	.037
Windows CUKS	.08	232	.205
Internet CUKS	.06	232	.338
Word Processing CUKS	.05	232	.799
Computer Games CUKS	.04	225	.509
Overall CUKS	.11	225	.089

Table 10. Relationship Between Sub-Scores of the Computer User Knowledge Survey and Graduation Exit Examination-21 Science Scores Among Seniors in a High School in South Louisiana

CUKS Score	R	N	P
Windows CUKS	-.06	243	.340
Multimedia CUKS	.06	240	.354
Computer Games CUKS	.05	235	.422
Internet CUKS	-.03	243	.615
Word Processing CUKS	-.02	243	.787
Basic Knowledge CUKS	-.01	243	.941
Overall CUKS	-.01	235	.872

Objective Five

Objective five was to determine if a model exists which explains a significant portion of the variance in academic achievement as measured by overall Math, English, Science, and Social Studies scores as measured by the scores on the Graduation Exit Examination-21 from self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge survey and the personal demographic characteristics of Gender, Race, and Age among high school seniors in a

suburban parish in South Louisiana. The four measures of the GEE-21 were entered as dependent variables and the six scales, Basic Knowledge, Windows, Word Processing, Internet, Multimedia, Computer Games, and the overall CUKS scores were entered as independent variables. Stepwise entry was used in the analysis due to the exploratory nature of the study. Variables were entered into the regression equation if they explained one percent or more of the variance under the condition that the overall regression model remained significant.

Table 11. Relationship Between Scores of the Computer User Knowledge Survey and Graduation Exit Examination-21 Social Studies Scores Among Seniors in a High School in South Louisiana

CUKS Score	R	N	P
Multimedia CUKS	.12	240	.061
Computer Games CUKS	.11	235	.093
Word CUKS	.05	243	.481
Internet CUKS	.04	243	.580
Basic Knowledge CUKS	.03	243	.652
Windows CUKS	-.01	243	.879
Overall CUKS	.07	235	.274

Objective Five Results

The first academic achievement measurement entered as a dependent variable in a regression analysis was the Math score as measured on the GEE-21. All independent variables included in a regression analysis must either be measured on a continuous scale (interval level or higher) or be dichotomous in nature. The scales of the CUKS instrument were measured as interval level data as was the variable Age which was computed from student birth dates acquired from the GEE-21 data base. The variable Gender is naturally dichotomous in nature; therefore, no adjustment had to

be made in this variable. However, the variable Race was measured as nominal data, and has multiple categories of measurement in the data base. Therefore, this variable had to be recoded as a series of dichotomous variables for it to be included in the regression analysis. This was accomplished by creating a separate dichotomous variable from each of the categories of race. For example, regarding the Black race, students in the study were classified as either possessing the trait of being Black or not possessing the trait of being Black. This same process was used for each of the categories of the variable race so that a separate dichotomous variable was created for White or not White, Hispanic or not Hispanic, and Asian or not Asian.

After the variables were prepared for entry into the analysis, the first step in conducting the regression analysis was to examine the bivariate correlations between the dependent variable and each of the independent variables to be included in the analysis. The bivariate correlations are presented in Table 12. Examination of this data reveals that none of the independent variables were found to be significantly related to the GEE-21 Math scores.

Correspondingly, when the regression analysis was conducted, no significant model was identified. Therefore, none of the variables included in the analysis explained a significant portion of the variance in the GEE-21 Math scores.

The second academic achievement measurement entered as a dependent variable in a regression model was the ELA scores as measured on the GEE-21. After the independent variables to be included in the regression analysis were prepared, the bivariate correlations between the dependent variable and each of the independent variables were examined. The bivariate correlations are presented in Table 13.

Examination of the bivariate correlations reveals that there are two significant relationships. The correlation between the independent variable Multimedia CUKS score and the dependent variable GEE-21 ELA score was $r = .15$ ($p = .012$). The correlation between the Basic Knowledge CUKS score and the ELA score was $r = .14$ ($p = .019$). These correlations are significant at the .05 level (see Table 13).

The next step in conducting a regression analysis is to examine the independent variable for the presence of multicollinearity. Multicollinearity can occur when the correlations among independent variables in a multiple regression model are too high. Although this situation will not reduce the predictive power or the reliability of the regression model, it can affect the results of individual predictor variables and their effects on the dependent variable.

The procedure used to test for the presence of excessive levels of multicollinearity is to examine the tolerance levels. Examination of the tolerance levels shows that none are below 0.20 for any of the independent variables of personal demographic characteristics or any of the CUKS measures (see Table 14). Therefore, multicollinearity is not a concern in this regression analysis.

Examination of the regression analysis revealed that the independent variable Multimedia CUKS score entered the regression model first (see Table 14). This variable explained 2.3% of the variance in the ELA GEE-21 scores. The nature of the influence of the variable Multimedia CUKS score was such that participants who scored higher on the independent variable Multimedia CUKS score tended to score higher on the dependent variable GEE-21 ELA scores (see Table 14).

Table 12. Bivariate Correlations Between English Language Arts Scores on the Graduation Exit Examination-21 as the Dependent Variable and the Independent Variables Selected Demographic Characteristics, Computer User Knowledge Survey Scale Scores and Overall Score

Variable	r	N	P
Gender ^a	.11	225	.053
Windows CUKS	-.08	225	.125
Age	-.07	225	.136
Hispanic ^b	-.05	225	.228
Asian ^b	.04	225	.259
Computer Game CUKS	-.04	225	.284
Multimedia CUKS	.03	225	.321
Word CUKS	-.03	225	.336
Black ^b	-.03	225	.339
White ^b	.02	225	.385
Basic Knowledge CUKS	.01	225	.440
Internet CUKS	.01	225	.472
Overall CUKS	-.02	225	.359

^a Coded 0 = Male, 1 = Female

^b Coded 0 = Absence of Trait (e.g. Black), 1 = Presence of Trait

The third academic achievement measurement entered as a dependent variable in a regression model was the Science scores as measured on the GEE-21. After the independent variables to be included in the regression analysis were prepared, the bivariate correlations between the dependent variable and each of the independent variables were examined. The results of this examination indicated that three of the relationships were significant (see Table 15).

The relationship between the dependent variable Science GEE-21 score and the independent variable Gender was $r = .20$ ($p = .001$). The variable Gender was a dichotomous variable where “1” corresponded to female on the response form and “0” corresponded to male. Therefore, the positive nature of Gender indicated that female participants tended to score higher on the science portion of the GEE-21. The

Table 13. Bivariate Correlations Between English Language Arts Scores on the Graduation Exit Examination-21 and Computer User Knowledge Survey Scores and Selected Personal Demographic Characteristics of High School Students in a Parish in South Louisiana

Variable	r	N	P
Multimedia CUKS	.15	225	.012
Basic Knowledge CUKS	.14	225	.019
Windows CUKS	.09	225	.081
Internet CUKS	.08	225	.128
White ^b	.07	225	.157
Computer Games CUKS	.04	225	.255
Gender ^a	-.04	225	.257
Hispanic ^b	-.04	225	.276
Asian ^b	-.04	225	.277
Age	.03	225	.312
Word Processing CUKS	.03	225	.352
Black ^b	-.02	225	.409
Overall CUKS	.11	225	.044

^a Coded 0 = Male, 1 = Female

^b Coded 0 = Absence of Trait (e.g. Black), 1 = Presence of Trait

correlation between Science GEE-21 scores and the independent variable Hispanic score was $r = -.13$ ($p = .021$). The negative relationship between the independent variable Hispanic and the dependent variable Science GEE-21 scores indicated that participants who reported that they were Hispanic tended to have lower scores on the Science portion of the GEE-21. The relationship between the independent variable White and the dependent variable Science GEE-21 scores was $r = .12$ ($p = .033$). The positive nature of this relationship indicated that participants who reported that they were White tended to score higher on the Science portion of the GEE-21 (see Table 15).

