ACTION RESEARCH

Findings, Implications, and Policy Recommendations

Integrating Technology for Academic Achievement in Phonics and Fluency

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2010

Abstract

With the push for teacher accountability and the controversy concerning high-stakes testing, more teachers are looking for systematic ways to increase academic achievement. If the U.S. is to regain its global position as number 1 in the education arena, education policy must dictate that teachers integrate technology as a regular part of core instruction to improve academic achievement. This action research seeks to investigate methods to close the achievement gap and prove that gains are made by high risk students in reading using various technological tools in the classrooms.

Action Research

Program: ProMAT

Certification Elementary

Teaching/Internship Assignment:

Title 1 Targeted Assistance Reading Intervention Teacher

CONTENT AREA Standard(s) addressed in this project: Reading, Fluency

Standard 1.0 General Reading Processes:

B. Phonics

1. Identify letters and their corresponding sounds

a. Identify digraphs, such as ch, ph, sh, th, and wh

b. Identify diphthongs, such as oy, ow, ay

2. Decode words in grade-level texts

a. Use phonics to decode words

c. Identify and apply vowel patterns to read words, such as CVC, CVCE, CVVC

C. Fluency *

1. Read orally from familiar text at an appropriate rate

b. Read familiar text at a rate that is conversational and consistent

c. Reread text multiple times to increase familiarity with words

2. Read grade-level text accurately

b. Decode words automatically

d. Read sight words automatically

INTASC Principle(s) addressed in this project:

8.3 Using data to inform instruction

4.1 Purposeful use of Instructional Strategies

6.3 **U**se of media communication techniques as supportive interaction

Changes in student achievement measured through (Ex: Weekly quiz grades, daily journals, vocabulary drills, etc.):

- Daily interactive online application (Study Island)
- Timed Fluency test given by teacher
- Oars (Online Assessment program)

OVERALL RESULTS over the time of the intervention, supported by targeted academic achievement data (check the one that applies)**:**

__√___ **POSITIVE:**	Findings indicate that **more students showed improvement** than failed to improve OR **more students in intervention group** showed improvement than in the control group OR **identifiable sub-group(s)** of students improved with the intervention.
_____ **INCONCLUSIVE:**	Findings do not support a conclusion regarding level of improvement associated with the intervention.
_____ **NEGATIVE:**	Findings indicate that **most students showed declining** academic achievement with **no identifiable subgroups** showing improvement OR **more students in control group** showed improvement than in the intervention group.

Johns Hopkins University
Department of Teacher Preparation

ACTION RESEARCH

Content Area: _____Reading _____
Title: Integrating Technology for Academic Achievement on Phonics and Fluency___

Context (school setting, grade, subject, student characteristics)

Title 1 Targeted Assistance Reading teacher for a Baltimore City Public Elementary / Middle school providing Tier 2 and 3 intervention services for students in grades 1st– 8th. The students have been identified as eligible from benchmark data, report card grades, teacher and parent observation and recommendation and attendance from the previous school year. The students that are being serviced are below grade level in math and reading.

