

At-Risk Students Succeed with TI-Nspire Navigator

Case Study 37

Teacher/Researcher - Kymn Van Dyken
Aspen Valley HS, Academy District 20, Colorado Springs, CO



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Teacher/Researcher	Kymn Van Dyken
Location	Aspen Valley HS, Academy District 20, Colorado Springs, CO
Course	Mathlab and Geometry
Grade	9-12 (Alternative School)
Student Profile	15 students age 13-20 years old, at-risk program. 97% enter below grade level. Ethnicity: 80% white, 20% minority. 10% economically disadvantaged. 9% LEP. 30% on IEP.
Technology	TI-Nspire handheld and Teacher Edition, TI-Nspire Navigator, TI-84, TI-Navigator, TI SmartView, Interactive White Board with Projector

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Setting: Aspen Valley High School is a 100-student alternative school located across from a shopping mall in Colorado Springs, CO. for at-risk students. Students are required to attempt a conventional high school before enrolling in Aspen Valley. The age range is 13 to 20 years, and students are in the 9 to 12 grade band. 98% enter the school below grade level. 100% of Ms. Van Dyken's students have experienced failure in math in other schools, and 30% have individual education plans (IEP) for special needs. Transiency is high with new students cycling into and out of the school every 6 weeks (hexters). Less than 5% of Ms. Van Dyken's students live in the community close enough to walk to school.

To graduate, students must volunteer in the community for 72 hours and maintain a side job for 18 weeks. The school offers no extra-curricular activities. Students are required to carry planners and have them signed by the teacher at the end of class. Students earn Planner points for each class from completed work, initiative, etc. They are also docked points for tardiness, incomplete work, etc. At the end of each week, students are rewarded with a free period if their planner points are high enough or receive a referral when their planner points drop below 90%.

Classes are on a 3-day, 85-minute block schedule with class size limited to 15 students. In 2009-10, Ms. Van Dyken taught three Geometry sections with a total of 42 students and one MathLab section with 9 students at the beginning of the year. 5 of the MathLab students also took geometry. By the end of the year, enrollment was at 32 students among all classes. All 9th and 10th grade students are scheduled into a mathlab in addition to their regular math classes. When students earn a proficient score on the state math exam, they are taken out of math lab.

Room 208 doubles as a computer lab, so fire codes require that desks and cords be attached to the wall. However, pods attached to the wall allow for a variation of student-center instruction and activities. Two of the pods have 4 chairs around a table, and one has 6 chairs around a

table. The teacher's desk and white board are at the front of the room. Ms. Van Dyken has the room for 4 of the 5 periods in the day. She changes the seating chart every 6 weeks. By the second 6-week hexter, she assigns seating according to Kagan structures which combine high and low students in teams, with one table of tag students who receive differentiated assignments.

Ms. Van Dyken comments, "Our school's motto is: **Respect, Responsibility, Citizenship**. On the back wall of my room is the following quote, 'I was ahead in the slalom. But in the second run, everyone fell on a dangerous spot. I was beaten by a woman that got up faster than I did. I learned that people fall down, winners get up, and gold medal winners just get up faster.'--Bonnie St. John, Paralympics Silver Medalist. This quote, off of a Starbucks cup, fits our town because the Olympic Training Center is in Colorado Springs. It fits my students because most of them have failed in school. I want them to know that life is full of failures but it is the process of learning to get up that makes the difference."

Ms. Van Dyken maintains a wall chart so that students can check their weekly progress (time) on Ascend, an online program used to target skill gaps.. Each semester students who log the most time win awards. Math lab students maintain individual notebooks with individualized assignments and progress charts. This helps Ms. Van Dyken's students learn to take ownership of their progress and participate in goals for future growth.

She comments, "the small atmosphere of our school lends itself to a positive climate and culture for all our students. Discipline issues are occasional."

Ms. Van Dyken's 26 years of teaching experience includes 6 years teaching in the math labs at Aspen Valley. This was her first time teaching Geometry in 20 years. Her certification is in secondary math.