After examination, the regression analysis indicated the independent variables Gender and Hispanic scores entered the regression model (see Table 16). The variable that entered the model first was the Gender measure. This variable explained 3.8% of

Table 14. Regression of English Language Arts Score of the Graduate Exit Examination-21 Test on Computer User Knowledge Survey Scores and Selected Personal Demographic Characteristics of High School Students in a Parish in South Louisiana

ANOVA								
Model	df	Mean Square		F	Sig.			
Regression	1	2992.383		5.240	.023 ^a			
Residual	223	571.066						
Total	221							

Model Summary								
Model	R	R ²	R ² Change	Change Statistics			Standardized Coefficient	
				F Change	df1	df2	Sig. F Change	Beta
Multimedia CUKS Score	.152 ^a	.023	.023	5.240	1	223	.023	.152

Excluded Variables				
Model	t	Sig	Tolerance	
White	1.087	.278	.999	
Basic Knowledge CUKS	1.018	.310	.710	
Word CUKS	-. 959	.330	.725	
Computer Games CUKS	-. 922	.357	.627	
Hispanic	-. 831	.407	.990	
Asian	-. 738	.461	.996	
Gender	-. 644	.520	1.000	
Age	.568	.571	.999	
Internet CUKS	- .296	.767	.634	
Black	- .107	.915	.997	
Windows CUKS	- .060	.952	.595	
Overall CUKS	- .338	-.735	.308	

the variance in the Science GEE-21 scores. Additionally, the variable whether or not the student was Hispanic entered the model and added 1.9% to the explained variance. Together these variables explained 5.7% of the variance in Science GEE-21 scores.

The nature of the influence of these variables was such that females and students who were not Hispanic tended to have higher scores on the Science portion of the GEE-21.

Table 15. Bivariate Correlations Between Science Scores on the Graduate Exit Examination-21 Test and Computer User Knowledge Survey Scores and Selected Personal Demographic Characteristics of High School Students in a Parish in South Louisiana

Variable	R	N	P
Gender ^a	.20	235	.001
Hispanic ^b	-.13	235	.021
White ^b	.12	235	.033
Age	-.08	235	.126
Multimedia CUKS	.06	235	.164
Windows CUKS	-.06	235	.190
Black ^b	-.06	235	.192
Asian ^b	-.06	235	.202
Computer Games CUKS	.05	235	.211
Internet CUKS	-.04	235	.288
Word Processing CUKS	-.02	235	.387
Basic Knowledge CUKS	-.00	235	.475
Overall CUKS	-.01	235	.436

^a Coded 0 = Male, 1 = Female

^b Coded 0 = Absence of Trait (e.g. Black), 1 = Presence of Trait

Examination of the tolerance levels show that none are below 0.20 for any of the independent variables of personal demographic characteristics or any of the CUKS measures (see Table 16). Therefore, multicollinearity is not a concern in this regression analysis.

The fourth academic achievement measurement entered as a dependent variable in a regression analysis was the Social Studies scores as measured on the GEE-21 test. After the independent variables to be included in the regression analysis were prepared, the bivariate correlations between the dependent variable and each of the independent variables were examined. The results of this examination indicated that three of the relationships were significant (see Table 17).

Table 16. Regression of Science Score of the Graduation Exit Examination-21
Test on Computer User Knowledge Survey Scores and Selected
Personal Demographic Characteristics

ANOVA								
Model	df	Mean Square	F	Sig.				
Regression	2	6700.721	6.972	.001				
Residual	233	961.149						
Total	234							

Model Summary								
Predictors	R	R ²	R ² Change	F Change	df1	f2	Sig. F Change	Beta
Gender	.195	.038	.038	9.168	1	33	.003	.198
Hispanic	.238	.057	.019	4.632	1	32	.032	-.137

Excluded Variables			
Model	T	Sig.	Collinearity Statistics
			Tolerance
Age	1.300	.195	.998
White	1.234	.218	.822
Black	- 1.21	.226	.992
Multimedia CUKS	1.21	.228	.995
Computer Gaming CUKS	.92	.361	.999
Asian	-.76	.447	.998
Windows CUKS	-.39	.69	.981
Basic Knowledge CUKS	.35	.724	.987
Internet CUKS	-.24	.814	.991
Word CUKS	-.09	.926	.997
Overall CUKS	.24	.81	.988

the relationship between the dependent variable Social Studies on the GEE-21 and the independent variable Gender was $r = .22$ ($p = < .001$). The positive nature of this relationship indicated that females tended to score higher on the Social Studies part of the GEE-21. The correlation between Social Studies and the independent variable Multimedia CUKS was $r = .14$ ($p = .018$). The positive nature of this relationship indicated that participants who had higher scores on the independent variable Multimedia CUKS tended to have higher scores on the GEE-21 Social Studies portion of the test. The correlation between Computer Gaming CUKS scores and the GEE-21 Social Studies scores was $r = .11$ ($p = .046$). The positive nature of the relationship between the independent variable Computer Games CUKS scores and the dependent variable GEE-21 Social Studies scores indicated that those participants who had higher scores on Computer Games CUKS tended to have higher scores on the Social Studies portion of the GEE-21 (see Table 17).

After examination, the regression analysis indicated the independent variables Gender and the Multimedia CUKS score entered the regression model (see Table 18). The variable that entered the model first was Gender. This variable explained 5.0% of the variance in the Social Studies GEE-21 scores. Additionally, the variable Multimedia CUKS Score entered the model and added 1.9% to the explained variance. Together these variables explained 6.9% of the variance in Social Studies scores. The nature of the influence of these variables was such that females and students who scored higher on the variable Multimedia CUKS score tended to have higher scores on the Social Studies portion of the GEE-21 Examination of the tolerance levels show that none are below 0.20 for any of the independent variables of personal demographic characteristics

or any of the CUKS measures (see Table 18). Therefore, multicollinearity is not a concern in this regression analysis.

Table 17. Bivariate Correlations Between Social Studies Scores on the Graduate Exit Examination-21 and Computer User Knowledge Survey Scores and Selected Personal Demographic Characteristics of High School Students in a Parish in South Louisiana

Variable	R	N	P
Gender ^a	.22	235	<.001
Multimedia CUKS	.14	235	.018
Computer Gaming CUKS	.11	235	.046
Age	-.09	235	.085
White ^b	.08	235	.119
Word CUKS	.05	235	.212
Hispanic ^b	-.04	235	.256
Basic Knowledge CUKS	.04	235	.259
Black ^b	-.04	235	.270
Internet CUKS	.04	235	.285
Asian ^b	.02	235	.408
Windows CUKS	.00	235	.496
Overall CUKS	.07	235	.137

^a Coded 0 = Male, 1 = Female

^b Coded 0 = Absence of Trait (e.g. Black), 1 = Presence of Trait

Table 18. Regression of Social Studies Score of the Graduation Exit Examination-21 Test on Computer User Knowledge Survey Scores and Selected Personal Demographic Characteristics of High School Students in a Parish in South Louisiana

ANOVA				
Model	df	Mean Square	F	Sig.
Regression	2	4805.152	8.650	<.001
Residual	232	555.530		
Total	234			

Model Summary								
Predictors	R	R ²	Change Statistics					Standardized Coefficients
			R ² Change	F Change	df1	df2	Sig. F Change	Beta
								(table con't.)