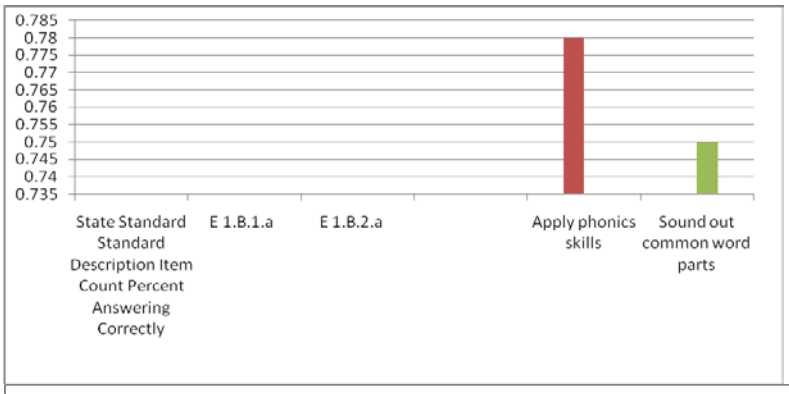
Problem

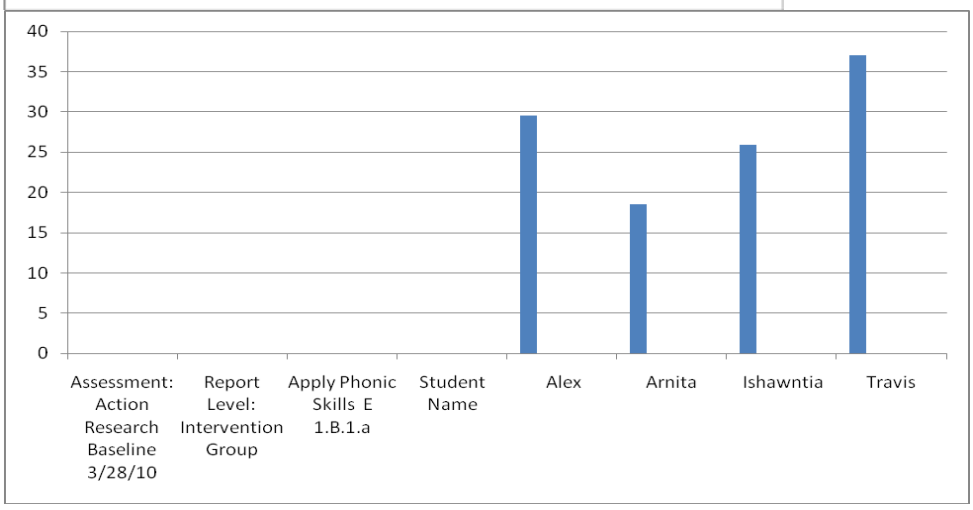
Technology will play a large role in opportunities to address student needs and a computer lab is scheduled to be installed in the next month or so. Students are pre-qualified for services based on benchmark scores, report card grades, standardized testing, etc. Students selected have not been able to basic sight words with difficulty. The students are below 2nd grade level in fluency and scored low in phonics on the benchmark test. 3 of the 4 selected students are also historically disengaged and exhibit behavior problems in regular classrooms. During the 1st and 2nd quarter the students were not getting daily fluency practice in the regular education classrooms.

The question is this, Will using technology increase academic achievement; specifically in fluency and phonics? INTASC principle 8 addresses the use of formal diagnostic assessment to "evaluate and ensure the continuous intellectual development of the learner and INTASC principle 6 (the use of media communication techniques as a supportive interaction in the classroom) relates to the integrating of technology."

Baseline Data

Various Research findings indicate that the reason there is such a wide discrepancy in academic achievement of students in one class over another is the inconsistent systematic use of technology in the classroom. As the Title 1 Targeted Assistance Reading teacher for this Elementary / Middle school the writer provides Tier 2 and 3 intervention services for students in grades 1st– 8th. Those students have already been identified as having a discrepancy in their academic achievement. The students selected for the study have difficulty reading basic sight words and are students are far below 2nd grade level in fluency. They scored low in phonics on benchmark test. In addition they are historically disengaged and exhibit behavior problems in regular classrooms which is probably a result of frustration and low self esteem. To top it all off ,the students did not receive daily fluency practice in the regular education classrooms for quarters 1 and 2.





Computers are not readily available to all students in the regular classrooms. During the research period, the writer visited the classrooms of teachers for different grades and discovered that the classrooms that did have computers setup and connected to the internet only were only used for the teachers use primarily for documentation, attendance, and data assessment but even

that was exclusive for the teachers use if at all. In many cases students did not have access to the **(1)** computer in the room. In some rooms the teachers had laptops and a computer but the system was not setup or being used. Research findings indicate that in a classroom of 15 – 25 students, 1 computer is not enough. The mandate to integrate technology will have to come down from the federal level in order for all classrooms to have equal access to the number of computers needed to make a difference. Schools just don't have the budget or training needed.

Researched Literature Review

Integrating Technology in the K-12 Classroom: Implications for Public Policy

Author:

Established in 1983, the Education Alliance Business and Community for public Schools is a 501(c) (3) nonprofit organization whose goal is business and community support to the West Virginia public school area for the success of students that reside there. They have, according to their website, awarded over 1.5 million dollars to the West Virginia public school system and impacted 50,000 students in 2008 alone. Currently more than 400 Education Alliance programs are at work in various schools.

Problem Investigated:

In 2005 they presented the results of a study entitled Integrating Technology in the K-12 Classroom: Implications for Public Policy that investigated the benefits of integrating technology into classrooms and the role the process would play on the educational Public Policy. Has the integration of technology into the public school system closed the achievement gap? Is it being utilized to its maximum potential? Are there documentable gains in student achievement as a result?

Background facts (who was studied, where, and when):

The article states that public school systems in America were studied by various sources between the years 1996 - 2005. In one instance the National Center for Education Statistics did a study to determine how many schools actually had access to computers and how many teachers actually had a computer in the classroom. The results were 99% school availability and 84% for teacher's classroom access. Despite the availability of the systems as much as 40% of the teachers admitted to not using the computers at all according to a survey by Education Week.

