Using Computer Technology and Application Strategies to Increase English Language Learners' Reading Comprehension

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A Special Project

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Using Computer Technology and Application Strategies to Increase English Language Learners' Reading Comprehension

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ABSTRACT

The purpose of this experimental research project was to determine the gains in 9th grade English Language Learners' reading comprehension when computer technology and application strategies were implemented at a rural high school in Washington State as measured the Measures of Academics Progress test. This study was limited to one rural high school. Therefore, the sample size was small.

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CHAPTER 1

Introduction

Background for the Project

In 2002 in the United States, the Bush Administration made reform in education a priority. Increasing numbers of illiterate and low-performing students were on the rise. In an effort to close the achievement gap among students in publicly-funded schools, the No Child Left Behind Act was created. Ensuring that no child was left behind, the nationwide reform placed increased emphasis on high-stakes testing in an attempt to increase student accountability and improve student literacy. Student accountability was measured using tests such as the Washington Assessment of Student Learning, which focused on the areas of reading, writing and mathematics. Washington State had adopted the Washington Assessment of Student Learning as the assessment test required for graduation. Seniors had to pass the test to receive a high school diploma. Most high school students met the requirements for passing the Washington Assessment of Student Learning, however, some students did not pass the Washington Assessment of Student Learning and needed a different type of assessment to demonstrate their skills. The Certificate of Academic Achievement was the assessment used for these students as an alternative to the Washington Assessment of Student Learning (OSPI, 2009).

Schools that failed to achieve Adequate Yearly Progress were federally sanctioned. The Washington State Superintendent of Public Instruction had declared that the mission of Washington State was to accommodate diverse student populations in accordance with the No Child Left Behind Act. The intent of all Washington State educators in public schools was to have every student achieve at high levels and be taught by high quality educators in safe,

supportive, and well-managed schools. The Washington Assessment of Student Learning was implemented as a tool to measure the effectiveness of Washington State's public schools' new reform on teacher effectiveness and student accountability (OSPI, 2003).

Negative consequences were put into place if teachers were not effective and students did not perform. Teachers focused attention on strategies necessary for students to be successful on high-stakes tests such as the Washington Assessment of Student Learning. Strategies were intended to increase understanding, increase comprehension, and improve fluency in reading. The use of strategies such as scaffolding, modeling, building background knowledge, frontloading vocabulary, the use of visual aids, graphic organizers, intentional grouping, and the use of supplemental texts had been identified as best practices for all learners by educational researchers (Fagan, 2003). The researcher believed that by using the strategies of scaffolding, frontloading vocabulary, building background knowledge and supplementing text strategies, coupled with computer technology and computer application strategies, students would achieve academic success.

Statement of the Problem

In poverty-stricken areas of Washington State, schools were plagued with high dropout rates, poor attendance, low skills, low literacy levels, and limited parental involvement. The district in which this study took place was no exception. Due to the high percentage of high school dropouts, poor attendance, and low literacy levels, the high school had difficulty meeting minimum state standards on the Washington Assessment of Student Learning. Pressure to improve scores in the areas of reading, writing, and mathematics on the Washington Assessment of Student Learning had teachers in the content areas working hard to improve students' skills

necessary to pass the Washington Assessment of Student Learning.

During the 2006-2007 school year, the high school used in this special project required all incoming freshmen to take a computer applications class titled, Introduction to Computer Applications. The purpose of the computer technology class requirement was to give freshmen high school students the opportunity to gain computer application skills to use in the students' high school career by increasing knowledge and comprehension in core subjects through the use of computer applications in all areas of study.

The district administration staff believed that computer technology classes had the potential to improve student achievement on the Washington Assessment of Student Learning. However, no data existed to verify that computer technology improved student achievement on the Washington Assessment for Student Learning.

Purpose of the Project

The purpose of the experimental research project was to determine the gains 9th grade English Language Learners made in reading comprehension when computer technology and application strategies were implemented at a rural high school in Washington State. Gains were measured based on scores on the Measure of Academic Progress test given fall and winter quarters.

Delimitations

The high school where the project took place was in a school district located in the lower part of the Yakima Valley and was primarily an agricultural community. The district, located in the central part of Washington State, was 205 miles from the city of Spokane and 150 miles from Seattle, Washington. The district had seen many changes in the last two decades as many new families moved into the area for agriculture-related jobs. The size of the district grew from 150

students to 430 students in the 20 year period.

