

CASE STUDY: SmartMath

Instructor: Dennis Ashendorf

Position: Math Intervention / Credit Recovery Teacher

Study Size: 47 Students

Location: Newport Beach & Costa Mesa, California, USA

School: MUSD Credit Recovery Center,
Newport-Mesa Unified School District



In his role of teaching Mathematics in Costa Mesa, California for the Newport-Mesa Unified School District, Dennis Ashendorf has employed eight real-time, data-driven, web-based software programs to improve the math scores and real math knowledge of his students.

For the past year, Dennis has utilized SmartMath (www.smartmath.eb.com) to provide personalized instruction with inherent summative and formative assessment for his classes -- in his words "continuous formative assessment." He says, "SmartMath makes a real difference not only just in terms of content and ease-of-use, but also in its proprietary formative assessment engine and clear, simple interface design. It interactively adapts to each student. Students are rewarded internally by completing work as quickly as possible - learning more - faster!

"SmartMath offers on-demand instruction for students only when they are eager to learn; usually after they struggle with a few problems. Most other products force students to watch instruction and pretend that the students paid attention, before offering more problems. This slows learning and bores. With SmartMath, students engage problems immediately. If they see that they aren't earning stars quickly, then they seek help, and they want it concise. SmartMath delivers."

In comparison to the other online math intervention programs, Dennis feels SmartMath reaches farther down than competitors. "Many students need to restart in first grade, not third grade, in order to advance. SmartMath's formative intelligence engine allows accelerated learning by adapting to each individual student. Even students who simply start at the lowest level, without using ii-Intelligence work rapidly. Both SmartMath strategies work well."

Power of Formative Assessment to Provide Personalized Instruction

Dealing with differences in student skill levels has always been an issue for math teachers in a collective classroom education environment. Dennis has focused on finding software that provides individualized data-driven instruction that is also pedagogically sound. In different words: math software must not only incorporate standards, but also provide either additional content and/or a superior design for bridging standards. Great software minimizes **stalling**. In Dennis's words: "Stalling is a far bigger problem and is rarely discussed. It means that students work until they cannot proceed - their next step is uninteresting or too difficult for them. This can be due to an error in a software program's design or, sadly, an incomplete standards set." What if there were a math learning tool that automatically adjusted materials and content difficulty level by interpreting feedback from individual students' practice performance? Wouldn't it be a big help to math teachers as well as the students who are either left behind or far ahead of class averages? SmartMath is designed to adapt teaching and practice with these goals in mind. In SmartMath, the exercises students are presented with are the result of how well they performed in answering previous math problems, and what students are taught is reflected in what they are assessed by our solution.

When implemented in class, students get direct and immediate feedback as they receive more and more difficult math questions at their own pace, a pace that the software encourages to be fast. The learning results of formative assessments are provided on the spot; giving teachers the data and tools to become more effective learning facilitators. At the end of the day, teachers can refer to the class and individual progress reports as formative results and plan personalized and effective instruction for each student and/or group.

Active Student Participation in the Learning Process

Dennis found SmartMath's real-time feedback provided instant instruction to students. When students answer a question incorrectly, they are shown the correct answers in real time. For



each word problem, they are shown a descriptive solution which explains to them how the answers are derived. Instead of participating passively in the learning process by viewing a math tutorial or a video, the SmartMath solution actively engages learners. "By allowing them to actively take part in the process, my students enjoyed using the program and stayed focused while working on each topic," said Dennis. "Furthermore, the students had flexibility in choosing a topic. This is vital in minimizing stalling. Sometimes, students simply stop because they don't like a topic. Offering choices keeps them moving. It's as if SmartMath is a river. If one channel is uninviting today, then another can be chosen. Students go back to the topic later, when they choose. Most programs are far too linear. Their presented problem must be solved! Students quit, but not with SmartMath."

Individualized Program that Helps Boost Student Confidence and Motivation

SmartMath's individualized help doesn't stop at offering on-demand instruction. Each individual's historic results are recorded to provide a basis for giving students additional practice in learning objectives that focus on areas where they need help. SmartMath is designed to pick the next question from a pool of 35,000 indexed math questions that best address a student's current needs. Confidence and motivation increase because students will not find the system-assigned math practice too easy or too difficult at any point in time. Instead, students see progress and experience success one step at a time. With SmartMath's positive reinforcement and the encouragement of teachers like Dennis Ashendorf or you, each student's confidence grows and the gap between higher and lower achievers is reduced.

Balance Fun Interactive Experience and Educational Value

The SmartMath student experience provides a balance of a fun and engaging educational setting with educational value. "Star awards are real-time interactions that encourage an interest in learning and show students their progress. The use of characters, avatars, work in math intervention, I found older students enjoyed selecting them and earning stars during practice. At first I was hesitant, but all of my students enjoyed SmartMath software that should work

just as well in first grade," Dennis claimed. Students practice to earn stars which can be used as lifelines or insurance to be used when they attempt to pass the timed challenge quiz for



each topic. "The search for different strategies to pass a math topic motivates students and engages multiple learning or gaming styles." Game-like approaches are simple, intuitive, and research-proven. SmartMath is one of the quickest systems that all students from grades 1 to 12 can adopt. Everything is web-delivered, requiring only that a computer's web browser be enabled with Adobe Flash™. Practically all are."

Effective Results in Increase Math Proficiency

During the eighteen week evaluation, 43 of the 47 math students raised themselves from first grade level to fourth grade level and ten reach sixth grade levels - 91 topics - a rigorous K-6 elementary school curriculum. "I was astonished that some of these students frequently refused to work on anything but SmartMath. SmartMath was successful in increasing and stabilizing their math proficiency and confidence. It rebuilt their math skills. SmartMath worked for these students like no other system has by taking math intervention in a different, more robust direction," Dennis stated. After completing all 91 topics, Dennis believed that his students were more prepared for Algebra than many conventionally-taught students because their well-roundedness in general math was demonstrated and knew how to attack problems with gusto. SmartMath succeeded. Dennis procured SmartMath for his new students for the following school year.

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