

EXECUTIVE OVERVIEW:

# St. Lucie County Public School System

*St. Lucie retrofits traditional schools with 21st century technologies, combining Learning Village with the interactive curriculum content of Destination Math, Destination Reading, and Assess2Know from Houghton Mifflin Harcourt*



Prepared by:  
Dr. Owen Roberts, Assistant Superintendent  
St. Lucie County Public Schools  
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**“The integration of Houghton Mifflin Harcourt technologies into the classroom has empowered our teachers and students to optimize teaching and learning and to positively impact student achievement. Over the past five years, St. Lucie Public Schools have implemented a suite of Houghton Mifflin Harcourt technology solutions-based curriculum in reading and mathematics that have significantly contributed to students’ overall academic improvement – and with our continued partnership improvement, we expect to continue in the years ahead. ”**

**Dr. Owen Roberts**

**Assistant Superintendent, St. Lucie County Public Schools**

## Executive Summary

Over the past five years, the St. Lucie County Public Schools have embarked on an aggressive plan to re-engineer itself into a world-class educational system to meet the demands of the 21st century. This plan is geared to transform the community from the “Treasure Coast”, a place for ease and retirement, to the premier status of a “Research Coast”, a place where innovation and science will bring the dawn of a new future with prospects for high-wage and high-skill job opportunities.

The public school system created and implemented a plan to build new schools that fit the 21st century design, where instruction drives construction, and to retrofit traditional schools with 21st century technologies. Classroom Audio-visual systems (CAVS) are available in 75% of all classrooms and the computer stations to student ratio stands at 3:1 in every school. Software systems are geared to support the K-12 teaching and learning processes and create opportunities for individualized and extended learning.

The purpose of the educational instructional technology in the schools is to increase student learning and achievement by integrating into, and complimenting the implementation of the curriculum, instruction, and student assessment in classrooms. Instructional technology contents are aligned with the Sunshine State Standards (SSS) and Benchmarks in order to provide authentic relationships between the technology intervention program contents and the expected contents and skills of the State Standards. This alignment is essential to ensure the instructional validity between the State’s curricular expectations and teachers’ instructional delivery.

The integration of Houghton Mifflin Harcourt technologies into the classroom has provided teachers and students with the leverage to optimize teaching and learning and to positively impact student achievement. Over the past five years, St. Lucie County Schools have implemented a suite of technology based curriculum in reading and mathematics that have significantly contributed to their overall academic improvement. These implementations over the five years have made significant inroads in closing the achievement gap. The school district has moved from a “C” to a “B” rated district, just 17 points away from an “A” based on Florida’s A+ Plan accountability system. According to Rick Stiggins (1994), a national educational researcher and author, “Schools exist to promote student achievement. In that sense, it is the most valued outcome of schools. If students achieve, schools are seen as working effectively.” Implementation of Instructional Technology in classrooms is helping to make St. Lucie County Public Schools work effectively for all boys and girls.

## **Background**

Many observers and educational experts believe that computer-assisted learning is worth pursuing. This is because of the benefits that it can provide which are (a) individualized teaching; (b) access to 'higher level' content by making complex material easier to master; (c) connections to a broad array of learning options; and (d) infinite patience. Each benefit is aligned closely with good pedagogy and the opportunities that educators have wanted to provide for their students. In addition, while existing research is not definitive about the effects of computer-assisted learning on educational outcomes, there are a number of promising findings. Experts and parents believe that schools should ensure that students master computer and related technology, whether or not there is a direct benefit to educational outcomes. They believe students must have these skills to succeed in post-secondary training and education, and to be employable in the 21st century.

The Center for Assessment and Policy Development conducted an in-depth study of meta-analyses of research and arrived at the several major findings (Sally Leiderman, et. al, 2001) which are used to guide this evaluation.

## **Methodology**

Within the context of existing research and best practice, the St. Lucie County School District created a vision and a strategic technology plan to redesign and upgrade its technology infrastructure. This was accomplished by providing technical support in all schools, provide on-going professional development to educators, establish partnerships with information technology (Panasonic Foundation, Dell, CELT) and instructional technology organizations (Houghton Mifflin Harcourt Technologies), and develop curricular, instructional, assessment, and professional development systems to drive the processes of teaching and learning in schools and classrooms.

This report is an evaluative study of the impact of the instructional technology initiatives over the past five years. The investigation is a multiple case study (i.e., each school and the district as an individual entity) that focused on the implementation of three primary technologies: Destination Reading and Destination Math, Learning Village (FOCUS—First Online Curriculum Uniform System, locally named system), and the use of a test-item bank (Assess 2 Know aka "A2K") for progress monitoring.