The high school's 2007-2008 School Improvement Plan reported that this district had a student population of 90% Hispanic, 6% Caucasian, and 4% Native American (OSPI, 2007). The majority of parents of students within this district were employed in farm-related jobs. The rural setting of this district made the school a central focal point of the town for learning, socializing, and recreation. The goal of the high school was preparing students to be technologically capable and college and career-ready when graduating from high school.

The classroom consisted of 13 female and 11 male Hispanic students. Participating 9th grade students were instructed using computer application strategies over a 16 week period while enrolled in Introductions to Computer Applications class. Students were pre-tested in the fall of 2008 and post-tested in the winter of 2009 using the Measures of Academic Progress assessment.

Assumptions

The assumption was made that the use of computer technology and application strategies in the classroom would improve 9th grade English Language Learners' achievement as measured by the Measures of Academic Progress assessment. All students were present throughout the study and used a computer in the classroom throughout the study. Teachers were highly qualified instructors. The curriculum was grade level appropriate according to the Essential Academic Learning Standards for Washington State. The program was a quality program. A further assumption was made that participating students assumed responsibility that best efforts would be made to enhance learning.

Hypothesis

Ninth grade English Language Learners who were instructed using computer technology and

application strategies as a part of the Introduction to Computer Applications class increased reading comprehension levels as measured by the Measure of Academic Progress test.

Null Hypothesis

Ninth grade English Language Learners who were instructed using computer technology and application strategies as a part of the Introduction to Computer Applications class did not increase reading comprehension levels as measured by the Measure of Academic Progress test. Significance determined for $p \leq$ was set at a 0.05 level.

Significance of the Project

The high school faced a number of obstacles in students' successfully passing the Washington Assessment for Student Learning. These factors had an impact on the status of the high school, including but not limited to the annual yearly progress of the high schools' academic improvement rate. Adequate Yearly Progress was a method of student progress measurement signed in law January 2002, as part of the No Child Left Behind Act. In Washington State student achievement was measured year to year on the Washington Assessment of Student Learning in reading and mathematics. The state raised the bar each year in gradual increments for students to achieve proficiency in each subject area and by the year 2013-2014 all students were expected to be proficient in each subject. Due to the high percentage of students with special needs, students with limited English proficiency and the number of English as Second Language Learners, the high school struggled to meet state standards on the Washington Assessment of Student Learning and were not meeting Annual Yearly Progress. Further, the high school endured a high teacher turnover rate, high poverty levels, poor attendance rates and lack of parent participation.

The high school used in this special project required that all incoming freshmen enroll in Introduction to Computer Applications class. If a relationship was established between computer application strategies and higher achievement on the Measures of Academic Progress test, the researcher hoped to convince the district administrators to provide more learning programs in computer application classes. Without convincing data there would be no modifications to the program.

Procedure

The procedure conducted in the present study took place in several stages. The researcher discussed the scope and purpose of evaluating the relationship between the use of computer applications and achievement on the Washington Assessment of Student Learning with the building principal. Washington Assessment of Student Learning scores from 2007 were gathered and compared to student rosters of computer application classes. The need for present study resulted from the author's observation of the deficiencies of the 9th grade scores of the Washington Assessment of Student Learning.

Throughout the first five weeks of the 2008 school year the author discussed with the principal the need to adopt selected instructional strategies using computer applications. A new textbook was purchased for the class. The new curriculum focused on critical thinking and the simple following of instructional steps. The curriculum was implemented over a 16 week period.

During fall 2008 the Measures of Academic Progress assessment was given to incoming freshman. The Measures of Academic Progress assessment was chosen because the test was a state-approved computerized adaptive assessment aligned with state technology standards for grade 9 that provided educators with the information needed to improve teaching and learning.

With the ability to test students up to four times a year, Measures of Academic Progress assessment results helped educators make student-focused, data-driven decisions.

A classroom was selected for the purpose of the study and scores were recorded. Eleven males and 13 females were involved in the study. The students were all Hispanic ethnicity and identified as English Language Learners. The students were given the Measures for Academic Progress pre-test in September and a post-test in February. The tests scores were compared statistically to determine if a significant level of improvement had occurred as measured by the Measures of Academic Progress assessment between fall and winter quarters. During March and April of 2009 data analysis was conducted and conclusions and recommendations were formulated.

Definition of Terms

Annual Yearly Progress. Annual Yearly Progress was a method of measurement used in Washington State measuring year to year student achievement on the Washington Assessment of Student Learning in reading and mathematics.

