Miami Middle School Teacher Attains Success with TI-Nspire™ Technology

Case Study 22

Teacher/Researchers – Anthony Armbrister, North Dade Middle School, Miami, FL

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Teacher/Researcher	Anthony Armbrister
Location	North Dade Middle School, Miami-Dade Schools, Miami, FL
Course	Intensive Mathematics 7th Grade
Grade	7
Student Profile	African American and Hispanic students, 95% below grade level
Technology	TI-Nspire handhelds with SMART Board™ and TI-Nspire Computer Software - Teacher Edition

"Students took the state exam, the FCAT (Florida Comprehensive Assessment Test), March 2009…FCAT year-to-year score comparisons are made using a special DSS scale. In Mr. Armbrister's two classes, the average DSS score improved by an impressive 256 point…,"

Setting: North Dade Middle School, with an enrollment of 845, has high expectations of its predominantly minority students. It has adopted the International Baccalaureate/Middle Years program, and it provides small class sizes for subjects such as Mr. Armbrister's 7th Grade Intensive Mathematics. Mr. Armbrister used TI-Nspire technology in two of his classes, each with 14 students (82% African-American, 18% Hispanic, 85% free/reduced lunch). At the beginning of the year, 95% of his students were below grade level, and 15% had limited proficiency in English.

Mr. Armbrister's 20 years of teaching experience includes 8 years teaching this course. His Specialist degree is in mathematics education, and he is permanently certified for middle school and high school mathematics teaching.

The supplemental classes meet for 110-minute blocks on Mondays, Wednesdays and Fridays. The classes meet in rooms assigned to other teachers. In both rooms, student desks and cooperative work stations are in the center of the room and face the interactive whiteboard. Computers line the left wall, and the teacher's desk is at the rear. To build interest, Mr. Armbrister was able to create a display in each room with topics of interest such as Puff Daddy's sales graph and Wii video games coordinated with graph concepts.

Despite the challenges of these students and the length of the class session, Mr. Armbrister reports that his strategies for interactivity using the technology minimized discipline or off-task behavior. He says he is "adequately satisfied" with the overall learning climate of the two classes.

Curriculum and Teaching:

Intensive Math is a supplemental class, so supplemental books such *FCAT (Florida Comprehensive Assessment Test) scoring high* and consumables are used. Other materials include a lessons learned document produced by the State Department of Education, *FCAT Explorer*, *Compass Learning* and *Explorlearning.com*. The curriculum is structured around a map of what is needed to cover annually-assessed benchmarks. About 85% of the planned curriculum was covered during the year.

Mr. Armbrister observed a change in the pattern of TI-Nspire™ use over the course. At the beginning, students rarely checked their own answers, and they used the handheld to compare answers, generate examples, make predictions and discuss problem solving strategy on a weekly basis. By the middle of the course, however, these activities had become daily occurrences, and answer computing and checking was done weekly by most students.

Mr. Armbrister also comments that his style of teaching with TI-Nspire technology was able to change from the beginning of the course to the middle and the end. Questions on operating the handhelds increased to daily, as the frequency of use increased. Questions on the right answer became a weekly occurrence, as did "*why?"* questions (asking for a reason or justification). By contrast, questions on the procedures for solving a problem declined from daily to weekly as the course progressed.

Corresponding changes were also reported in the type of TI-Nspire activity used in class. Early in the term, TI-Nspire technology was used for multiple representations on a weekly basis, with daily teacher-created TI-Nspire documents. By the middle of the course, the equations and tables functions of the technology were used simultaneously on a daily basis. Use of geometry capabilities increased to daily by the end of the course.

Mr. Armbrister often used the Teacher Edition software to project a problem from the state test (FCAT) released items and manipulate the features of the on-screen handheld with the SMART Board to develop the concepts in a more dynamic manner. Students were engaged and grasped the concepts in a concrete way.

In addition, Mr. Armbrister served as the mathematics coach for the school. He presented a "Problem of the Week" via closed-circuit TV broadcast during the 40-minute Homeroom session. In these presentations, he used the TI Nspire software and a SMART Board to demonstrate problem solving dynamically.

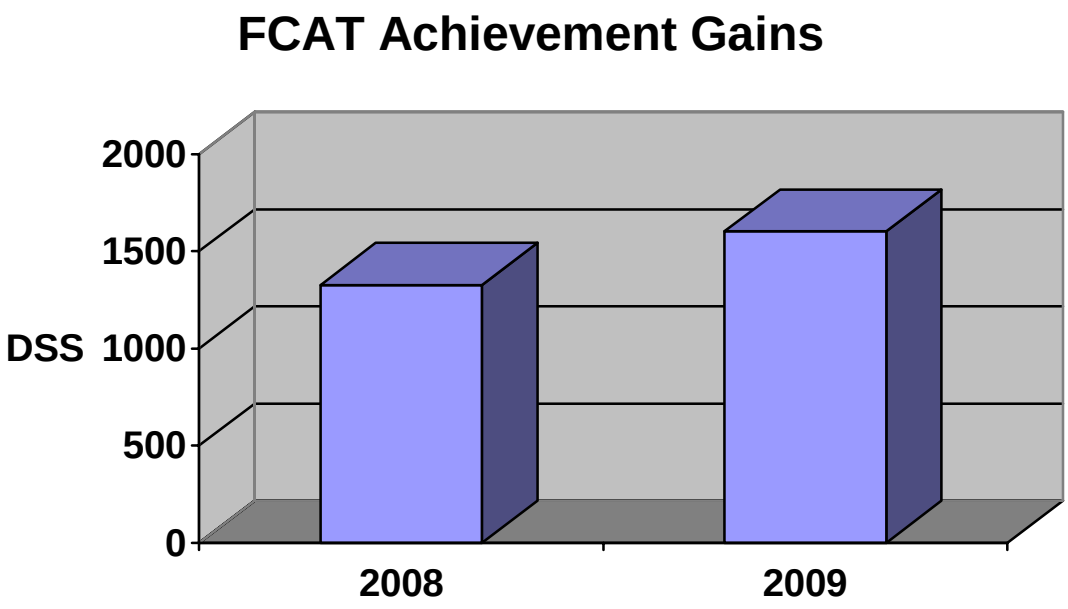
Assessment Method:

The course began with a pretest. Interim progress assessments were from the district using a data analyzer called *Edusoft*. The assessments were approximately 30 items long and were developed using *Examview Pro* with participation of

district mathematics specialists. The end-of-course assessment was a 40-item districtwide test. Test grades were cumulated into a 100-point grading system.

In addition, students took the state exam, the FCAT (Florida Comprehensive Assessment Test), March 2009.

Results:
FCAT year-to-year score comparisons are made using a special DSS scale. In Mr. Armbrister's two classes, the average DSS score improved by an impressive 256 points, as shown by the graph below:



Compared to his previous experience with graphing calculators, Mr. Armbrister notes that the TI-Nspire handheld has "a plethora of advantages. [It is] a handheld that has the ability to produce text, graphics and numerical representations simultaneously. [It provides] interactivity in real time and easy manipulation of functions."

Mr. Armbrister concludes, "This is an excellent tool to teach concepts and then to manipulate the software using your computer and a projector."