## **Programs**

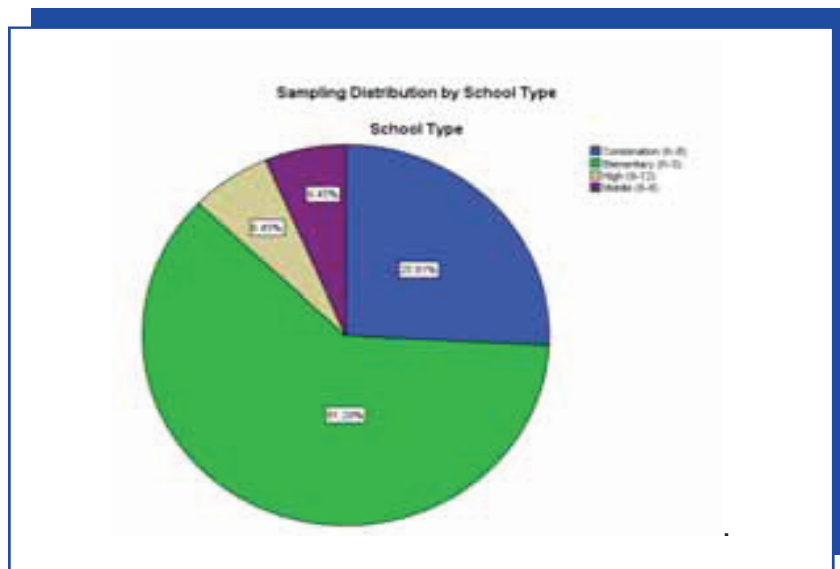
- Houghton Mifflin Harcourt Destination Reading. A reading intervention program that provides instruction in reading that is aligned to the Sunshine State Standards and Performance Benchmarks. It has a learning management system (LMS) that tracks students' performance over time. It is being implemented in grades K-8.
- Houghton Mifflin Harcourt Destination Math. A mathematics intervention program that provides instruction in mathematics that is aligned to the Sunshine State Standards and Performance Benchmarks. It has a learning management system (LMS). It is being implemented in grades K-9.
- Learning Village (FOCUS). A curriculum management system populated with curriculum resources such as curriculum maps for core subjects, model lesson plans, digital teacher and student activities, video vignettes modeling best practice, and access to other curriculum applications. The system is organized based on grade level and subject contents that are aligned to the district's curricula scope and sequence.
- Benchmark Progress Monitoring Assessment (St. Lucie Standardized Benchmark Assessment System-- SLSBAS). This is based upon A2K item bank and locally developed items. It is an online and pencil-paper test administration and reporting system for assessments in reading, mathematics, and science. The system is being implemented in grades K-12 for the district's quarterly assessments and school-based mini-assessments.

The study also focused on the efficacy and impact of the Destination Reading and Destination Math Solutions on student and school performance in St. Lucie Public School District over the past five years. Thirty-one schools were selected for the evaluative study. The targeted sample of schools, students, teachers, and administrators is representative of the district's population demographically.

## **Design of the Study**

The sampling selection was based on a proportionate stratified random sampling of schools by student demographics clusters – minority vs. majority (ethnic factor), low socio-economic vs. high socio-economic (free-reduced lunch factor), mobility rate (stability factor), and prior school performance (achievement factor). This means that schools (see chart below) were selected randomly based on demographics, and students were selected in clusters within schools to represent the demographics of the district within the four factors mentioned before. The total schools sampled were 31. Nine (29%) schools selected in the sample are Title I, while the remaining 22 (71%) are Non-Title I; consisting of nineteen elementary, eight combination, and four secondary schools. This investigation included a sample size of over 1,000 students, 150 teachers and 8 administrators.

Teachers and school administrators were selected based on the student clusters that were selected. Each teacher’s classroom selected had to meet a minimum criteria in volume of student usage (number of instructional minutes per week in students usage of Destination Reading and Math) and frequency of use (at least three times per week), as well as having participated in all of the required training for the implementation of the programs in order to be included in the study.



## **Instructional Technology Treatment**

### **Intervention**

The study examined the régime of instructional technologies that were implemented to support the delivery of curriculum in reading and mathematics. All schools included in the study have full access to the suite of Destination Reading and Math Solutions, FOCUS (Learning Village), and the Benchmark Assessment Measures (A2K item-bank). Within the past five years, the teachers and school administrators have received on-going training and technical support in the implementation of each of the curricular applications.