English Language Learner. The term English Language Learner indicated a person in the process of acquiring English and had a first language other than English. Other terms commonly found in the literature included language minority students, limited English proficient, English as a Second Language, and culturally and linguistically diverse.

experimental research. Experimental research was a type of research in which at least one independent variable was manipulated, other relevant variables were controlled, and the effect on one or more dependent variables was observed.

Measures of Academic Progress. Measures of Academic Progress was a state-aligned

computerized adaptive assessment program that provided educators with the information needed to improve teaching and learning. Educators used the growth and achievement data from MAP to develop targeted instructional strategies and to plan school improvement. With the ability to test students up to four times a year, MAP test results helped educators make student-focused, data-driven decisions.

mean and standard deviation. In statistics, mean was the expected value of a random variable. Standard deviation was a simple measure of the variability or dispersion of a data set. A low standard deviation indicated that all of the data points were very close to the same value (the mean), while high standard deviation indicated that the data was spread out over a large range of values.

Northwest Evaluation Association. Northwest Evaluation Association developed the Measures of Academic Progress assessment.

STATPAK. STAKPAK was a statistical tool used to help calculate frequently-used tests quickly and effectively. When scores were entered, STATPAK generated and printed statistical results. STATPAK was run on a Windows-based personal computer.

t-test. The *t*-test was an inferential statistics technique used to determine whether the average of two groups was significantly different at a given probability level.

t-test for non-independent samples. The *t*-test for non-independent samples was a parametric test of significance used to determine whether, at a selected probability level, a significant difference exists between the average for one sample at two different times.

Washington Assessment of Student Learning. The Washington Assessment of Student Learning was a standardized educational assessment system that was also used as a high school

graduation examination in Washington State.

Acronyms:

AYP. Annual Yearly Progress

CAA. Certificate of Academic Achievement

EALRs. Essential Academic Learning Requirements

ELL. English Language Learners

LEP. Limited English proficient

MAP. Measures of Academic Progress

NCLB. No Child Left Behind

NWEA. Northwest Evaluation Association

OSPI. Office of the Superintendent of Public Instruction

TAAS. Texas Assessment of Academic Skills

WASL. Washington Assessment of Student Learning

CHAPTER 2

Review of Selected Literature

Introduction

Literature selections reviewed for the study focused on research that addressed the differences in student and school performance, reducing the achievement gap, dropout prevention, issues in multicultural curriculum, building background knowledge for academic achievement, and looking for new innovative ways to teach children of diversity in schools today. The researcher selected three major areas for concentration: 1) At-Risks Students, 2) Strategies for English Language Learners, and 3) Effective Practices for Hispanic Students in Washington State.

Research Related to At-Risk Students

Students who dropped out of high school were less likely to be employed and earned less over a lifetime than students who graduated from high school (Baum, 2004). The job market in the United States had grown increasingly competitive over recent years making job placement difficult for high school dropouts to compete.

Orfield, Losen, and Wald (2004) suggested that multiple factors contributed to a student's eventual dropping out of school. According to a report published in 2005 by OSPI called *Promising Programs and Practices for Dropout Prevention*, high school dropout rates were dependent on both external and education-related factors. External factors that caused students to drop out were related to socioeconomic status, ethnicity, low academic achievement level, changing schools frequently, language ability, family expectations, pregnancies, and/or gang and drug cultures. Education-related causes that contributed to the student dropout problem included cultural conflicts, ineffective discipline systems, lack of adequate counseling, lack of language

instruction, disregard of student learning styles, passive instructional strategies, and/or retentions/suspensions (OSPI, 2005).

To combat inequities inherent within the public school system, federal legislation, specifically NCLB, had placed increased emphasis nationwide on decreasing the number of high school dropouts. In 2002, the nationwide high school dropout average was 11% as reported by NCLB. According to the Graduation and Dropout Statistics report published in 2005 by OSPI, Washington State endured a 6.7% dropout rate overall during the 2002-2003 school year, and an improvement to 5.8% during the 2003-2004 school year. While Washington State's dropout rate was lower than the national average, the Adequate Yearly Progress mandate had forced OSPI to increase expectations of Washington's public schools.