Gender	.223	.050	.050	12.160	1	33	.001	.225
Multimedia	.263	.069	.020	4.934	1	32	.027	.141
CUKS								

Excluded Variables

Model	T	Sig.	Collinearly Statistics
			Tolerance
Age	-1.533	.127	.998
White	1.325	.187	.998
Windows CUKS	-1.187	.237	.615
Hispanic	- .910	.364	.995
Black	- .683	.496	.981
Internet CUKS	- .581	.562	.668
Computer Games CUKS	.457	.648	.607
Asian	.263	.792	.995
Basic Knowledge CUKS	- .114	.909	.726
Word Processing CUKS	- .024	.981	.799
Overall CUKS	- .655	.513	.337

CHAPTER FIVE: FINDINGS AND CONCLUSIONS

Purpose and Objectives

The primary purpose of this study was to determine the influence of self-perceived computer user knowledge and selected demographic characteristics on the academic achievement of high school seniors in a parish in South Louisiana.

Specific Objectives

The following specific objectives were formulated to guide the researcher in accomplishing this purpose:

1. To describe high school seniors in a parish in South Louisiana on the following personal demographic characteristics:
 - a. Gender,
 - b. Age, and
 - c. Race.
2. To describe high school seniors in a parish in South Louisiana on academic achievement as measured by the scores on the Graduation Exit Examination-21. These scores included the overall scores in each of the following areas:
 - a. Mathematics,
 - b. English Language Arts,
 - c. Science, and
 - d. Social Studies.

3. To describe high school seniors in a parish in South Louisiana on self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey.
4. To determine if a relationship existed between the academic achievement as measured by the scores on the Graduation Exit Examination-21 and self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey among high school seniors in a parish in South Louisiana.
5. To determine if a model existed explaining a significant portion of the variance in academic achievement as measured by the scores on the Graduation Exit Examination-21 from self-perceived computer user knowledge as measured by the overall scores of the Computer User Knowledge Survey and the following personal demographic characteristics among high school seniors in a parish in South Louisiana:
 - a. Gender,
 - b. Age, and
 - c. Race.

The target population for this study was defined as high school seniors in public schools in South Louisiana. The accessible population was the senior class of one high school in South Louisiana with an approximate enrollment of 380 seniors. The minimum sample size needed for the study was determined using the Cochran sample size determination formula.

The sampling plan for the study included administering the sampling tool (the Computer User Knowledge Survey) to the students in all of the English IV classes at the selected high school. From these, a minimum sample of 191 responses (64.7%) were to be selected. The actual number selected was 295 (77.6%).

The properly completed surveys were scanned and the raw score data sheets were forwarded to a representative of the school system in which the high school was located. Data from the Louisiana Department of Education was accessed by the representative and the student's name and CUKS score were matched with and added to the standardized test scores kept in the state data base. The names of the sample students were deleted after the CUKS scores had been added and then returned to the researcher. This data included the GEE-21 scores for the four subject categories, the overall CUKS scores, the scores of the six CUKS sub-scores, and the age, gender, and race of each sample student.

The original instrument from which the Computer User Knowledge Survey was developed was a non-copyrighted survey used by a South Louisiana school system technology department as a self-evaluation tool for teachers. The original 90 item survey with a Likert-type response system was modified to a 148 item survey with a dichotomous response system. It is divided into six sub-scales, which are:

1. Basic Knowledge,
2. Windows,
3. Word Processing,
4. Internet,
5. Multimedia, and

6. Computer games.

Student responses were collected on scannable recording forms and processed by the Louisiana State University Technology Department and returned to the researcher. They were then processed by a representative of the school system to match CUKS scores to GEE-21 scores for the 295 participants and returned to the researcher where all names were removed from the research data. This data included the GEE-21 scores for the four achievement categories, the CUKS overall scores, the scores of the six CUKS sub-scales, the age, the gender, and the race of each sample student.

Findings Objective One

The first objective was to describe high school seniors in a parish in South Louisiana on the following personal demographic characteristics: gender, age, and race. The first demographic variable used to describe the students in the study was Gender. Of the 295 student participants, 281 provided information on gender. Of these students, 161 (57.3%) reported their gender as female and 120 (42.7%) indicated that they were male. Gender of 14 participants was not reported. The second demographic characteristic on which the student participants were described was age. Birth dates for the 295 subjects were obtained from the Louisiana Department of Education GEE-21 data base. These birth dates and the date of the administration of the CUKS instrument were used to determine the age of study participants. Age of students ranged from 15.03 to 21.58 with the mean age of 18.03 years ($SD = 0.58$). The majority of the students ($n = 154$, 54.8%) who participated in the study were 17 (between 17.0 and 17.99 years) years old.

The third demographic characteristic on which students participants were described was Race. Four racial groups were identified in the results with “White” being highly dominant. Of the 278 responses to Race, 254 (91.4%) were of the “White” race. Fifteen subjects were of the “Black” race (5.4%). Five subjects (1.8%) indicated they were of the “Hispanic” race and four subjects (1.4%) indicated they were either “Asian” or “Pacific Islander”.

Findings Objective Two

The second objective of the study was to describe high school seniors in a parish in South Louisiana on academic achievement as measured by the scores on the GEE-21. Data were available for 269 of the 295 participants (91.2%) in the study. Math scores for the 269 students ranged from 283 to 441 with a mean of 334.24 (SD=28.35). Examination of the GEE-21 scores indicated that 88 participants (32.7%) scored in the two achievement levels above Basic and 35 participants (13.0%) scored in the two achievement levels below Basic or 2.51 times as many students scored in the two top levels than in the two lower levels. Comparisons with the statewide numbers reveals that 32.7% of the study participant scored in the top two levels (Advanced and Mastery) and 25% of students statewide scored in the two top levels. Similarly, 13.0% of the study participants scored in the lower two achievement levels (Unsatisfactory and Approaching Basic) compared to 27% of students statewide.

The scores of the students who participated in the ELA, Science and Social Studies portions of the GEE-21 when compared to the statewide scores are as follows. Of the 269 ELA student participants, 41(15.2%) scored in the top two levels (Advanced and Mastery), compared to 13% of the statewide students. In the lower two levels of

the ELA portion of the GEE-21 (Unsatisfactory and Approaching Basic), 65 participants (24.2%) scored in the two lower achievement levels compared to 38% of the statewide students. In Science, 49 of the 280 participants (17.5%) scored in the higher two levels of academic achievement (Advanced and Mastery) compared to 21% of students statewide. Similarly, there were 83 (29.6%) of the study participants in the two lower achievement levels (Unsatisfactory and Approaching Basic), compared to 39% of students statewide. Of the 280 Social Studies students in the study, 37 students (13.2%) compared to 10% of students statewide scored in the two higher achievement levels (Advanced and Mastery). Similarly, 64 students (22.9%) scored in the lower two levels (Unsatisfactory and Approaching Basic) compared to 38% of students statewide.