Curriculum & Teaching: The geometry classes used *Geometry: An Investigative Approach* by Michael Serra, published by Key Curriculum Press. Students completed the first 5 chapters of the book and then focused on state standards for the rest of the book. About 60% of the planned curriculum was covered.

In Mathlab, Ms. Van Dyken's incoming students are tested via a placement test with Scantron and Ascend to determine the level of their first skill gaps, to identify needs and plan for mathlabs. Incoming students test between 3rd and 11th grade. They then log one hour per week of individual targeted work on skill gaps. Ms. Van Dyken brakes the Mathlab into 3 segments each day:

- First is a teacher guided activity or investigation which fit into small teacher developed units. (It was during this part of the class that she uses TI-Navigator or other activities.)

- Second, students work problems in class. Each student has a 3-ring binder with individual problems selected to fit both the unit of study and diagnosed gaps from CSAP, Scantron and Ascend.
- Finally, a part of each class is devoted to 20 minutes on Ascend. During this time she is able to provide individual tutoring for the students.

During the units, Ms. Van Dyken uses student work with questioning to monitor progress.

Ms. Van Dyken comments, “I prefer for my students to use handhelds attached to TI-Navigator, rather than using computer-based software. The TI-Navigator allows me to monitor all of my students so that I know all of them are participating and I know that I am addressing the needs of all of my students.” She rates her comfort level with TI-Navigator and handhelds as good, after about 12 weeks of use. “The Activity center is the feature that I use the most with my classes,” she comments. “The ability to collect data, put it in lists and send it back out is also great. Learn checks serve as short formative assessments while my students liked the quick polls.” Her students’ proficiency was good in most representation modes after about 6 weeks. She comments, “Students like to create some of their own materials (for example, they like to create pictures with coordinates). Because I have new students joining my class every 6 weeks, I have beginners cycling in on a regular basis. Interestingly, my experienced students take the initiative to teach the new students.”:

Over the course of the semester, Ms. Van Dyken noticed students changed their questions. Early in the semester, questions on operating the handhelds are a daily occurrence. By the end of the term, such questions are rare. She routinely asks students to provide reasons for their answers and prediction, and she often asks questions to stimulate thinking about problem solving. On the other hand, questions challenging students to justify their answers increase in frequency, so that by midway through the term they are a daily practice.

Assessment Method:

Assessment is something that I do “for” my students instead of something I do “to” my students. When Scantron tests are given to students 3 times a year they receive feedback as soon as possible. I created a form for students to compare their progress in each of the standards and reflect on causes for growth. Because my students understood their strengths and weaknesses, they understand the reason behind the materials we covered.

Each unit culminates with an individual test targeting students identified needs (from Scantron) Each test is approximately 50 questions long.

Ms. Van Dyken explains, “My current grading system includes a combination of in class activities which count toward a participation grade, short assignments which are graded on accuracy, short biweekly quizzes graded on accuracy, unit tests, and a participation

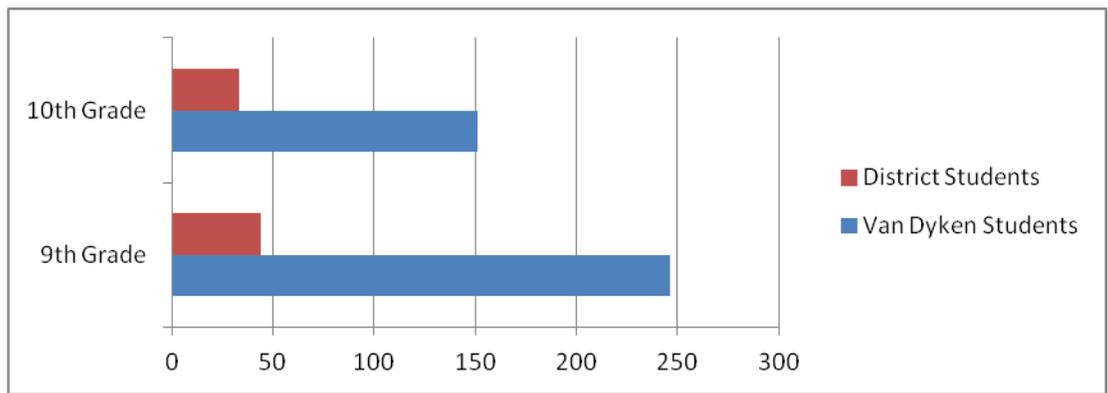
grade for 1-2 hours per week logged on Ascend. Students are allowed to correct tests for partial credit.”