Over a 12-year period beginning in 2002, OSPI sought to increase the number of graduates in Washington State by 21%. From 2002 to 2005, 66% of students were expected to graduate from high school. By 2014, 85% of Washington State high school students were expected to graduate at a rate of one percent per year for the first four years and by three percent in the years to follow until 2014. Further, students slated to graduate in 2008 were required to pass all three sections of the WASL in reading, writing, and mathematics. Students who failed to pass the WASL were to be retained in high school until the student passed all three sections. However, retention due to inability to pass the WASL had negatively impacted high-risk students, including ethnic minorities, the limited English proficient, learning disabled, and students from lower socioeconomic families, thereby placing the students in the above mentioned high-risk categories at a severe disadvantage (OSPI, 2005).

Individual school districts throughout Washington State accommodated students who fell into

one or more of the high-risk categories and struggled to close the achievement gap. The high school chosen for this study was one of those schools. In 2007-2008, the high school had 388 students; 88.8% qualified for free or reduced lunch, 17.3% participated in transitional bilingual program, and 10.3% participated in special education services. The 2005-2006 dropout rate for students at the high school was 2.7% and ethnic minorities including Hispanic and American Indian or Alaskan native comprised 92.3% of the student population. Similar scenarios in surrounding districts in Central Washington made achieving Average Yearly Progress difficult. The high school studied was not meeting AYP (OSPI, 2008).

Orfield, Losen, Wald, and Swanson (2004) found that minority youth had fallen behind in the effort to increase graduation rates as test-driven accountability standards were increasingly difficult for disproportionately low achieving students to achieve AYP. Clarke, Haney, and Madaus (2000) concluded high-stakes testing programs had been linked to decreased rates of high school completion. In lower socioeconomic groups, high-stakes tests that demonstrated minimum competency were more likely to cause students to drop out at an earlier age, typically between eighth and ninth grade (Clarke et al., 2000). Swanson (2003) encouraged school districts to provide special learning assistance for low-performing students to raise test scores, thereby helping struggling schools to meet test-based accountability benchmarks. Haney (2004) concluded that states that required students to pass an exam as a requisite for graduation or promotion to the next grade were more likely to reduce the dropout rate compared to those states not requiring a requisite.

Haney (2004) cautioned, however, that legislation designed to address NCLB would leave children behind as high-stakes testing had sometimes increased disparities in student

achievement, especially among minority groups. Students retained due to the outcome of high-stakes testing would be more likely to drop out than ever before. Accordingly, increased emphasis needed to be placed on programs that prevented students from dropping out, with increased emphasis placed on consequences imposed on students not meeting state achievement standards.

Strategies for English Language Learners

Student accountability was measured using tests such as the Washington Assessment of Student Learning which focused on the areas of reading, writing and mathematics. Washington State had adopted the WASL as the required assessment beginning with the graduation year 2002-2003. Seniors had to pass the WASL to receive a high school diploma as of 2003 in reading and writing (mathematics was postponed). According to the Washington State Report Card data collected by OSPI (2008), 76.5 % of the students at the high school studied passed the reading portion, 17.5% passed the math portion, and 66.7% passed the writing portion of the WASL.

Students and teachers were held to higher standards according to federal and state legislation. Schools that failed to achieve Adequate Yearly Progress were federally sanctioned. The Washington State Superintendent of Public Instruction had declared the mission of Washington State was to accommodate diverse student populations in accordance with the No Child Left Behind Act. The intent of all Washington State educators in public schools was to have every student achieve at high levels and be taught by high qualified educators in safe, supportive, and well-managed schools.

The WASL was implemented as a tool to measure the effectiveness of Washington State's

public schools' new reform on teacher effectiveness and student accountability (OSPI, 2003). Negative consequences were to be imposed if teachers were not effective and students did not perform. Teachers focused attention on methods and strategies necessary for students to be successful on high-stakes tests such as the WASL. Methods included were second-language development, methods for integrating language and content instruction, materials development and teacher change (Echevarria, Vogt, & Short, 2004). Strategies needed would increase understanding, increase comprehension, and improve fluency in reading. The use of strategies such as scaffolding, modeling, building background knowledge, frontloading vocabulary, the use of visual aids, graphic organizers, intentional grouping, and the use of supplemental texts had been identified as best practices for all learners by educational researchers. The researcher was hoping that these methods and strategies, coupled with computer technology, would increase student reading comprehension and bring about academic success.

Practices for Hispanic Students in Texas and Washington State

The passing of House Bill 1209 in 1993 launched reform programs in Washington State schools making schools more accountable for higher student achievement. Evidence gathered had revealed that while schools were making gains in the more rigorous standards, some schools were struggling. In the schools that were struggling, over 50% of the students were from families below the poverty line (Washington School Research Center, 2003).