Findings Objective Three

The third objective of the study was to describe high school seniors in a parish in South Louisiana on self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey (CUKS). Data used to accomplish this objective included participant's responses to the 148 items on the CUKS instrument. The CUKS is divided into six sub-scales of computer user knowledge and skills. Participants received a score for each of the six sub-scales that corresponded to the total number of "Yes" responses in the section of the instrument. Additionally, the participants received a total CUKS score which was the sum of the responses to all 148 items.

The first CUKS sub-scale was Basic Knowledge. There were 19 items in this section. The number of participants responding to this sub-scale was 294 ($N = 294$). The range of scores was from 6 (indicating that the participant responded to 6 of the 19

items with a response of “yes”) to 19 (indicating that the participant responded “yes” to all 19 items on the sub-scale. The mean score of “Yes” responses was 16.56 (SD = 3.15) with a mean “Yes” percentage of 87.16%.

The second CUKS sub-scale was Windows. There were 39 items in this section. The number of participants responding to this sub-scale was 294 (N = 294). The range of scores was from 4 (indicating that the participant responded to 4 of the 39 items with a response of “yes”) to 39 (indicating that the participant responded “Yes” to all 39 items on the sub-scale. The mean score of “Yes” responses was 34.78 (SD = 6.43) with a mean “Yes” percentage of 89.18%.

The third CUKS sub-scale was Word Processing. There were 38 items in this section. The number of participants responding to this sub-scale was 294 (N = 294). The range of scores was from 0 (indicating that the participant responded to 0 of the 38 items with a response of “yes”) to 38 (indicating that the participant responded “Yes” to all 38 items on the sub-scale. The mean score of “yes” responses was 35.63 (SD = 5.39) with a mean “yes” percentage of 93.76%.

The fourth CUKS sub-scale was Internet. There were 22 items in this section. The number of participants responding to this sub-scale was 294 (N = 294). The range of scores was from 0 (indicating that the participant responded to 0 of the 22 items with a response of “yes”) to 22 (indicating that the participant responded “yes” to all 22 items on the sub-scale. The mean score of “yes” responses was 19.29 (SD = 4.02) with a mean “yes” percentage of 87.68%.

The fifth CUKS sub-scale was Multimedia. There were 23 items in this section. The number of participants responding to this sub-scale was 291 (N = 291). The range of

scores was from 0 (indicating that the participant responded to 6 of the 0 items with a response of “yes”) to 23 (indicating that the participant responded “yes” to all 23 items on the sub-scale. The mean score of “yes” responses was 18.74 (SD = 5.36) with a mean “yes” percentage of 81.48%.

The sixth CUKS sub-scale was Computer Games. There were seven items in this section. The number of participants responding to this sub-scale was 286 (N = 286). The range of scores was from 0 (indicating that the participant responded to 0 of the seven items with a response of “yes”) to 7 (indicating that the participant responded “yes” to all seven items on the sub-scale. The mean score of “yes” responses was 5.96 (SD = 1.61) with a mean “yes” percentage of 85.14%.

The Overall CUKS sub-scale was the total CUKS score. There were 148 items on the CUKS survey. The number of participants responding “yes” to any item on the survey was 286 (N = 286). The range of scores was from 30 (indicating that the participant responded to 30 of the 148 items with a response of “yes”) to 148 (indicating that the participant responded “yes” to all 148 items on the instrument. The mean score of “yes” responses was 131.09 (SD = 20.66) with a mean “yes” percentage of 88.57%.

Findings Objective Four

The fourth objective was to determine if a relationship existed between the academic achievement as measured by the scores on the Graduate Exit Exam and self-perceived computer knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey among high school seniors in a parish in South Louisiana using Pearson Product Moment correlations coefficients.

The first academic achievement score compared to the CUKS sub-scales and the overall scale was the scores on the GEE-21 Math test. There were no correlations between the math scores and the CUKS sub-scales and overall scores.

The second academic achievement score compared to the CUKS sub-scales and the overall scale was the scores on the GEE-21 ELA test. Examination of the correlations showed there were two significant relationships. The relationship between ELA scores and Multimedia was $r = .16$ ($p = .018$). The second significant correlation showed that Basic Knowledge had a correlation of $r = .14$ ($p = .037$). Both of these were significant at the .05 level. These correlations were positive indicating that students with higher scores on the Multimedia CUKS and the Basic Knowledge CUKS tended to have higher scores on the ELA GEE-21 test.

The third academic achievement score compared to the CUKS sub-scales and the overall scale was the scores on the GEE-21 Science test. Examination of the correlations showed there were no significant relationships.

The fourth academic achievement score compared to the CUKS sub-scales and the overall scale was the scores on the GEE-21 Social Studies test. Examination of the correlations showed there were no significant relationships.

Findings Objective Five

Objective five was to determine if a model exists which explains a significant portion of the variance in the four measures of academic achievement, Math, English, Science, and Social Studies as measured by the scores on the Graduation Exit Examination-21 from self-perceived computer user knowledge as measured by the overall and sub-scores of the Computer User Knowledge Survey and the personal

demographic characteristics of Gender, Race, and Age among high school seniors in a parish in South Louisiana.

The four measures of the GEE-21 were entered as dependent variables and the six sub-scales, Basic Knowledge, Windows, Word Processing, Internet, Multimedia, Computer Games, and the Overall CUKS scores were entered as independent variables.

The first academic achievement variable entered as a dependent variable in a regression analysis was the Math scores as measured on the GEE-21. After the variables were prepared for entry into the analysis, the first step in conducting the regression analysis was to examine the bivariate correlations between the dependent variable and each of the independent variables to be included in the analysis. Examination of these correlations showed that none of the independent variables were found to be significantly related to the GEE-21 Math scores.

Correspondingly, when the regression analysis was conducted, no significant model was identified. Therefore, none of the variables included in the analysis explains a significant portion of the variance in the GEE-21 Math scores.

The second academic achievement measurement entered as a dependent variable in a regression model was the ELA scores as measured on the GEE-21. After the independent variables to be included in the regression analysis were prepared, the bivariate correlations between the dependent variable and each of the independent variables were examined.

Examination of the bivariate correlations revealed that there are two significant relationships. Correlation between the independent variable Multimedia CUKS score

and the dependent variable GEE-21 ELA score was $r = .15$ ($p = .012$). The correlation between Basic Knowledge CUKS score and the GEE-21 ELA score was $r = .14$ ($p = .019$). These correlations are significant at the .05 level.

Examination of the tolerance levels showed that none are below .20 for any of the independent variables of personal demographic characteristics or any of the CUKS measures. Therefore, co linearity is not a concern in this regression analysis.

Examination of the regression analysis revealed that the independent variable Multimedia CUKS score entered the regression model first. The variable explained 2.3% of the variance in the ELA GEE-21 scores. The nature of the influence of the variable Multimedia CUKS score was such that participants who scored higher on the independent variable Multimedia CUKS score tended to score higher on the dependent variable GEE-21 ELA scores.

The third academic achievement measurement entered as a dependent variable in a regression model was the science scores as measured on the GEE-21. After the independent variables to be included in the regression analysis were prepared, the bivariate correlations between the dependent variable and each of the independent variables were examined. The results of this examination indicated that three of the relationships were significant. The relationship between the dependent variable Science GEE-21 score and the independent variable Gender was $r = .20$ ($p = .001$). The positive nature of the variable Gender indicated that female participants tended to score higher on the Science portion of the GEE-21. The correlation between Science GEE-21 scores and the independent variable Hispanic score was $r = -.13$ ($p = .021$). The negative relationship between the independent variable Hispanic and the Dependent

variable Science GEE-21 scores indicated that participants who reported they were Hispanic tended to have lower scores on the Science portion of the GEE-21. The relationship between the independent variable White and the dependent variable Science GEE-21 scores was $r = .12$ ($p = .033$). The positive nature of this relationship indicated that participants who reported they were White tended to score higher on the Science portion of the GEE-21.