Findings and limitations of the results of the study:

The findings in this article demonstrate that technology is definitely linked to achievement and should be considered a key element in 21st century education but despite well documented studies completed by many sources many hurdles still exist. The findings also indicate that installing and or increasing the numbers of computers in public schools will not answer the problem automatically. Other areas will need to be mastered and/or addressed in order to bring about the desired results such as increased access for students and teachers with at least a 1: 5 computer per student ratio, ongoing relevant Professional Development for teachers, up-to-date infrastructure and easily accessible technical support preferable on-site or in-house as opposed to outside vendors, finally a technology friendly curriculum. The findings indicated that even though computers were available to many of the classrooms they were not being used or being used inappropriately due to the lack of training provided to teachers. Teachers are not comfortable using the computers and the professional development was very limited especially concerning hands on opportunities.

Technology and Student Achievement – The Indelible Link

Author:

ISTE is a membership association for educators that are concerned about advancing the effective use of technology in PK-12 and teacher education. Established in 1989, ISTE (International Society for Technology in Education) has produced a series of policy briefs that addresses the link between technology and learning. This brief is the first that was presented with the purpose of providing a tool for education technology supporters to advocate that students are adequately prepared for the 21st century.

Problem they investigated:

ISTE (International Society for Technology in Education) studied the effectiveness of the technology - education integration on student achievement more than 20 years. Their findings confirm that there is a definite correlation between student academic gains and the inclusion of computers and technology in the ***daily*** curriculum.

Background facts (who were studied, where, and when):

Several Public schools America were included in a comprehensive comparison study with several states standing out as leaders and have shown significant gains over non-participating peers. Missouri, Michigan and Texas all demonstrated significant gains in reading, math and science by using consistent and structurally sound strategies to integrate the technology

component. The most comprehensive study reported was the eMINTS (Missouri Instructional Networked Teaching Strategies) mathematics classroom in 2001 - 2005 which showed consistent gains for students that were in eMINTS classrooms vs. students who were not with an average 10 point gain in all academic areas except one. In addition to Missouri, Michigan, Iowa, Texas were mentioned as well with significant gains in reading, math, science.

Findings and Limitations of the results of the study:

ISTE strongly recommends that local, state, and federal policy makers begin the implementation of the following: a rigorous ongoing technology training initiative, a curriculum that implements technology based instructional strategies and a budget that covers the cost of building an all inclusive technical infrastructure that will support the everyday use a computer network throughout the public school sector. Seven factors were listed that affect and maximized the impact of using technology in schools. Those factors were effective professional development; interventions that mirror local and state curriculum standards, daily integration of technology into the regular classroom as opposed to students taking computer as a resource, the ability of differentiate activities with frequent feed back to individual students, activities that involve student collaboration, support and scaffolding from teachers and staff. Studies also indicate that computer based activities should be project-based learning , real-world simulations with problem solving skills involved as opposed to drills and practice which were much more ineffective. Inequities exist for students in high risk areas in regards to access to computers and frequent usage. In addition several findings indicated that there were no significant gains after the implementation but further investigation revealed that the failure was a result to properly implement the technology into teaching. Purchasing computers and software is not an instant resolution. Having taught in several schools in the system I have witnessed schools that have elaborate computer labs that are used to play video games during a resource period. ISTE suggest that other factors must exist to maximize technology integration such as curriculum alignment, professional development, leadership that sees the instructional value in technology, etc. The National Telecommunication & Information Administration's 2000 report *Falling through the Net: Defining the Digital* found inequities produced by external factors such as high poverty areas that have limited computer access outside the schools, running into roadblocks making obtaining funding difficult and the inadequate preparation of teachers. The report recommends seeking additional funding and the creation of more opportunities outside the classroom etc. This report makes specific recommendations to the current policy including the restoration of a $700.5 million budget from 2001, the passing of the ATTAIN (**Achievement through**

Technology and Innovation Act) and a guaranteed connection speed of 1 gigabit per second for school networks.

Technology and Student Achievement

Author:

The National Association of Elementary School Principals (NAESP) was established in 1921 by a group of principals for principles to promote their profession and provide a platform where there voice would be heard. The group of 51 elementary school principals has grown into 30,000 over the years. In the '30s, NAESP launched the *National magazine now titled* *Principal* magazine In the 2005 periodical Volume 85 Number 2, November/December 2005 , page(s)46-48, Nancy Protheroe discusses how integration of technology has the potential to transform education. Nancy Protheroe is the Educational Research Service Dir Special Research Projects.

Problem Investigated:

What evidence exist that integrating education and technology has increased student learning? Standards-based accountability and the costs involved have increased the urgency to answer this question.