A Washington State research study identified effective practices of middle and junior high schools with high percentages of Hispanic and LEP students. A research team was formed consisting of 9 educational researchers from Washington. Researchers carefully investigated Washington schools with large numbers of Hispanics and high levels of academic achievement.

However, when the data was disaggregated by ethnicity, Hispanics were not sharing in the success of higher achievement.

The researchers looked outside of the state to further the study and invited 18 schools from Texas to be a part of the study. Texas middle schools and junior high schools were chosen because of the similar academic achievement and demographics to Washington schools. An obvious limitation was that each state used a different assessment to determine student academic proficiency. Washington Assessment of Student Learning was the test used for Washington and Texas Assessment of Academic Skills was used for Texas. While both tests were criterion-referenced, based on reading, writing and mathematics, the tests were scored differently. The differences in the assessments made data comparisons of performance levels very difficult. The similarities, however, could not be overlooked. Both assessments were measures of the states' essential learning goals, both states were required to increase student achievement to higher standards, and both were required to raise the academic achievement levels of all ethnic groups in schools. Other similarities were that the Hispanic students of Texas faced the same challenges that Hispanic students faced in Washington. The researchers believed there were enough similarities to make the study useful.

The procedures used in studying the Texas schools were by invitation. The researchers invited 18 Texas middle/junior high schools to participate. Each school received a letter inviting the school to participate in the study. All schools chose to participate. Site visits were scheduled and interviews with staff were also scheduled. Chosen staff members were provided with a list of interview questions prior to the visit. Each school principal was also asked to complete a questionnaire. The questions were based on general information about the school concerning

demographics, sources of outside funding, and curriculum used in the classroom. Each member of the research team had training in general interview procedures prior to the trip to Texas. The focus question for the interview was, "To what do you attribute your academic success over the last three to five years?" Other questions were regarding district support, state policies, classroom practices, and bilingual and ESL practices. The research team split into groups of three and were led by a research team leader from the Washington School Research Center. The visits took place in October, 2002 (Washington School Research Center, 2003).

The research findings were based on qualitative research. Several factors were identified as contributing to the success of the Texas schools. Texas teachers held students to higher expectations. The teachers no longer blamed academic failure on student poverty or language. Education was placed on priority status and both school and home were united in emphasizing the value of learning. Strategies and programs were put into place which included extended-day tutoring, Saturday school, parent contracts, double-blocking for core subjects, and planning time used for tutoring students. High expectations were extended to the teachers. No tolerance was allowed for the teacher who was not prepared.

Teachers communicated the empowerment of having access to meaningful data. The accountability movement in the state of Texas had made education better for a child of poverty and for minority children. Teachers collaborated and teamed together to review data, share curriculum materials, brainstorm ideas for lessons and discuss student assessment information. Teachers spent a great deal of time in planned meetings. First year teachers were given mentors, as were veteran teachers new to the district. Mentoring programs allowed the school to maintain common focus on school expectations.

Leadership by all staff played a large role in the success of student learning. Trust between the teachers and the administration was expressed to a high degree. Principals were highly supportive of the staff and considered a part of the family. The administration modeled high expectations of leadership motivating the staff to follow. Professional development was considered part of the daily routine and not training. Teachers shared knowledge with each other. Teachers were respected as valuable resources.

Curriculum was completely clear and focused. No question existed about what and when to teach. Teachers followed specific timelines and schedules to assess students on state standards. Teachers planned goals and timelines and informed students of the planned schedule and state standards.

Parent involvement was critical to the success of the student. Teachers and administrators became partners with parents. The parents understood the expectations for the school and student, the grading system, behavior policies and the instructional program. Home-school connections were very strong.

A variety of programs had been implemented to support students with limited English proficiency. Serving the needs of LEP students varied. Students who spoke no English were placed in the Newcomer class. Students were taught primarily in Spanish and were slowly introduced to English. Many teachers were trained in the effective use of Gifted and Talented and ESL instructional strategies to meet student needs. Many teachers were ESL certified to assist in the needs of students in special programs (Washington School Research Center, 2005).

Summary

At-risk students were identified in the literature as students who were dropping out of high

school due to reasons relating to socio-economic status, ethnicity, low academic achievement, frequent change of schools, language barrier, family expectations, pregnancies, and/or gang and drug involvement. Educational-related causes that contributed to the student dropout problem included cultural conflicts, ineffective discipline systems, lack of adequate counseling, lack of language instruction, disregard of student learning styles, passive instructional strategies, and/or retentions/suspensions.