Results:

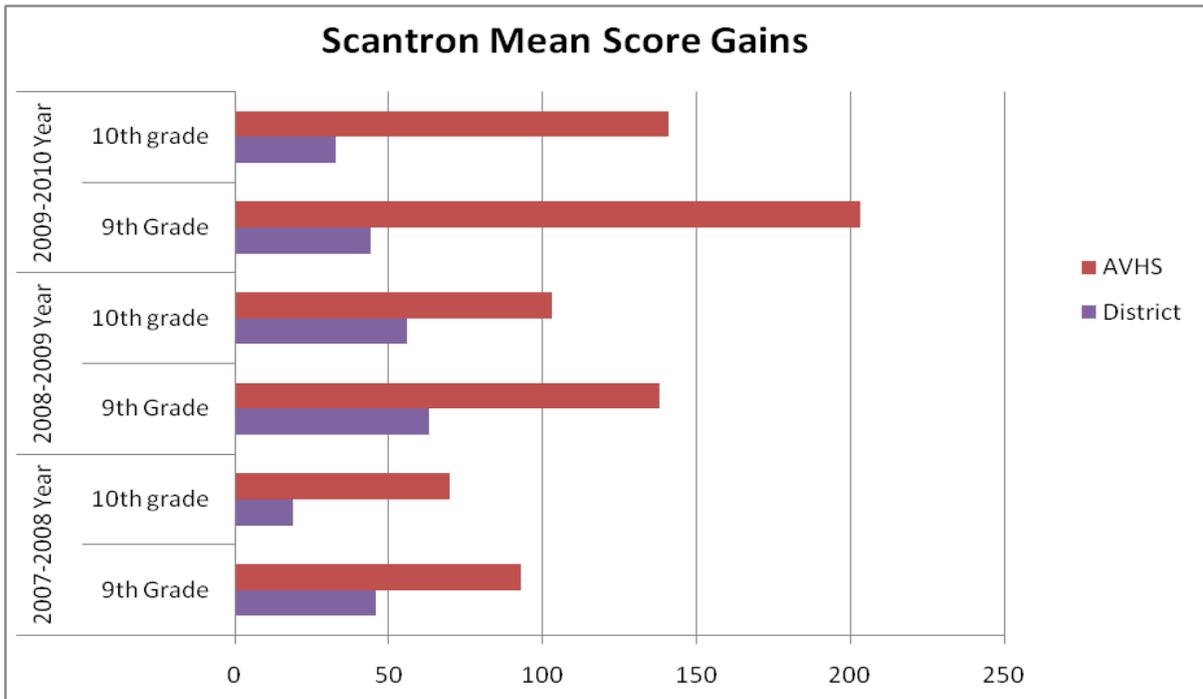
A pretest was given to Geometry students, and they averaged 15% proficiency.

Scaled scores on the 2009-10 end of year tests (using the Scantron item bank) show that Ms. Van Dyken’s 9th grade students scored 43 points above the school-wide average, and her 10th grade students scored 7 points above average. Her students outperformed the schoolwide average on every subtest: number and operations, algebra, geometry, measurement, and data and probability, with the only exceptions being 9th grade data and probability, and 10th grade Algebra.