After examination, the regression analysis indicated the independent variables Gender and Hispanic scores entered the regression model. The variable that entered the model first was the Gender measure. This variable explained 3.8% of the variance in the Science GEE-21 scores. Additionally, the variable whether or not the student was Hispanic entered the model and added 1.9% to the explained variance. Together these variables explained 5.7% of the variance in Science GEE-21 scores. The nature of the influence of these variables was such that females and students who were not Hispanic tended to have higher scores on the Science portion of the GEE-21.

Examination of the tolerance levels showed that none are below .20 for any of the independent variables of personal demographic characteristics or any of the CUKS measures. Therefore, multicollinearity is not a concern in this regression analysis.

The fourth academic achievement measurement entered as a dependent variable in a regression analysis was the Social Studies scores as measured on the GEE-21 test. After the independent variables to be included in the regression analysis were prepared, the bivariate correlations between the dependent variable and each of the independent variables were examined. The results of this examination indicated that three of the relationships were significant. The relationship between the dependent

variable Social Studies on the GEE-21 and the independent variable Gender was $r = .22$ ($p = <.001$). The positive nature of this relationship indicated that females tended to score higher on the Social Studies part of the GEE-21. The correlation between Social Studies and the independent variable Multimedia CUKS tended to have higher scores on the GEE-21 Social Studies portion of the test. The correlation between Computer Gaming CUKS scores and the GEE-21 Social Studies scores was $r = .11$ ($p = .046$). The positive nature of the relationship between the independent variable Computer Games CUKS scores and the dependent variable GEE-21 Social Studies scores indicated that those participants who had higher scores on Computer Games CUKS tended to have higher scores on the Social Studies portion of the GEE-21.

After examination, the regression analysis indicated the independent variables Gender and the Multimedia CUKS scores entered the model. The variable that entered the model first was Gender. This variable explained 5.0% of the variance in the Social Studies GEE-21 scores. Additionally, the variable Multimedia CUKS score entered the model and added 1.9% to the explained variance. Together these variables explained 6.9% of the variance in Social Studies scores.

The nature of the influence of these variables was such that females and students who scored higher on the variable Multimedia CUKS score tended to have higher scores on the Social Studies portion of the GEE-21.

Examination of the tolerance levels showed that none are below .20 for any of the independent variables of personal demographic characteristics or any of the CUKS measures. Therefore, multicollinearity is not a concern in this regression analysis.

Conclusions, Implications, and Recommendations

Conclusion One

The study subjects were predominantly of the “White” race. This conclusion is based on the following findings of the study: 91.4% of the participants who reported their race indicated that they were of the “White” race. Correspondingly, only 5.4 % ($n = 15$) and 1.8% ($n = 5$) reported that they were “Black” and “Hispanic” respectively. Additionally, 1.4% ($n = 4$) reported their race as “Asian or Pacific Islander”.

Potential implications of this conclusion relate primarily to the historical relationship between minority status and performance on standardized tests. The Louisiana Department of Education Student Accountability website, under the sub-groups section, showed that on the ELA test 29.5% and 21.3% of students who reported their race as “Black” and “Hispanic” respectively scored in the Unsatisfactory achievement level, while 9.5% of the students who reported their race as “White” scored in the Unsatisfactory achievement level. Students who reported their race as “Black” and “Hispanic” had 5.5% and 9.2% respectively scores in the combined Advanced and Mastery achievement levels of the ELA portion of the GEE-21 test compared to 16.4% of the students who reported their race as “White”. On the Math portion of the GEE-21 test, 29.5% and 21.3% of the “Black” and “Hispanic” students respectively scored in the Unsatisfactory achievement level compared to 9.5% of the “White” students. The percentages of “Black” and “Hispanic” students scoring in the combined Advanced and Mastery achievement levels of the GEE-21 test were 10.5% and 19.4% respectively, compared to 34.1% for the students who reported their race as “White”.

Conclusion Two

Students from the study school demonstrated a higher level of academic achievement than the students statewide on the GEE-21 test. This conclusion is based on the following findings of the study: On the GEE-21 Math test, 32.7% of the students from the study school scored in the Advanced and Mastery achievement levels. This compares to 25% of the students statewide. Additionally, less than one percent of the students from the study school scored in the Unsatisfactory achievement level compared to 11% of students statewide. Eighty-seven percent of the study school seniors scored in the top three achievement levels (Advanced, Mastery, and Basic) compared to 73% of the students statewide.

On the ELA GEE-21, less than 1% of the study participants scored in the Unsatisfactory achievement level compared to 12% of the students statewide. Similarly, 75.8% of the study participants scored in the top three achievement levels of the ELA GEE-21 compared to 62% of students statewide.

On the Science portion of the GEE-21 test, 4.3% of the study participants scored in the Unsatisfactory achievement level compared to 15% of the students statewide. On the Science GEE-21, 70.4% of the study participants scored in the top three achievement levels (Advanced, Mastery, and Basic) compared to 61% of the students statewide.

On the Social Studies portion of the GEE-21 test, 3.9% of the student participants scored in the Unsatisfactory achievement level compared to 16% of students statewide. Seventy-seven percent of the student participants scored in the top

three achievement levels (Advanced, Mastery, and Basic) compared to 62% of students statewide.

Implications of this conclusion: There must be some underlying reasons for the study participants to perform consistently higher across all four subject categories on the GEE-21.

There are several logical reasons that might help explain this conclusion. The study school has a reputation for being a strongly discipline oriented school. Class disruption and students who chronically cause class disruptions are not tolerated by the school administration. Additionally, the district in which the study school is located is insistent that the teachers follow the State Curriculum Guide in a timely fashion as directed by the Curriculum Calendar, a pacing chart that keeps the classes on a tight schedule ensuring that all Grade Level Expectations are covered as directed by the Louisiana Department of Education. Another factor that could contribute to the study school's GEE-21 performance levels is the community support. Nearly all of the students in the suburban community are in one feeder system that feeds the one high school. Therefore, there is little political dissention among the members of the community concerning the operation of the schools. These factors along with the previously discussed racial make-up of the school possibly explain the higher student performance of the study participants on the GEE-21 test.

Recommendations for research: An examination of the overall student aptitude; teacher quality and practices; school discipline policies, focus, and curriculum; and community factors that might explain the higher performance levels should be undertaken.

Recommendations for practice: Any findings from this list or other factors that come to light during the examination should be made available to schools and districts that are working to improve their GEE-21 or other standardized test scores.

Conclusion Three

The student participants from the study school demonstrated a very high level of performance on the GEE-21 Math test. This conclusion is based on the following findings of the study: Eighty-eight of the 269 participants, (32.7%) had scores on the GEE-21 that placed them in either the Advanced or the Mastery achievement levels of the GEE-21 Math test. The percentage of students statewide taking the GEE-21 Math test and scoring in the Advanced or Mastery achievement levels was 25%. Eighty-seven percent of the student participants scored in the three highest achievement levels of the GEE-21 (Advanced, Mastery, and Basic) compared to 73% of the students statewide. Even more impressive, the percentage of student participants who scored in the two lower achievement levels (Unsatisfactory and Approaching Basic) was 13%, less than half of the statewide percentage of 27%. The data showed that 2.5 times more students scored in the Advanced and Mastery levels of the Math portion of the GEE-21 than in the Approaching Basic and Unsatisfactory levels.