Washington State, in a reform effort to combat the increasing dropout rate, started the No Child Left Behind Act in 2002. The Office of Superintendent of Public Instruction enforced new accountabilities to be placed on students each year. Student accountability was measured by using tests such as the Washington Assessment of Student Learning which focused on areas of reading, writing, and mathematics. The WASL was also implemented as a tool to measure the effectiveness of Washington State's public schools' new reform on teacher effectiveness. Teachers were now turning their focus on methods and strategies. Strategies would increase understanding, comprehension and fluency in reading. The use of strategies such as scaffolding, modeling, building background knowledge, front loading vocabulary, using visual aids, graphic organizers, intentional grouping, and supplemental texts were identified as best practices for all learners.

Looking for help, Washington State educators formed a research team and chose to study 18 Texas schools. Washington and Texas had similar demographics and academic achievement. The research findings were based on a qualitative research. Texas teachers held their students to higher expectations and no longer blamed academic failure on student poverty or language. Education was placed on priority status and a relationship was built between the school and the

home, parent contact, and double-blocking for core subjects. Teachers teamed together to review useful data, share curriculum materials, brainstorm lesson plans, and discuss student assessment information. The administration modeled high expectations of leadership motivating the staff to follow and teachers became stronger leaders in the classroom.

Chapter 3

Methodology and Treatment of Data

Introduction

The researcher hoped to prove that 9th grade English Language Learner students who participated in computer applications class would demonstrate gains in reading comprehension as measured by the Measures of Academic Progress (MAP) test. Essential baseline data was obtained by using the MAP test scores of ELL students from one classroom that were present throughout the research period. This data was analyzed with the use of the STAKPAK. Conclusions and recommendations thus were formulated. The researcher included details concerning participants, instruments, design, procedure, treatment of the data, and summary.

Methodology

Experimental research was used to test the hypotheses to establish cause-effect relationships. The researcher used an experimental research design to determine the extent in which student reading comprehension levels were impacted after 9th grade ELL students received instruction in computer applications. The researcher manipulated at least one independent variable, controlled other relevant variables, and observed the effect on one or more dependent variables (Gay, Mills, & Airasian, 2006). A *t*-test for non-independent samples was calculated for data analysis as a part of the STATPAK statistical software program, and the *Education Research: Competencies for Analysis and Applications* text (Gay et al., 2006) to determine significance following pre- and post-testing. All 9th grade students were administered one pre-test at the beginning of the

school year in the fall 2008. Students were identified as English Language Learners. The research was conducted for a period of 16 weeks. All students were administered post-tests at the end of the study.

Participants

Participants involved in the study were 9th grade students who were enrolled in a computer applications class. The classroom consisted of 13 female and 11 male Hispanic students. The population studied was comprised of English Language Learners.

Instruments

The Measures of Academic Progress (MAP) test was adopted and used for pre- and post-tests. The MAP test results served as an indicator of student reading comprehension abilities and was used as a measure for student growth. The MAP scores served as a tool for planning instructional lesson plans, and identifying areas in need of improvement.

Design

In this experimental research the researcher used a pre- and a post-test to compare student scores from fall and winter tests. All students who participated in this research study were taught the same computer applications strategies within the classroom.

Procedure

During the beginning of the 2008-2009 school year the researcher discussed the need for the study with the building principal. Permission was obtained to access student test data and conduct the project. The researcher studied selected literature using relevant articles and the internet as primary sources. During the fall of 2008, the researcher collected data from the MAP test for the students that participated in the study. Data was

also collected in the winter of 2009 from the participating students. Data from the pre- and post-tests used in the study were then compiled and analyzed. Conclusions and recommendations were formulated.

Treatment of the Data

A *t*-test for non-independent samples, used in conjunction with the STATPAK statistical software program and the *Education Research: Competencies for Analysis and Applications* text (Gay et al., 2006), was used to analyze the data. The researcher compared the pre- and post-test scores from the fall and winter MAP test of the 9th grade students participating in the study. Significance was determined for $p \geq$ at 0.005, 0.001, and 0.001 levels.

Summary

The researcher used an experimental research design to determine the extent in which student reading comprehension levels were impacted after receiving instruction in computer applications to 9th grade ELL students. During the fall of 2008 and the winter of 2009, the researcher collected data from the MAP test for the students that participated in the study. Data from the pre- and post-test used in the study were then compiled and analyzed. A *t*-test for non-independent samples was utilized for data analysis to determine significance following pre- and post-testing. The research was conducted over a period of 16 weeks. The researcher hoped to prove that 9th grade English Language Learner students who participated in computer applications class made greater gains in reading comprehension as measured by the MAP test.