Background facts (who was studied, where, and when):

The results of 25 years of technology and education research are discussed after being analyzed on its effectiveness. The article cites sources from 1996 – 2001 however it claims that 25 prior to 2005 has performed research on the topics. (1980 – 2005) Many researchers were listed such as: Herman 1994, Heinecke et al. 1999, Glennan and Melmed 1996, Schacter and Fagnano (1999), Kosakowski 1998), Becker (cited in Mergendoller 2000, Stratham and Torell (1996) Sivin-Kachala *et al*. (2000) (ORC Macro 2005), Waddoups (2004) Shank (2000) Johnston and Cooley (2001)

Findings and limitations of the results of the study

Protheroe has come to the conclusion that research has failed to prove that coalition of technology and education is a cost effective way to improve student achievement. Research methodologies have made it difficult to demonstrate a connecting relationship. A study by Herman finds it next to impossible to control the variables that exist in the schools environments

across the nation. (Herman 1994). Heinecke observes that there is a blatant haziness in the desired outcomes that we want students to achieve. His study showed various goals being sort after by schools with no clear national goal ranging from preparing critical thinkers, job preparation, and information accessibility, to increasing test scores. The later, in my opinion, being a major goal in the most schools especially since the No child left behind data-driven instructional approach to education. It was noted that there is a direct correlation between the effectiveness of the technology and the instructional design, content, and teaching strategies employed by the teacher. In the article, Waddoups (2004) agree that teachers hold the key to success. Implementing technology into the daily curriculum has also helped to improve attendance and deter negative behavior issues. Teachers have heretofore been hesitant concerning technology in lessons but should use the same lesson planning strategies and thoughtfulness as with other academic subject areas. Traditional queries of instructional planning remain pertinent:

Summary:

After reading the 3 selections I discovered that research has arrived at different conclusions concerning the effect that technology in education will have on student's academic success. It is clear that they all seem to agree that if technology is to be used it must be viewed as an integral part of the curriculum on a national, state, and local level with mandates that support what is needed to make it work including cost, training, and a confident, positive mind-set. Certain recommendations keep re-emerging such as on-going in depth professional training and on-site tech support; a rigorous and relevant curriculum that provides various differentiated project-based problem solving activities coupled with immediate feedback, a budget that covers the cost required to keep the ever changing world of technology up to date, and the understanding that technology is here to stay and in order for our students to be competitive and prepared globally for the 21st century technology should be fully integrated on a daily basis. Certainly even with the integration of technology into the curriculum, basic standards will continue to exist like the critical role that teachers must play in the motivation of students and the preparation of lessons to make content meaningful for students and relevant. Going forward I conclude that my success and future efforts will require proper planning on my part to ensure smooth the smooth integration and academic success for the students.

Action Intervention Plan

After starting the project it became apparent that the research focus would need to be narrowed. Phonics is way too broad of a topic to get relevant results in such a short time without targeting a specific skill. So, for the study the writer elected to use specific content standards regarding phonics and fluency wpm rate would be one of the assessment tools to compare. Based on the results of previous State mandated benchmark test (1^{st} – 3^{rd} Quarter) students were given a targeted, teacher created, pre-assessment test in Oars ((March 23, 2010). For data analysis they pre-tested on a second platform (internet - Study Island) that targeted Phonics. Lastly, based on the results of previous state mandated benchmark test (1^{st} – 3^{rd} Quarter), a fluency test was given to all 4 students and retested at the end of the period for growth. A teacher created pre-assessment test, using *Inspect* on the BCPSS assessment application called OARS, was created and a post-assessment test will be given using the same tool. The test will include letter sounds (long and short vowels, blends, diagraphs, diphthongs, etc.). The results from the two tests will be the baseline data. The writer implemented a daily repetition of reading sight words and chunked phrases and allowed students to log on to study island regularly.

The potential effect on student achievement is that the students will increase fluency rates, improve word attack of high frequency words, improve automaticity, demonstrate increased active engagement and improve behavior during class times.

Plan Summary:

4 -Targeted Assistant 2 grade students to complete the research.

2 areas will be evaluated on 3 platforms:

Area tested

- Phonics
- Fluency

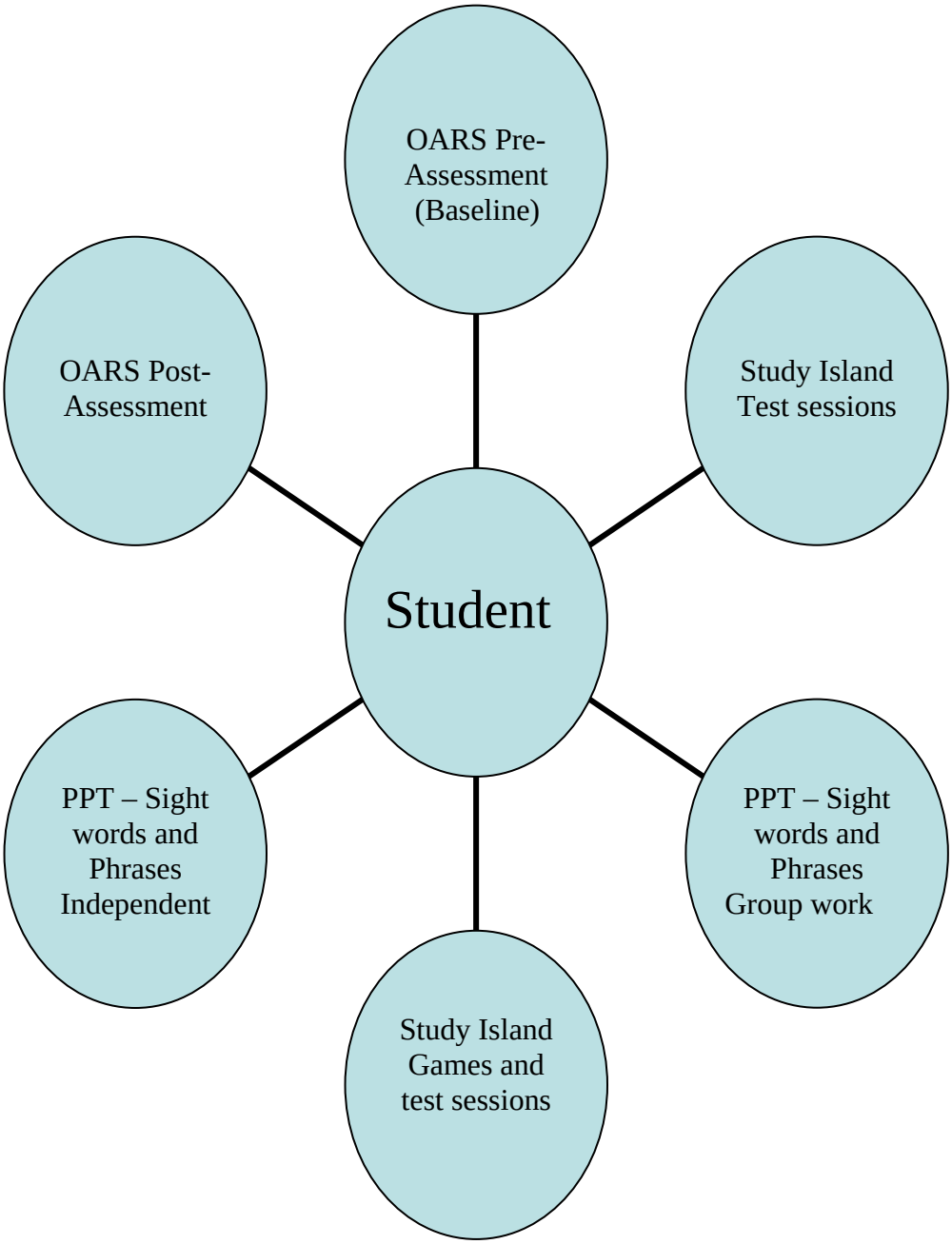
Platform

- Research based Computer application
- Oral reading test
- Written test

Tools Used:

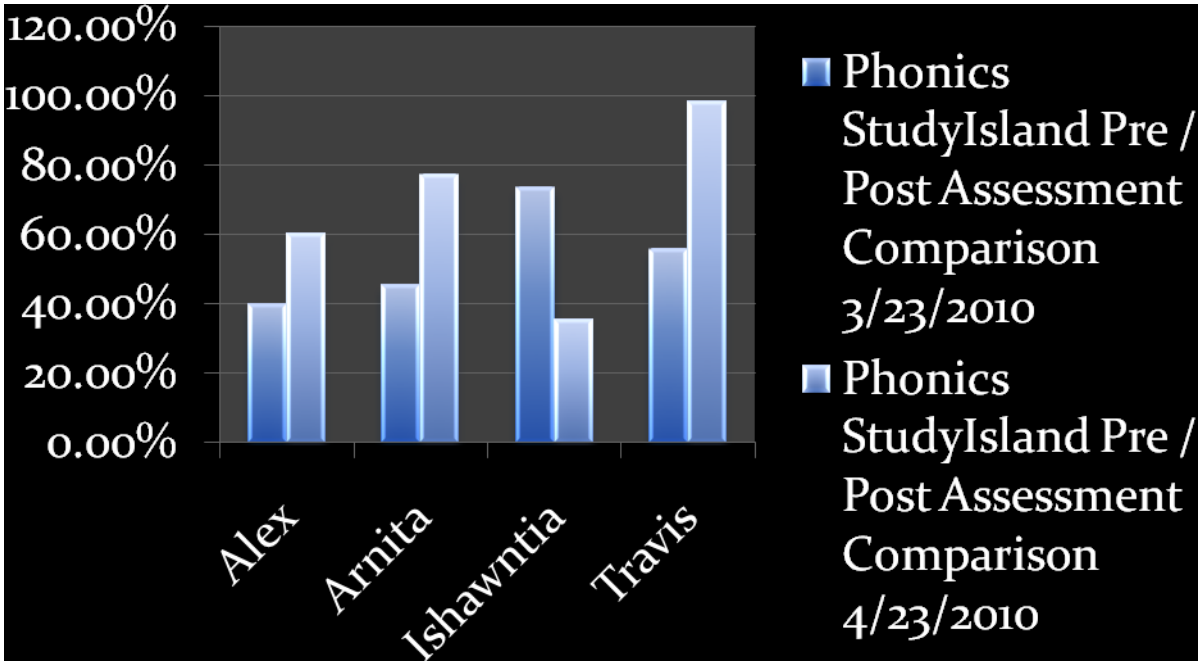
- **Study Island.com**
- **Online Assessment Reporting System**
- **2006 Hasbrouck & Tindale Oral Reading Fluency Data**
- **Lakeshore Building Fluency Card Bank**

