The Ascend Math Solution Use Model:

Remediation and Enrichment

Developed By:

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Background

In April of 2006, the President of the United States issued an Executive order establishing the National Mathematics Advisory Panel (NMAP). The panel was charged with reviewing research and hearing public testimony to establish a "state of mathematics instruction" and to provide broad recommendations for ensuring mathematical competency for American students.

According to the NMAP's final report, issued in March of 2008, while the National Assessment of Educational Progress (NAEP) shows positive trends in math achievement at elementary and middle grades, only 32% of 8th grade students and 23% of 12th grade students scored at or above proficient in mathematics. In addition, the demand for remedial math courses in colleges and universities is growing—a sign that students who are able to graduate from high school are still entering college unprepared to achieve in mathematics.

At the same time, the NMAP found that there is a tendency to hold some students back from engaging in mathematics concepts deemed "too sophisticated" for their age group. That is, children who have a natural aptitude for and curiosity about math may not be pushed beyond the limits of their grade level curriculum, thus preventing them from advanced achievement (NMAP 2008).

Thus, educators are tasked with addressing the needs of incredibly diverse learners, from low- to high-performing, of varying levels of English language proficiency, and attuned to various learning styles. **The Ascend Math Solution** enables schools to provide anytime, anywhere learning opportunities for students from the most behind to the most advanced by developing customized learning pathways based on rigorous diagnostic and periodic assessment. The result is a single solution for remediation and enrichment of all students. At its core, Ascend enables educators to fulfill the intent of the NMAP's findings—to provide individualized instruction that leaves no child behind and holds no child back.

A brief description of Ascend's approach to some of the 45 individual NMAP recommendations is provided at the end of this document.

Instructional Use

One of the key challenges for educators is to find a way to meet the individual needs of very diverse learners without investing in a multitude of products. Within a given school, there may be students who:

- Are performing below grade level and need targeted remediation to bring them on par with their peers;
- Have a basic foundation of mathematics proficiency but have low English proficiency that prevents them from succeeding on high stakes assessments;

- Have attendance problems that prevent them from keeping up with the rest of the class;
- Are above proficiency in mathematics and are being held back from even greater enrichment and advancement due to a lack of instructional time, resources, or both.

The Ascend Math Solution's flexible instructional use allows educators to address the needs of all of these students using a single product. Ascend automatically guides students through student-centered learning containing multi-modality instructional activities. The automated study plans are directly tied to assessments, and the assessments automatically follow and are directly linked to the prescribed learning activities. The result is a fully-customized learning experience for each student.

Frequency & Duration

Because of the incredible flexibility of **The Ascend Math Solution**, it can be used in any number of configurations. Ascend is fully automated and student-driven, therefore the schedule on which each student receives instruction can be different. Further, based on the initial diagnostic assessment, each student's instruction is fully personalized, enabling them to progress regardless of how little (or much) time is available for remediation and enrichment.

In a Florida middle school, for example, students used Ascend in the following configuration:

- Duration per session: 45 minutes
- Sessions per week: 5
- Total duration: 1 semester

Within a single semester of intervention, students performing approximately four years below grade level achieved the following results:

- 32% of students gained one to two grade levels;
- 45% of students gained two to three grade levels;
- 13% of students gained three to four grade levels;
- 10% of students gained more than four grade levels.

In a Colorado high school, students used Ascend in the following configuration:

- Duration per session: flexible
- Sessions per week: minimum of one 1-hour session (students used Ascend in class, study hall, home, or a combination)
- Total duration: 13 – 31 hours

Students using Ascend in this configuration increased their ACT test scores by approximately 7%. In addition:

- 32% of students gained half a grade level of mathematics proficiency;
- 28% of students gained one grade level;
- 21% of students gained one and a half levels;
- 13% of students gained two levels.

In addition to the use models described above, the Ascend Mathematics Solution is highly appropriate for:

- Before- or after-school tutoring sessions;
- Summer school programs;
- Computer lab or study period use;
- Distance learning;
- Gifted student camps, clinics, or special programs.

Administrative Use

Coordinating the effective instruction of a variety of learners can be overwhelming from an administrative standpoint. Frequent assessment and the analysis of assessment results to determine student progress can tax teachers and take away from time they might otherwise spend on instruction. **The Ascend Math Solution** automates many of these tasks, minimizing teachers' and administrators' paper burden. In fact, the product's built in reports are so simple to create and review that parents and students can easily run and analyze their own reports, taking control of student achievement.

Teacher/Administrator Use

At the start of the program, students are given a diagnostic assessment keyed to the instructional content of the program to determine areas of mastery and gaps in skills. Ascend's alignment to local or state standards and/or assessment objectives enables teachers and administrators to view students' proficiency status in terms of high-stakes assessments as well.

Based on the results of the diagnostic assessment, the Ascend system develops individualized learning pathways for each student. Students progress at their own pace through the program, and the learning pathways are adjusted automatically as skills and concepts are mastered.

Using embedded, continual assessment, student progress can be captured virtually at any point in the program. Again, aligning Ascend to local and state standards enables teachers and administrators to quickly and easily view individual, group, and class progress in terms of mastery of high-stakes assessment objectives.

Perhaps one of the most important aspects of the Ascend Math Solution is its ability to empower teachers and administrators to engage in detailed analysis of student progress and make timely decisions about placement. With Ascend, teachers and administrators can view student progress much more frequently and make decisions about which students may need more or less time on Ascend to fill in skill gaps or achieve desired progress goals. The automaticity of the reporting system significantly reduces the amount of time needed to view, analyze, and act on data, increasing response time to student progress and maximizing instructional resources.