CHAPTER 4

Analysis of the data

Introduction

The district administrative staff believed that computer technology classes had the potential to improve student achievement on the Washington Assessment of Student Learning. However, no data existed to verify that computer technology improved student achievement on the Washington Assessment for Student Learning. The researcher hoped to prove that 9th grade English Language Learner students who participated in a computer applications class would make greater gains in reading comprehension as measured by the MAP test.

Description of the Environment

The high school where the project took place was in a school district located in the lower part of the Yakima Valley and was primarily an agricultural community. The district was located in the central part of Washington State.

The classroom consisted of 13 female and 11 male Hispanic students. Participating 9th grade students were instructed using computer application strategies over a 16 week period while enrolled in Introductions to Computer Applications class. Students were pre-tested in the fall of 2008 and post-tested in the winter of 2009 using the Measures of Academic Progress (MAP) assessment. Data from the pre- and post-tests used in the study were then compiled and analyzed. A *t*-test for non-independent samples was utilized for data analysis to determine significance following pre- and post-testing.

Hypothesis

Ninth grade English Language Learners who were instructed using computer technology and application strategies as a part of the Introduction to Computer Applications class increased reading comprehension levels as measured by the Measure of Academic Progress test. Significance determined for $p\leq$ was set at a 0.05 level.

Null Hypothesis

Ninth grade English Language Learners who were instructed using computer technology and application strategies as a part of the Introduction to Computer Applications class did not increase reading comprehension levels as measured by the Measure of Academic Progress test. Significance determined for $p\leq$ was set at a 0.05 level.

Results of the Study

The t-*test* calculated a *t*-value of 5.97 with a degree of freedom of 23. Results of this study indicated that students who were instructed using computer technology and application strategies as a part of the Introduction to Computer Applications class increased reading comprehension levels as measured by the Measure of Academic Progress test. The raw data for the test was included for review.

Table 1 displayed data collected from the 9th grade level MAP test for the study. The *t*-test for non-independent samples on the STATPAK statistical software was used to calculate data statistics and values. The sum of D was 166, the Mean of D was 6.92, and the Sum of D squared was 1890.00. The *t*-value was 5.97and the Degrees of Freedom was 23.

Table 1

t-test for Non-independent Samples for 9th grade student MAP tests

Statistic	**Value**
Number of Pairs	24
Sum of D	166
Mean of D	6.92
Sum of D squared	1890.00
t-value	5.97
Degrees of Freedom	23

Table 2 showed the distribution of *t* with 23 degrees of freedom. The distribution of *t* was used to determine levels of significance. The *t*-test was used to compare MAP pre- and post-test scores. The *t*- value was 5.97 as noted in Table 2, and the degrees of freedom at 0.005, 0.01 and 0.001 was 23. Significance was determined at $p \leq 0.005$ level of 2.069, 0.01 level of 2.807, and 0.001 level at 3.767. Accordingly, the hypothesis was accepted and supported.

Table 2

Distribution of *t* with 23 Degrees of Freedom

df	0.05	0.10	0.001
23	2.069	2.807	3.767
t	5.97	5.97	5.97

Findings

Significant differences existed between participants' pre- and post-test comprehension scores after receiving computer applications instructional strategies. In the 16 weeks of the computer applications class almost all of the participating students showed definite gains. The t-*test* calculated a *t*-value of 5.97 with a degree of freedom of 23. The data indicated that the hypothesis was accepted at $p\leq$ at the 0.05, 0.01, and 0.001 levels. Therefore, the hypothesis was supported. Of the 24 students participating in the study only 2 did not show gains.

Discussion

Currently the computer applications class was a 9th grade requirement at the school where the study took place. Selected literature supported that schools should provide additional instructional strategies where there was weakness. Swanson (2003) encouraged school districts to provide special learning assistance for low-performing students to raise test scores, thereby helping struggling schools to meet test-based accountability benchmarks.

Participating 9th grade students were instructed using computer application strategies over a 16 week period while enrolled in the Introductions to Computer Applications class. Students were pre-tested in the fall of 2008 and post-tested in the winter of 2009 using the Measures of Academic Progress test.