Implications of the findings: The performance levels of the Math scores on the GEE-21 are very impressive. There are underlying causes and/or actions that support these higher Math levels.

Research into why this was true is recommended. A study group should be established to examine the actions or activities that lead to these higher performance levels. This study group might examine previous standardized math test scores

compared with the GEE-21 Math scores in an effort to identify whether or not these higher performance levels are consistent with earlier math performance. If this examination shows that the Math achievement levels have been improved in the high school math classes, as indicated by the GEE-21 results, then further examination of the school program should be conducted to discover what actions or activities have improved the math performance levels.

Examination of teachers and teaching practices as well as examination of the school focus and curriculum to determine if any exceptional practices of the high school program might be identified as being effective enough to have influenced the student's math performance levels. If so, these should be made available to other schools or districts as possible means of improving other math programs.

Another key question the study group should address is the community involvement in the schools. The suburban community in which the study school is located is an example of a community based school. There is only one high school in the community and it is fed by the only two middle schools in the community. The study group could endeavor to discover if this has an effect on the higher performance levels.

Conclusion Four

Student subjects perceived their computer user knowledge to be high. This conclusion is based on the following findings of the study: Student participants at a high school in a parish in South Louisiana were given a self-evaluation survey consisting of six sub-scales and 148 separate items with a dichotomous response scale (see Appendix I). The six sub-scales were Basic Knowledge, Windows, Word Processing, Internet, Multimedia, and Computer Games. They ranged in number from 7 to 39 items

in each scale and the mean “yes” responses to the six scales ranged from 81.4% to 93.76%. The student participants mean “yes” answers for the Overall CUKS score was 88.57%.

Implications of these findings: In this researcher’s experience as a high school teacher, these CUKS sub-scale and overall scores seem unreasonably high for a “normal” high school (not a magnet or gifted-talented school). These high scores could be the result of self-reporting error by the students. Some of the monitoring teachers indicated that they observed students marking response sheets apparently without reading the items asked. Another possibility of student error is that students have different ideas of what constitutes knowing how to perform a skill or not knowing how to; knowing the function of a device or not knowing its function.

The very high “yes” response percentage, combined with the anecdotal reports from the monitoring teachers, indicate a possibility of a high margin of error.

Conclusion Five

There was very little relationship identified between academic achievement and the CUKS scores. This conclusion is based on the following findings from the study: When the six CUKS sub-scores and the Overall CUKS score were correlated with the Math scores of the GEE-21 test, no significant relationships were found. Correlating the ELA scores and the seven CUKS scales indicated one significant relationship, Multimedia CUKS $r = .16$ ($p = .018$). Correlating Science GEE-21 scores with the seven CUKS sub-scores indicated no significant relationship. Correlating Social Studies GEE-21 scores with the seven CUKS scores indicated no significant relationships.

Recommendations: Although the lack of relationship is clear, there may be reason for further attention. In the previous conclusion, the possibility of error on the self-perceived Computer User Knowledge Survey was considered. The study may have shown different results if the student participant data were gathered from more objective sources. Data from more objective sources would make the technology measurements, the independent variables, more accurate and useful.

Such objective data could include grades from technology classes taken in high school. The difficulty here is that there are few if any required technology classes in schools similar to the study school, making acquisition of appropriate data difficult.

Another method for obtaining data on computer user knowledge and still reducing the self-perception error would be to complete a factor analysis of the current CUKS instrument. This would shorten the current CUKS' 148 item structure reducing the time and increasing the useful data. The results would be more valid computer user knowledge information.

The best alternative would be to construct a technology based and administered assessment that could, more objectively, measure student's actual computer user knowledge. This instrument would be designed to be administered at a computer work station with key skills and assessments designed into the instrument.

Conclusion Six

The student's self-perceived knowledge of Multimedia CUKS contributed to the explanation of academic performance. This conclusion is based on the following findings of the study: The Multimedia CUKS measure, when entered into a regression analysis, explained 2.3% of the variance in the ELA GEE-21 test score. It also

explained 2.0% of the variance in the variance in the Social Studies GEE-21 test results.

The implication of these findings is that one of the CUKS measures did enter two regression models. Why was it the only CUKS measure to enter a model and what made it significant enough to enter the models? Possible reasons for Multimedia entering the model are that the items on the Multimedia CUKS scale were identified by students during the validation process as being the hardest (i.e. least familiar) scale on the CUKS. Correspondingly, it had the lowest percentage of “yes” responses (81.48%) of the CUKS sub-scales.

Recommendations: Future studies that seek to relate computer knowledge to academic achievement should be careful to ensure that the computer user knowledge instrument is challenging and on the cutting edge of current practices.

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APPENDIX A

Individual Item Results The Computer User Knowledge Survey

Sec I	Basic Knowledge – Do You Know the Function of the :	Yes	% Yes	No	% No	Missing
1	Monitor	294	100	0	0	1
2	Keyboard	293	99.7	1	.3	1
3	Mouse	293	99.7	1	.3	1
4	C Drive-Hard Drive	252	85.7	42	14.3	1
5	A Drive-Floppy Disc Drive	264	89.8	30	10.2	1
6	D Drive-CD Drive	273	92.9	21	7.1	1
	Can you perform each of the following procedures?					
7	Turn on the computer.	292	99.7	1	.3	2
8	Shut down the computer	292	99.3	2	.7	1
9	Use the computer re-start feature	291	99.0	3	1.0	1
10	Use the A drive to access floppy discs	254	86.4	40	1.6	1
11	Use the D drive to access CD's	265	90.1	29	9.9	1
12	Install a scanner	198	67.3	96	32.7	1
13	Load the driver for the scanner	173	59.0	120	41.0	2
14	Install a printer	231	78.6	63	21.4	1
15	Load the driver for the printer	205	69.7	89	30.3	1
16	Use Ctrl+Alt+Delete buttons to restart the computer	281	95.6	13	4.4	1
17	Install software	259	88.1	35	11.9	1
18	Run a CD Rom	276	93.9	18	6.1	1
19	Install a jump drive	283	62.2	111	37.8	1
Sec 2	Windows-Can you perform each operation below?					
20	Open a window	290	99.0	3	1.0	2
21	Close a window	290	98.3	4	1.4	1
22	Move a window	287	97.6	7	2.4	1
23	Use the maximize function to size a window	289	98.3	5	1.7	1