The students will practice a timed, teacher created, PPT of high frequency and frequently used phrases on a daily basis. They will be post assessed at the end of 4 weeks. They will log on to the Study Island phonics games and testing portion on a daily basis. Finally, the students will be given a final post assessment using the same pre-assessment test developed in Oars (April 24, 2010) and a final fluency test using a new passage (April 24, 2010).



Analysis of Post Intervention Data

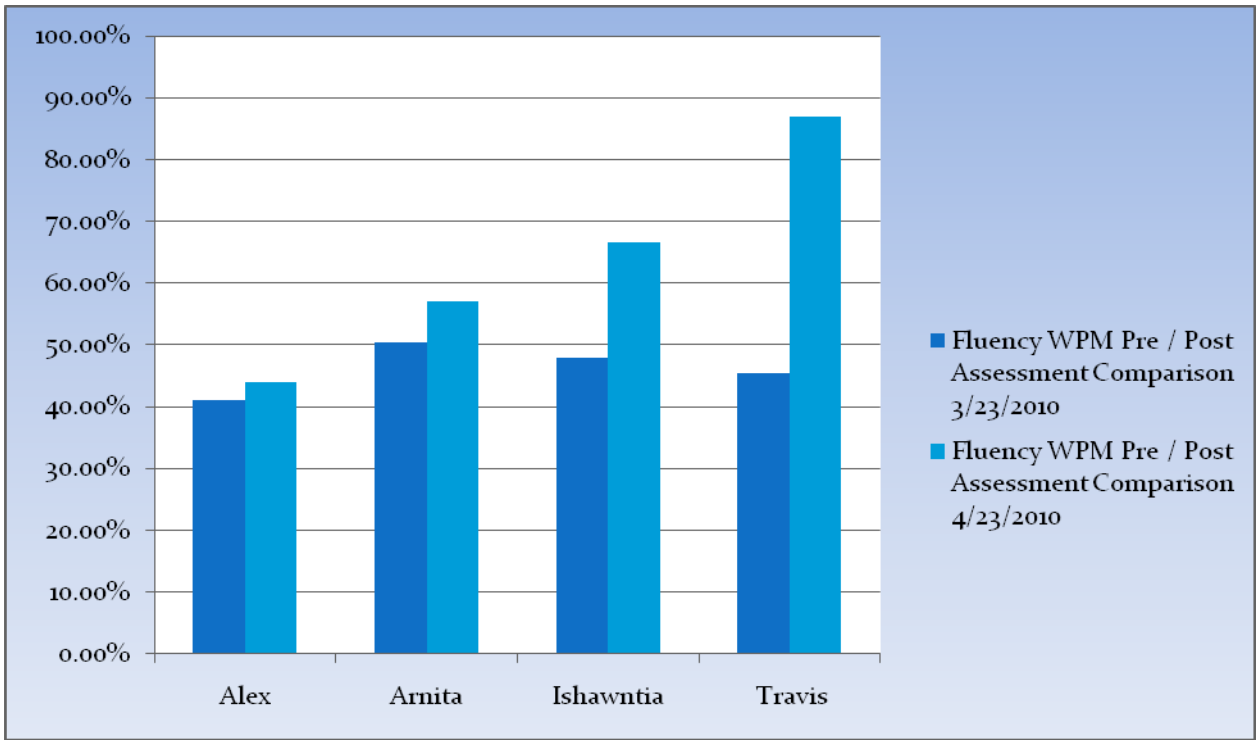
Impact as a result of Technology



Impact as a result of Technology

- **Alex – 20.4%**
- **Arnita – 31.60 %**
- **Ishawnta – (-37.90%)**
- **Travis – 42.40%**