Scantron Mean Change (Average Growth)		
	9th Grade	10th Grade
Van Dyken Students	246	151
District Students	44	33



Scantron Mean Change (Average Growth)						
	2007-2008 Year		2008-2009 Year		2009-2010 Year	
	9 th Grade	10 th grade	9 th Grade	10 th grade	9 th Grade	10 th grade
District	46	19	63	56	44	33
AVHS	93	70	138	103	203	141



Colorado ACT test results for the entire high school showed a mean math score of 18.4. This compares with the statewide average of 19.3, and reflects a steady improvement year by year. “I used the district comparison as a way of defending growth within the school.” Ms. Van Dyken comments. The district had over 22,000 students and was “Accredited With Distinction” by the Colorado Department of Education for the 2009/2010 year.

Under the new Colorado growth model, CSAP scores showed that 72% of AVHS 9th graders and 74% of AVHS 10th graders were classified as “high growth” in mathematics for the 2009/2010 year.

Ms. Van Dyken concludes that “by focusing on growth the students were able to start at a spot where they were able to complete the work. Through the use of guided inquiry based relevant activities and practice, the students made significant progress toward catching up to their peers.”

Ms. Van Dyken sees a number of benefits to her approach to teaching with handhelds and TI-Navigator. She reports:

- “My class is on task more than 90% of the time.”
- “Now, with the use of TI-Navigator, I KNOW exactly where my students are in the Navigator activity. For one example, during the 09/10 year I was using a Match my graph activity with a small group of geometry students reviewing algebraic concepts. With the Navigator I received feedback on each problem.”
- “During the 09/10 year I used the TI-Navigator Activity Center to teach linear functions to students. We started with a match my graph example, reviewed the meaning of the b in $y=mx+b$ and continued onto to introduce the slope as rise/run. At the end of the class, I had students requesting, “one more” because they were totally engaged.”
- “I also videotaped my classes and critiqued my teaching. When I watched the video tape, I was particularly struck by one student who repeatedly had the right answers but let others claim his work. With the Navigator, he couldn’t hide. Over time, he would sit there with a big grin on his face just watching to see if I noticed while another student would try and take credit for the correct answer.”
- “During the 08/09 school year I used TI-Navigator Learning Checks with an algebra I class at least once a week. Students completed a paper copy of the Learning Check at home or as a warm-up at the start of class. Via the Navigator, I collected the file and used it as a graded review at the start of class. Because of the immediacy of the feedback, I was able to focus on material that my students needed. Because of the grade and the interest in the technology, my students completed the assignment the majority of the time. Interestingly a couple of my students complained about the delivery of the problems on the Navigator. The complaints settled around reading the TI-84 screen. (Note that the TI-84 display recently has been upgraded with MathPrint, and the TI-Nspire screen is much larger and clearer.—*ed.*) Combining the paper copy of the Learning Check with the TI-84 satisfied all students. Students loved the PowerPoint feature of the Navigator and often pointed out their incorrect answers but also self-corrected when they saw similar problems.”

Ms. Van Dyken has worked with her fellow teachers to spread the use of the technology in her school. Thinking of her own experience, she comments, “collaboration with other teachers using the same technology would have quickened my progress through the difficult spots.” She also reports:

My colleagues are split into two camps. One camp wants to learn and incorporate the technology into their classroom. Hurdles include the financial cost and the time to learn the technology. These colleagues respond enthusiastically to one-on-one time helping them with their grants or technology set up. They are interested in using Navigator and probes.

In the other camp I have experienced colleagues who have the technology setting in their room and turn down offers to get it up and running. The biggest inroads have been made in two ways. First, I taught the students to use the calculators. The students in turn taught their next teacher how to use the calculators. When the students are excited about the technology and asked the teacher to use it, the teacher started using calculators in class.

When starting with any new technology, including Navigator, I would recommend that [teachers] start with one application such as quick poll. They should use the one application until they want to expand to another application. I also suggest that when they first introduce students to the technology, they use a non math activity such as a quick poll on trivia. That way students can focus on the technology instead of the math which may be a challenge to them.