24	Use a minimize function to size a window	289	99.3	5	1.7	1
25	Use the restore function to size a window	279	94.9	15	5.1	1
26	Work with the menu bar	289	98.3	5	1.7	1
27	Work with the task bar	285	97.3	8	2.7	2
28	Use the Help function in Windows to get help	279	94.9	15	5.1	1
29	Use the program menu	276	93.9	18	6.1	1
30	Use the run command	248	84.4	46	15.6	1
31	Use the find command	243	82.7	51	17.3	1
32	Cascade ant tile windows	179	60.9	115	39.1	1
33	Open multiple windows	279	95.2	14	4.8	2
34	Move between windows in an application	277	94.2	17	5.8	0
35	Create files	279	94.9	15	5.1	1
36	Delete files	286	97.6	7	2.4	2
37	Create folders	285	96.9	9	3.1	1
38	Delete folders	286	97.3	8	2.7	1
39	Move files to a 3½ inch floppy disc	238	81.0	56	19.0	1
40	Move files to a CD	257	87.7	36	12.3	2
41	Move folders to a 3½ inch floppy disc	235	79.9	59	20.1	1
42	Move folders to a CD	248	84.9	44	15.1	3
43	Move files from a 3½ inch floppy disc to the “C” drive	221	75.7	71	24.3	3
44	Move files from a CD to a “C” drive	232	79.7	59	20.3	1
45	Move folders from a 3½ inch floppy disc to the “C” drive	225	76.8	68	23.2	2
46	Move folders from a CD to a “C” drive	232	79.7	59	20.3	4
47	Copy files	271	92.8	21	7.2	3
48	Copy folders	269	91.8	24	8.2	2
49	Rename files	283	96.6	10	3.4	2
50	Rename folders	281	95.9	12	4.1	2
51	Print from a file	275	93.5	19	6.5	1
52	Print from a from a 3½ inch floppy disc	255	86.7	39	13.3	1
53	Print from a CD	258	87.8	36	12.2	1
54	Print from a jump drive	230	78.2	64	21.8	1
55	Change desktop using the control panel	269	91.5	25	8.5	1
56	Use <i>My Computer</i> to bring up the 3½ inch disc drive	243	82.7	51	17.3	1
57	Use <i>My Computer</i> to access the jump drive	236	80.8	56	19.2	3
58	Use <i>My Computer</i> to bring up the CD drive	251	85.4	43	14.6	1

Sec III	Word Processing: Can you perform each operation listed below					
59	Enter text (type into a file)	274	97.9	6	2.1	15
60	Delete text	267	96.7	9	3.3	19
61	Close a document	288	98.0	6	2.0	1
62	Save a document	287	98.0	6	2.0	2
63	Open a saved document	289	98.3	5	1.7	1
64	Create a new document	288	98.0	6	2.0	1
65	Select and use copy and paste	287	97.6	7	2.4	1
66	Select and use cut and paste	286	97.6	7	2.4	2
67	Organize files	272	92.5	22	7.5	1
68	Organize folders	273	93.2	20	6.8	2
69	Use the menu bar in word processing	278	94.9	15	5.1	2
70	Change the document view	264	90.4	28	9.6	3
71	Use the <i>Standard Toolbar</i>	274	93.2	20	6.8	1
72	Use the <i>Formatting Toolbar</i>	271	92.2	23	7.8	1
73	Use the bold attribute	280	95.2	14	4.8	1
74	Use the italic attribute	284	96.6	10	3.4	1
75	Use the underline attribute	283	96.3	11	3.7	1
76	Change alignment	277	94.2	17	5.8	1
77	Set tabs	270	91.8	24	8.2	1
78	Set margins	279	95.2	14	4.8	2
79	Preview documents	282	95.5	12	4.1	1
80	Create a template.	248	84.6	45	15.4	2
81	Select a font style	279	94.9	15	5.1	1
82	Select a font size	283	96.3	11	3.7	1
83	Add page numbers	278	94.6	16	5.4	1
84	Add borders	271	92.2	23	7.8	1
85	Add shading	272	92.8	21	7.2	2
86	Add forced page breaks	255	86.7	39	13.3	1
87	Control paper size used by the printer	262	89.4	31	10.6	2
88	Add headers	277	94.2	17	5.8	1
89	Add footers	277	94.5	16	5.5	2
90	Apply auto-formatting	252	86.0	41	14.0	2
91	Create numbered lists	279	94.9	15	5.1	1
92	Use bulleted items in numbered lists	280	95.2	14	4.8	0
93	Create tables	275	93.5	19	6.5	1
94	Add and delete columns	281	95.6	13	4.4	1
95	Add and delete rows	277	94.2	17	5.8	1

96	Add graphics	277	94.5	16	5.5	2
Sec IV	Internet-Can you perform each operation listed below					
97	Access the net.	283	97.3	8	2.7	4
98	Use hyper links	256	87.4	36	12.3	3
99	Use buttons as links	249	85.6	42	14.4	4
100	Use image maps as links	235	81.0	55	19.0	5
101	Use graphic objects as links	242	82.3	52	17.7	1
102	Use web sites	274	93.2	20	6.8	1
103	Move between pages	273	93.5	19	6.5	3
104	Use <i>url's</i> to access Web sites	274	93.8	18	6.2	3
105	Add bookmarks to the <i>Favorites</i> list	271	92.5	22	7.5	2
106	Organize <i>Favorites</i> by clearing subfolders	254	86.4	40	13.6	1
107	Use search engines to locate information	278	94.6	16	5.4	1
108	Use e-mail to send messages	274	93.2	20	6.8	1
109	Use e-mail to receive messages	279	95.5	13	4.5	3
110	Add names to an e-mail address book	277	94.2	17	5.8	1
111	Delete e-mail messages	283	96.3	11	3.7	1
112	Print e-mail messages	278	94.6	16	5.4	1
113	Forward e-mail messages	277	94.5	16	5.5	2
114	Participate in discussions through various newsgroups	207	70.4	87	29.6	1
115	Subscribe to a newsgroup	207	70.6	86	29.4	2
116	Download messages from a subscribed newsgroup	205	70.0	88	30.0	2
117	Copy pictures from the Internet	280	95.9	12	4.1	3
118	Convert graphic formats	216	73.5	78	26.5	1
Sec VI	Multimedia- Can You Perform Each Operation Listed Below					
119	Use a microphone to add audio	210	72.9	78	27.1	7
120	Use a recorder to add audio	202	70.4	85	29.6	8
121	Use a scanner	255	88.2	34	11.8	6
122	Incorporate internet into other activities	245	85.1	43	14.9	7
123	Navigate through pre-made multi-media programs	226	79.6	58	20.4	11
124	Create Power Point presentations	265	92.7	21	7.3	9
125	Crete newsletters	227	79.6	58	20.4	10
126	Create web pages	205	72.4	78	27.6	12
127	Use a digital camera	227	79.1	60	20.9	8
128	Download digital pictures from a digital camera	255	90.1	28	9.9	12
129	Insert digital pictures in other applications	255	89.5	30	10.5	10

130	Insert sound files into other applications	235	82.7	49	17.3	11
131	Insert video files into other applications	240	83.3	48	16.7	7
132	Import clip art	265	94.7	24	8.3	6
133	Use clip art in other applications	265	92.0	23	8.0	7
134	Create original artwork on the computer	257	89.2	31	10.8	7
135	Use original artwork in other applications	245	85.7	41	14.3	9
136	Create texts with graphics	255	88.5	33	11.5	7
137	Size graphics as needed	263	92.6	21	7.4	11
138	Prepare a presentation using sound, text and clip art.	262	90.7	27	9.3	6
139	Plan and produce a storyboard	204	71.6	81	28.4	10
140	Develop multimedia presentations	230	80.1	57	19.9	8
141	Use a scan converter	160	55.7	127	44.3	8

Sec VI	Computer Gaming-Can you perform the gaming function listed					
142	Installing games	253	89.7	29	10.3	13
143	Accessing the game after its loaded	263	92.3	22	7.7	10
144	Changing levels in a game	259	91.2	25	8.8	11
145	Accessing Internet based games	264	93.6	18	6.4	13
146	Competing with players from other sites	235	83.3	47	16.7	13
147	Creating key bindings	179	63.5	103	36.5	13
148	Using key strokes to move characters	252	90.0	28	10.0	15

APPENDIX B

The Computer User Knowledge Survey

Instructions

This survey is part of a research project designed to measure the relationship between basic computer user knowledge and academic achievement among high school seniors in south Louisiana. It could be used to improve the curriculum in technology courses as well as improve the availability of technology equipment and hardware in the schools. Please answer all items carefully. The personal information is important in determining if any groups of students need additional technology education in the future.