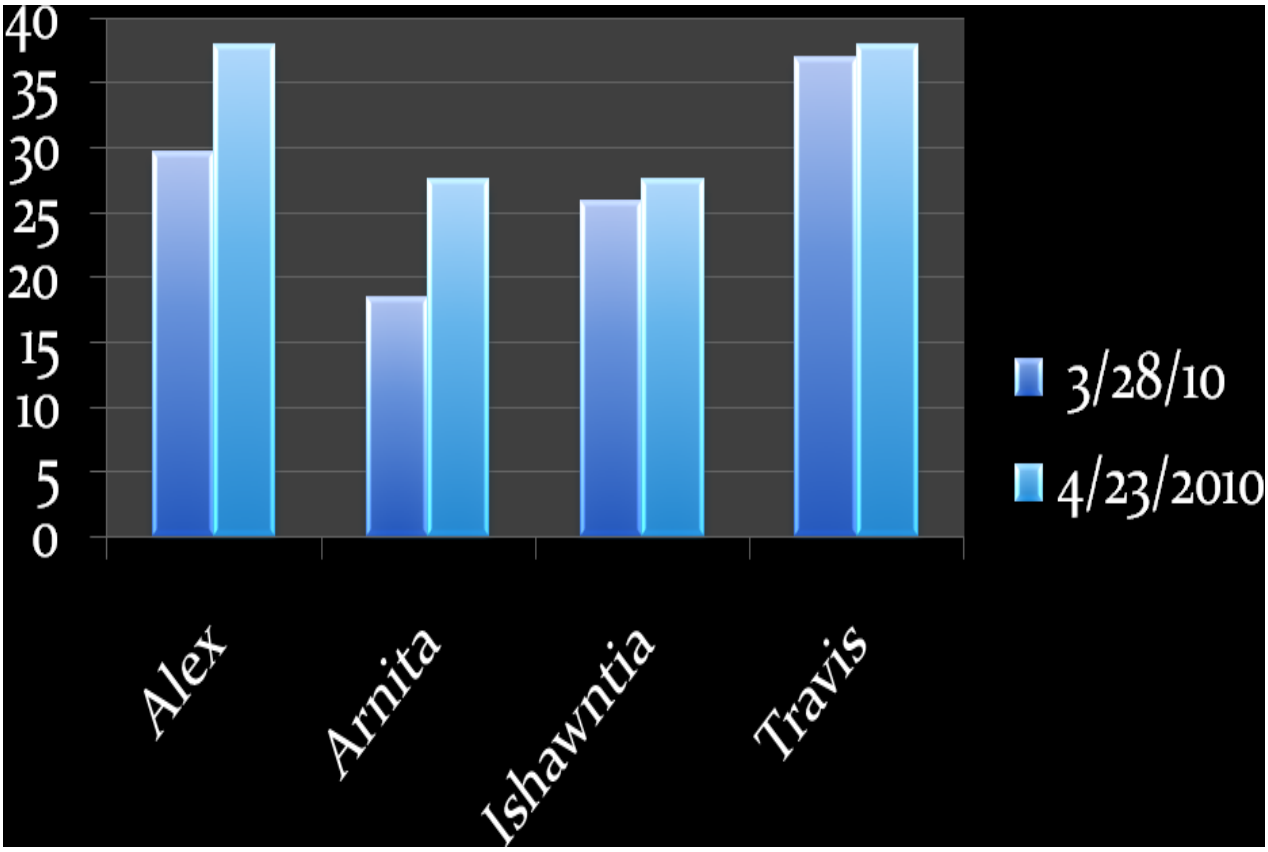
Impact on Fluency 3/23/10 – 4/23/10



Impact on Fluency 3/23/10 – 4/23/10

- **Alex – Baseline (41 wpm) Post Assess (44 wpm) = Gain (4.5 wpm) 1.2**
- **Arnita – Baseline (50.5 wpm) Post Assess (57 wpm) = Gain (6.5 wpm) 1.6**
- **Ishawnta – Baseline (48 wpm) Post Assess (66.5 wpm) = Gain (18.5 wpm) 4.6**
- **Travis – Baseline (45.5 wpm) Post Assess (87 wpm) = Gain (41.5 wpm) 10.5**
- **2006 Hasbrouck / Tindal Fluency norms for 2nd grade**
- **Spring Words Correct Per Minute – 89**
- **Average Expected Weekly Improvement – 1.2 words**