### **Program Applications**

Both Destination Reading and Math are used as supplemental instructional resources to support the core instruction either as extension of learning, practice, remediation, acceleration, or as a means to provide individualized or small group instruction in a differentiated delivery model. Teachers used both applications in a Response to Intervention (RtI) model to meet the academic need of at-risk learners. The learning management system (LMS) of both applications provided relevant instructional data for decision-making: time on task, frequency, mastery of skills and concept, and curriculum recommendations on a trajectory of a learning continuum.

The FOCUS curriculum management system is a database of curriculum resources: curriculum maps, lesson plans, student activities, student digital content, and teacher instructional content for directed or guided instruction. The system enables teachers to access resources that are aligned to the Sunshine State Standards which clearly specify the learning performance objectives and the teaching and learning resources for both teachers and students to use in delivering and mastering the curriculum objectives.

The progress monitoring system, St. Lucie Standardized Benchmark Assessment System (SLSBAS), is an assessment and reporting tool for assessing and reporting student progress towards the desired achievement outcomes. The system provides students with quarterly feedback on their progress toward mastery in reading, mathematics, and science. Students and teachers get disaggregated data on individual curricular benchmarks and standards, as well as comparative performance trend including pre-test data and each quarterly performance data to track progress and set performance targets/goals. The system also provides test validity and reliability data for test analysis. Most important is the functionality of the system

to estimate a probability of success for future outcome on the state standardized assessment. This provides the student and teacher with a gauge of the student likelihood of readiness for success on the Florida Comprehensive Assessment Test (FCAT). Most schools have access to mini-assessments that were designed by teams of teachers at the school level for weekly benchmark assessment and monitoring of progress. These weekly assessment data provided for weekly data chats, planning, and a focus on at-risk students who needed intensive intervention.

## **Training**

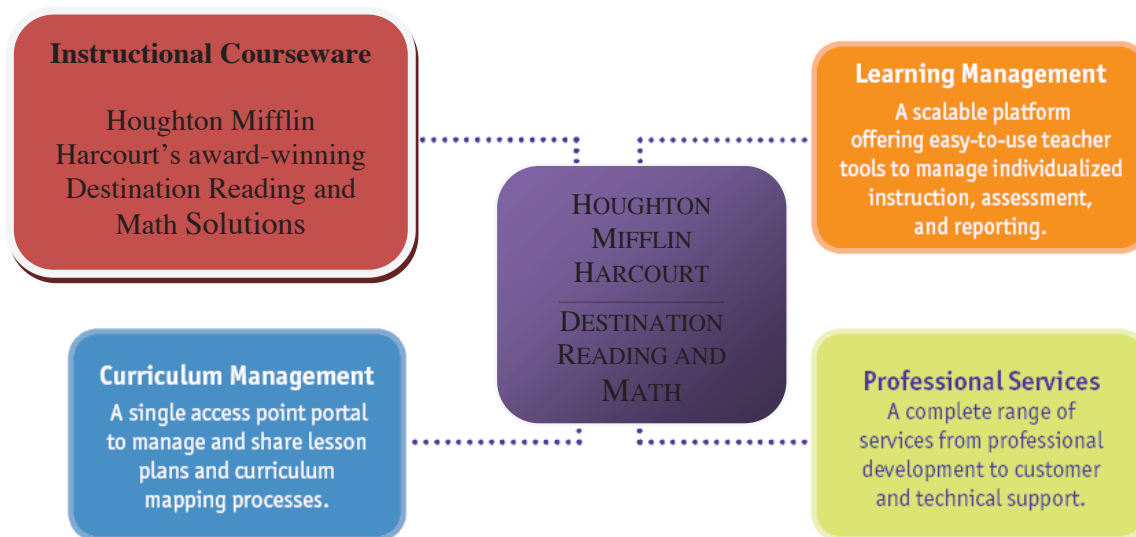
Consistent with the program implementation stated above is the training provided to teachers and administrators. The quality and success of the implementation of this curriculum initiative was hinged on the professional development provided. A systematic training plan was developed and implemented in collaboration with the Houghton Mifflin Harcourt staff over the past five years. This enables St. Lucie County professional development staff to learn and begin to model and coach teachers on the technical use of the instructional systems and at the same time build the capacity to ensure sustainability of the practice in the coming years.