The assumption was made that the use of computer technology and application strategies in the classroom would improve 9th grade English Language Learners' reading comprehension as measured by the Measures of Academic Progress assessment. All

students were present throughout the study and used a computer in the classroom throughout the study. Teachers were highly qualified instructors. The curriculum was grade level appropriate according to the Essential Academic Learning Standards for Washington State. The program was a quality program. A further assumption was made that participating students assumed responsibility that best efforts would be made to enhance learning.

Summary

The researcher used a *t*-test for non-independent samples to compare participants' pre- and post-test MAP scores. The data indicated that there was significance and the hypothesis was supported at $p\leq$ at the 0.05, 0.01, and 0.001 levels based on the non-independent *t*-test. The 9th grade students receiving computer applications instructional strategies achieved greater gains in reading comprehension as measured by the MAP test.

CHAPTER 5

Summary, Conclusions, and Recommendations

Introduction

The purpose of the experimental research project was to determine the gains 9th grade English Language Learners made in reading comprehension when computer technology and application strategies were implemented at a rural high school in Washington State. Due to the high percentage of students with special needs, students with limited English proficiency and the number of English as Second Language Learners, the high school struggled to meet state standards on the Washington Assessment of Student Learning and were not meeting Annual Yearly Progress. The MAP test was administered in the fall 2008 and winter 2009 as the assessment for this research project and gains were measured based on participating students' scores.

Summary

Results of this study supported the hypothesis. Results of this study indicated that the use of computer technology and application strategies in the classroom improved 9th grade English Language Learners' reading comprehension as measured by the Measures of Academic Progress Assessment.

In an effort to close the achievement gap among students in publicly-funded schools, educators needed to find new strategies to assist students to improve academic performance. The intent of all Washington State educators in public schools was to have every student achieve at high levels and be taught by highly qualified educators in safe, supportive, and well-managed schools. In poverty-stricken areas of Washington State,

schools were plagued with high dropout rates, poor attendance, low skills, low literacy levels, and limited parental involvement. The district in which this study took place was no exception. Due to the high percentage of high school dropouts, poor attendance, and low literacy levels, the high school had difficulty meeting minimum state standards on the Washington Assessment of Student Learning.

Literature selections reviewed for the study showed students dropping out of high school were less likely to be employed and would earn less over a lifetime than students graduating from high school. The job market in the United States had grown increasingly competitive over recent years making job placement difficult for high school dropouts to compete.

To combat inequities inherent within the public school system, federal legislation, specifically NCLB, placed increased emphasis nationwide on decreasing the number of high school dropouts. Schools that failed to achieve AYP were federally sanctioned. Students and teachers were held to higher standards according to federal and state legislation. Students achieved higher standards, irregardless of ethnicity, when the expectations were set high.

Conclusions

From the research findings the researcher believes that of all Washington State educators in public schools want every student to achieve at high levels and be taught by highly qualified teachers in a safe, supportive, and well-managed environment. Instructional strategies such as scaffolding, modeling, building background knowledge, frontloading vocabulary, the use of visual aids, graphic organizers,

intentional grouping, and the use of supplemental texts have been identified as best practices for all learners. When these instructional strategies are in place, students should be able to achieve higher standards, regardless of ethnicity, especially when the expectations are set high. Of the 24 students participating in this study who were introduced to these strategies, 22 students showed significant growth in reading comprehension. Students that did not show gains were limited to 2.

Recommendations

Additional research is needed to verify the results of this project. Should this project be replicated, the researcher recommends that the project be conducted with a controlled group to be used for comparison. A study should be conducted on a classroom of students who did not have the computer applications class in the 9th grade.

Education programs focusing on at-risk students can positively impact the dropout and unemployment rates in the United States. Education should provide learners with a variety of strategies to enhance their learning to help students be successful citizens. To assist ELL learners, educators should practice ELL instructional strategies in the classroom. Educators need to continue to work hard to help all students reach high expectations to ensure their success.

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APPENDIX

Pre-test scores for the 9th grade student assessments were obtained in September of 2008. Post-test scores for the 9th grade student assessments were obtained in February 2009.

MAP test scores

Student	Fall 2008 Group X Pre-test	Winter 2009 Group Y Post-test
1	221	226
2	197	204
3	196	211
4	196	196
5	222	227
6	210	216
7	232	236
8	207	207
9	215	216
10	222	235

11	221	223
12	215	214
13	217	216
14	170	173
15	217	233
16	202	215
17	212	220
18	207	215
19	213	225
20	211	220
21	201	221
22	199	203
23	207	214
24	198	207