Impact on Oars Written Test



Impact on Written Test

- **Baseline (written)** **Post Assessment**
- **Alex – 29.6** **38**
- **Arnita – 18.5** **27.52**
- **Ishawnta – 25.9** **27.52**
- **Travis – 37** **38**

Findings and Implications

The writer wanted to implement timed repeated readings in order to improve fluency levels but the only interactive website that provided timed readings was far above grade level for the 2nd graders. The results prove that this approach increased automaticity, engagement and fluency level but with inconsistent results. The duration of the intervention may have been a factor in the scope of improvement in assessment results. Even though there was growth the outcome could have been much greater if the study was more consistent (there were breaks in the schedule due to Spring Break and Standardized testing dates) and the duration longer.

The writer's position allowed access to the newly installed computer lab in the Title 1 classroom. Thirteen computers were ordered to be used for the students that qualified for the services. That, unfortunately, excludes 2/3's of the school (at least for the next two years). After getting setup with internet access, the Title team purchased the software application called Study Island.

The writer realized after starting the Action Research that the focus would needed to be narrowed. Phonics is way too broad to get relevant results in such a short time without targeting a specific skill. So, for the study, I elected to use several specific standards regarding phonics, the rate fluency as a way to assess the effect of phonics study and as a tool of comparison. 2 of the 5 students remained on the test portion of the Study Island because they continuously (every session) guessed the wrong answers. With Study Island, you must answer 60% correctly in order to earn the right to play educational games that practice the same skills. Despite apparent gains

their success potential remains inclusive due to inattentiveness and inability or unwillingness to read the instructions.

Ishawnta has very poor spelling skills and needs to revisit decoding principles so she was unable to do many of the phonics activities and became frustrated and resorted to guessing.

Alex is very low in fluency, based on a fluency test that was administered (44.5 averages of 2 repeated readings). This is consistent with the district wide standardized benchmark results (41 wpm -Test B). After using the flash card PPT I administered the same test for the 3 time and his wpm increased by 11 words. He was placed on the automated PPT fluency sight words activity, and the animation timer increased from 6 seconds to 3 seconds during several practices. This proved to be a problem because this is an independent activity and he continuously mispronounced the same words until he was corrected. That indicates that technology in this case would be good for solidifying the words he knows but the decoding and phonetic principles need to be revisited or at least integrated into the technology piece. He did better with the phrasing.

The introduction of technology on a daily basis cut down negative behaviors but not entirely The same students that demonstrate negative behaviors in the regular classroom also demonstrate negative behaviors during the research but not with the impact of classroom disruption. The introduction of technology increased student engagement: Students were willing participants and often asked if they come even when sessions were scheduled. The repetitive use of high frequency words and phrases improved the fluency for students at an average 1.2 wpm per week. Test scores improved slightly but not enough for a proficiency grade for any student. It is also evident that differentiation will be a crucial component when implementing. Each child had strengths and weaknesses that differed as with any classroom.

In order to reach the goals of the NCLB mandate technology needs to be available everyday or at least a regular part of the academic curriculum that extends past the recreational use of a resource class. It is recommended that regular educators incorporate technology to support and enhance learning in some way to increase academic achievement and student engagement. The findings will show that in order to have consistent, relevant results the intervention using technology needs to be engaging, systematic, providing immediate feedback, user friendly, rigorous, repetitious, scaffold. The findings conclude that when used to improve academic achievement in targeted areas, technology is best as a supplemental tool and or integrated as a scaffolding tool or a repetition of prior taught skills

Recommended Next Steps

- ✓ Incorporate the PPT's in regular classroom morning drill
- ✓ Use PPT's as a warm up to intervention sessions
- ✓ Gather more interactive research based intervention resources to use
- ✓ Pre-plan for differentiation
- ✓ Narrow the focus of targeted intervention
- ✓ Pre-teach the area of intervention
- ✓ More interactive research based intervention resources to use
- ✓ Determine which functions need 1-to-1 teacher support throughout the activity

Since Studies also indicate that computer based activities should be project-based learning, real-world simulations with problem solving skills as opposed to drills and practice should be included in planning.

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Integrating the PowerPoint

Included is a PowerPoint that can be used to help increase automaticity of sight words.
To implement into daily classroom use, select a time that students will be able to focus on the PowerPoint without interruptions. An example of an ideal time would be in the morning prior to the start of instruction and presenting as a class. Using a projector or instrument such as Elmo or xxx board the class will likely be engaged until instructional tie starts. Workshop is another opportunity to use this tool. Sitting students at the computer with headsets allow independent reinforcing of sight words. It is recommended that the words be reviewed by the teacher prior to repetition to avoid learning he words incorrectly.