## **Instructional Model**

The instructional model implemented in the St. Lucie Schools in reading has been based on direct instruction, guided-practice, and independent and differentiated work. In mathematics, the approach has been one of inquiry-based learning applying a methodology that begins with concrete strategies, then representational, and concludes with abstract problem-solving strategies (CRA model). These models are supported by the Destination Reading and Math Solutions and are grounded in the research literature. The illustration below depicts a conceptual model for the integration of the instructional technology teaching and learning system.



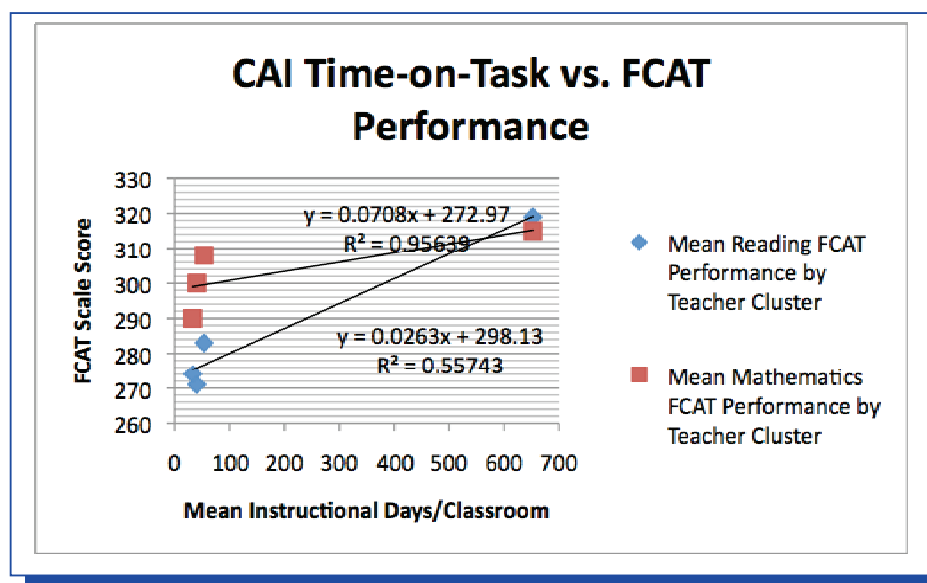
## Conceptual Design of Program Integration.



### Findings

SEVERAL MAJOR FINDINGS WERE THE RESULTS OF THIS STUDY:

1. There is a significant correlation between the number of minutes or instructional days that students spent on Destination Reading and Math Solutions learning activities in reading and mathematics and student achievement on the benchmark assessment in the thirty sampled schools.



Also, a significant correlation exists between school performance (Florida's school grading accountability system) and students' time on task on the learning activities in Destination Reading and Math Solutions. Based upon these significant relationships (see graph below), it is reasonable to deduce that the instructional activities using the computer-assisted Houghton Mifflin Harcourt technology of Destination Reading and Destination Math Solutions had a direct impact on the students and school FCAT performance. The logic would be, since students' reading and mathematics FCAT and benchmark scores are correlated to school grades ( $R= 0.677$ ,  $M= 0.665$ ,  $R= 0.713$ , and  $M= 0.645$  at the 99% confidence level), and school grades are correlated to instructional time on task on Destination Reading and Destination Math Solutions (0.395 at the 95% confidence level), then the logic would follow that Destination Reading and Destination Math Solutions has essentially contributed to the students' learning in reading and mathematics which in turn had a meaningful effect on the individual student and schools' performance.

2. All schools in this study that implemented CAI at least three days per week and with an average of 100 instructional days, yielded student performance growth in reading at grades 3-8 and in mathematics at grades 3-9.
3. As indicated by the results of the data analyses, schools where students spend less time and frequency on CAI learning tasks showed a trend of lower performance in reading and mathematics on the post-benchmark assessment and the FCAT, than schools that had significantly greater CIA time-on-task (with the exception of FPM K-8 and OH K-8).
4. Relative to CAI implementation, all schools and grade levels studied made significant learning gains in mathematics as demonstrated by the difference between the benchmark assessment pretest and post-test. This seems to suggest that the supplemental mathematics instructions had a meaningful contribution to the overall learning and performance.
5. An empirical instructional model that was developed suggests that CAI supplemental instruction in grades 3-9 should be implemented for 50 minutes/day or 250 minutes/week per student in order for students to acquire the learning necessary to perform on grade level. The data in the table below represents correlation between time-on-task and the impact on achievement.