This is a confidential research project. The names of the students completing this survey will be deleted after the information is prepared for processing.

On side two of the answer sheet, print your name, one letter to a box, in the name section. Leave one empty box between your first and last name. Do not bubble in the letters below the name squares. Bubble in male or female below the name section. Below the male or female section, bubble in the last two numbers of your birth year and the day of the month of your birthday.

Be sure to read each item. If you do not know the function, item, or procedure, mark B for no on the answer sheet. If you do know or can perform the function, mark A for yes on your answer sheet.

Section I-Basic Computer

Directions: Please read each item carefully and mark A for yes on the ANSWER SHEET if you know the function of that device and mark B for no on the ANSWER SHEET if you do not know the function of that device.

A-Yes B-No

1	Monitor
2	Keyboard
3	Mouse
4	The C Drive-the hard drive
5	The A Drive-the floppy disc drive
6	The D Drive-the CD drive.

Directions: Each item below indicates a particular computer procedure. Please read each item carefully and mark A for yes on the ANSWER SHEET if you know how to perform that procedure and mark B for no on the ANSWER SHEET if you do not know how to perform that procedure.

A-Yes B-No

7	Turn on the computer
8	Shut down the computer
9	Use the computer restart feature
10	Use the A Drive to access floppy discs
11	Use the D Drive to access CD's
12	Install a scanner
13	Load the driver for the scanner
14	Install a printer
15	Load the driver for the printer
16	Use <i>Ctrl+Alt+Delete</i> buttons to restart the computer
17	Install software
18	Run a CD Rom
19	Install a jump drive

Section II-Using Windows

Directions: Each item below indicates a particular computer operation in windows. Please read each item carefully and mark A for yes on the ANSWER SHEET if you know how to perform that operation and mark B for no on the ANSWER SHEET if you do not know how to perform that operation.

A-Yes B-No

20	Open a window
21	Close a window
22	Move a window

23	Use the maximize function to size a window
24	Use the minimize function to size a window
25	Use the restore function to size a window
26	Work with the menu bar
27	Work with the task bar
28	Use the <i>Help</i> function in Windows to get help
29	Use the <i>program</i> menu
30	Use the <i>run</i> command
31	Use the <i>find</i> command
32	Cascade and tile windows
33	Open multiple windows
34	Move between windows in an application
35	Create files
36	Delete files
37	Create folders
38	Delete folders
39	Move files to a 3½ inch floppy disc
40	Move files to a CD
41	Move folders to a 3½ inch floppy disc
42	Move folders to a CD
43	Move files from a 3½ inch floppy disc to the C drive
44	Move files from a CD to the C drive
45	Move folders from a 3½ inch floppy disc to the C drive
46	Move folders from a CD to the C drive
47	Copy files
48	Copy folders
49	Rename files
50	Rename folders
51	Print from a file
52	Print from a 3½ inch floppy disc
53	Print from a CD
54	Print from a jump drive
55	Change desktop using the control panel
56	Use <i>My Computer</i> to bring up the 3½ inch disc drive
57	Use <i>My Computer</i> to access the jump drive
58	Use <i>My Computer</i> to bring up the CD drive

Section III-Word Processing

Directions: Each item below indicates a particular computer operation in word processing. Please read each item carefully and mark A for yes on the ANSWER SHEET if you know how to perform that operation and mark B for no on the ANSWER SHEET if you do not know how to perform that operation.

A-Yes B-No

59	Enter text (type into a file)
60	Delete text
61	Close a document
62	Save a document
63	Open a saved document
64	Create a new document
65	Select and use copy and paste
66	Select and use cut and paste
67	Organize files
68	Organize folders
69	Use the menu bar in word processing
70	Change the document view
71	Use the <i>Standard Toolbar</i>
72	Use the <i>Formatting Toolbar</i>
73	Use the bold attribute
74	Use the italic attribute
75	Use the underline attribute
76	Change alignment
77	Set tabs
78	Set margins
79	Preview documents
80	Create a template
81	Select a font style
82	Select a font size
83	Add page numbers
84	Add borders
85	Add shading
86	Add forced page breaks
87	Control paper size used by the printer
88	Add headers
89	Add footers
90	Apply auto-formatting
91	Create numbered lists
92	Use bulleted items in numbered lists
93	Create tables
94	Add and delete columns
95	Add and delete rows
96	Add graphics

Section IV-Using the Internet

Directions: Each item below indicates a particular computer operation using the Internet. Please read each item carefully and mark A for yes on the ANSWER SHEET if you know how to perform that operation and mark B for no on the ANSWER SHEET if you do not know how to perform that operation.

A-Yes B-No

97	Access the Internet
98	Use hyper links
99	Use buttons as links
100	Use image maps as links
101	Use graphic objects as links
102	Use web sites
103	Move between pages
104	Use URL's to access Web sites
105	Add bookmarks to the <i>Favorites</i> list
106	Organize <i>Favorites</i> by clearing subfolders
107	Use search engines to locate information
108	Use e-mail to send messages
109	Use e-mail to receive messages
110	Add names to an e-mail address book
111	Delete e-mail messages
112	Print e-mail messages
113	Forward e-mail messages
114	Participate in discussions through various newsgroups
115	Subscribe to a newsgroup
116	Download messages from a subscribed newsgroup
117	Copy pictures from the Internet
118	Convert graphic formats

Section V-Multimedia Operations

Directions: Each item below indicates a particular computer operation. Please read each item and mark A for yes if you know how to perform that operation and mark B for no if you do not know how to perform that operation.

A-Yes B-No

119	Use a microphone to add audio
120	Use a recorder to add audio
121	Use a scanner
122	Incorporate internet into other activities
123	Navigate through pre-made multi-media programs
124	Create Power Point presentations
125	Create newsletters
126	Create web pages
127	Use a digital camera to transmit live video
128	Download digital pictures from a digital camera
129	Insert digital pictures in other applications
130	Insert sound files into other applications
131	Insert video files into other applications
132	Import clip art
133	Use clip art in other applications
134	Create original artwork on the computer
135	Use original artwork in other applications
136	Create texts with graphics
137	Size graphics as needed
138	Prepare a presentation using sound, text and clip art.
139	Plan and produce a storyboard
140	Develop multi-media presentations
141	Use a scan converter

Section VI Computer Games

Directions: If you can perform the gaming function listed below mark A for yes on your ANSWER SHEET. If you cannot perform the gaming function listed below mark B for no on your ANSWER SHEET.

A-Yes B-No

142	Installing games.
143	Accessing the game after it's loaded
144	Changing levels in a game
145	Accessing Internet based games
146	Competing with players from other sites
147	Creating key bindings
148	Using keystrokes to move characters

VITA

Mike Brown is the proud father of two wonderful daughters both of whom graduated from Louisiana State University. Both of them are equally wonderful though very different. He has spent his whole life in the field of education and hopes to contribute to the field in the future.