Grade Groups	Range of Number of Minutes on CAI Learning Activities	Mean Reading FCAT Performance by Teacher Cluster	Mean Mathematics FCAT Performance by Teacher Cluster	Median School Grade
3-8	195,661 – 17,494	319 (L-3)**	315 (L-3)**	A
3-8	15,995 – 12,001	283 (L-2)**	308 (L-2/3)**	B+
3-9	11,977 – 10,027	271 (L-2)**	300 (L-2)**	B
3-8	9,927 – 8,016	274 (L-2)**	290 (L-2)**	B-

6. Teachers whose students showed significant learning gains implemented the programs approximately 45 minutes per student/day.
  
7. Title I schools that have a large percentage of students who are struggling learners (at-risk) in reading and mathematics, have shown learning gains equal or greater than most non-Title I schools. This suggests that the instructional strategies implemented in Title I schools, which included CAI, have benefitted the struggling learners significantly through extended learning time and individualization of instruction. One of the critical attributes of CAI is the immediate and frequent feedback that the program provides to learners. This tenet is clearly substantiated in the research literature (Woodward, J. and Herbert, R, 1997; Hattie, J. and Timperley, H., 2007).
  
8. All schools that have been implementing a CAI model have shown a positive trend in student performance on the State Annual Assessment (FCAT) over the past five years.
  
9. Teachers indicated the efficacy and fidelity of their implementation of CAI. Eighty-seven percent (87%) indicated that they were adequately trained in the implementation and use of the data in Destination Reading and Destination Math; 97% believe that CAI helps students to master content and skills in subjects taught in school; 87% indicated

that they used the programs for differentiated instruction; 90% indicated that CAI is effective in helping struggling learners; 61% indicated that they used the mastery data in the LMS to make decisions in assigning students targeted intensive activities to develop mastery of concepts and skills; and 80% to 97% indicated that Destination Reading and Math Solutions, FOCUS, and the quarterly benchmark assessments, as well as their teacher developed weekly mini-assessment, provided effective technology tools to improve their teaching and students learning.

## **Conclusions**

The implementation of CAI in St. Lucie County Public Schools over the past five years has resulted in establishing an instructional technology infra-structure that has a near approximation to Liederman, et. al (2001) model of ideal conditions to foster computer-assisted learning. The vision and mission of the school board and the superintendent to re-engineer the school system into a world-class 21st century learning environment, has provided the impetus for district-level and school-based administrators to work together in allocating resources to provide classrooms with the hardware—computers, CAVS units, fiber- and wireless- network with appropriate band-width, to handle the digital traffic and load of an efficient and effective informational and instructional technology operation.

Concomitant to the hardware development, are the essential software applications that drive the instructional operations: a curriculum management system (Learning Village); curricular software (Destination Reading and Destination Math, Discovery Education digital content, Earobics, Scholastics Read-180, and ALS credit retrieval course content); and an “home-grown” assessment system platform (SLSBAS) integrated with A2K test item-bank.

Within the five year span, the school board authorized the hiring of one technology specialist for each school. These specialists played a key role in maintaining, trouble-shooting, upgrading of hardware and software, and providing teachers and school administrators with on-demand, on-time, real-time support.

Most important to the success of the instructional technology implementation is the training of the implementers (teachers and school administrators). The district’s professional development department, in conjunction with our technology and school reform partners: Houghton Mifflin Harcourt, Panasonic Foundation, CELT, and the Standard bearer Network -- Dr. Phillip C. Schlechty Center for Leadership in School Reform, provided the school system with an infusion of knowledge and experiences to focus the system in a path of excellence and innovation.

The findings presented in this study are an indication and clear evidence that CAI is a viable strategy to be included in the repertoire of educational experiences that are provided to students, and is an effective tool in the “tool-box” of teachers in meeting the diverse needs of learners, whether they are student with disabilities, English Language Learners, struggling learners, or on-grade level learners. This multiple case study unearths a significant finding that proposes an instructional model for the effective and efficient implementation of the Destination Reading and Destination Math Solutions. It also established an empirical-based relationship between process data (benchmark assessments) and product data (FCAT assessment and school grades). It is expected that future implementation of Destination Reading and Math Solutions CAI will provide the opportunity to generalize the instructional models for reading and mathematics to other educational settings, and an evaluative study could be designed to test the reliability and validity of the models. Such a contribution would be invaluable to the teaching and learning enterprise in integrating research-based computer-assisted instruction into the classroom.