Student/Parent Use

One of the key benefits of the Ascend Mathematics Solution is that students themselves are able to monitor their own progress throughout the remediation/enrichment process. The National Mathematics Advisory Panel noted in its final report, "When children believe that their efforts to learn make them "smarter," they show greater persistence in mathematics learning" (NMAP 2008). At any given time when using Ascend, students can access achievement data and visualize the progress they have made. By putting control of learning in the hands of students, the Ascend MathSolution motivates them to continue in the program.

This student-centered, technology-based learning experience is particularly beneficial when working with today's generation of students. These "digital natives," says Marc Prensky in his article *Digital Immigrants, Digital Natives*, simply think differently than students of previous generations. With daily and lifelong access to digital input, these students are used to receiving information immediately, to using on graphics as well as (or instead of) text to assimilate information, and to receiving immediate feedback (Prensky 2001). Instructional materials and methods must meet the particular needs of these students in order to be successful. The Ascend Math Solution is fully responsive to today's generation of students, providing video-based instruction and high-interest graphics, providing immediate and private feedback on progress, and putting students in the "driver's seat."

Similarly, because Ascend can be accessed anytime/anywhere, parents are afforded significant access to student progress. Being able to watch their children improve and achieve not only provides motivation for parents to become more active in their children's learning, it empowers them to make good decisions about how, when, and how frequently their children should use the program.

National Mathematics Advisory Panel Recommendations

In its final report, the NMAP issued 45 individual findings over a wide range of domains. The following describes how Ascend's approach meets the intent of several of these findings.

13) Mathematics performance and learning of groups that have traditionally been underrepresented in mathematics fields can be improved by interventions that address social, affective, and motivational factors.

Ascend's approach enables students to take control of their own learning. At any time, students can view the progress they have made and the lessons they need to cover. The program is inherently motivational to students. In addition, because it is available anytime/anywhere, students who struggle with attendance, discipline, or other social challenges can use the program to continue mathematics instruction when they are not able to be in the regular classroom. The program is also designed to minimize student failure based on English language proficiency (as opposed to mathematics proficiency) through a multi-modal approach that minimizes the need to read text, providing video-based instruction and high-interest graphics.

14) Children's goals and beliefs about learning are related to their mathematics performance. Experimental studies have demonstrated that changing children's beliefs from a focus on ability to a focus on effort increases their engagement in mathematics learning, which in turn improves mathematics outcomes: When children believe that their efforts to learn make them "smarter," they show greater persistence in mathematics learning.

Ascend's approach is inherently rewarding. First, the program meets students at their current level of mastery, enabling them to experience immediate success in the program. As students master new concepts, they can clearly view the progress they are making. The more students use the program, the more apparent their ability to succeed becomes to them.

15) Teachers and developers of instructional materials sometimes assume that students need to be a certain age to learn certain mathematical ideas. However, a major research finding is that what is developmentally appropriate is largely contingent on prior opportunities to learn. Claims based on theories that children of particular ages cannot learn certain content because they are "too young," "not in the appropriate stage," or "not ready" have consistently been shown to be wrong.

Just as Ascend allows students below proficiency to progress quickly regardless of their age or grade level, the program allows more advanced students to push beyond the boundaries of their textbooks, classroom syllabi, and grade levels as necessary.

23) All-encompassing recommendations that instruction should be entirely "student centered" or "teacher directed" are not supported by research. If such recommendations exist, they should be rescinded. If they are being considered, they should be avoided. High-quality research does not support the exclusive use of either approach.

One of the unique aspects of the Ascend approach is that while student learning is entirely self-paced based on mastery of skills and concepts, instruction is given in part using videos of an award-winning mathematics instructor. In addition, the system's administrative functions allow teachers to quickly hone in on individual students' needs, and to group students according to ability level to ensure that instruction is as tailored as possible.

25) Teachers' regular use of formative assessment improves their students' learning, especially if teachers have additional guidance on using the assessment to design and to individualize instruction.

Assessment is embedded and continual, enabling teachers to have immediate access to students' proficiency status. As students progress through the program, the embedded assessments continually individualize instruction based on concepts mastered and identified gaps in skills.

28) Research on instructional software has generally shown positive effects on students' achievement in mathematics as compared with instruction that does not incorporate such technologies.

Ascend seamlessly integrates GraspMath™ content with video-based instruction delivered by an award-winning mathematics teacher. Students have access to technology-based manipulatives, interactive mathematics explorations, and ample practice filled with high-interest, informative graphics. Ascend capitalizes on the full benefits of technology-based instruction to improve students' mathematics proficiency.

33) Publishers must ensure the mathematical accuracy of their materials. Those involved with developing mathematics textbooks and related instructional materials need to engage mathematicians, as well as mathematics educators, at all stages of writing, editing, and reviewing these materials.

Developed by one of the leading mathematics instructors in the country, the Ascend Math Solution provides accurate, well-crafted mathematics content. An award-winning instructor and best-selling author, Elayn Martin-Gay has taught mathematics at the University of New Orleans for over 25 years. She has received the University Alumni Association's Award for Excellence in Teaching, *and was named* Outstanding Developmental Educator at University of New Orleans. *Martin-Gay has authored dozens of best-selling mathematics textbooks and professional development resources.*

References

Foundations for Success: The Final Report of the National Mathematics Advisory Panel. United States Department of Education, 2008. http://www.ed.gov/about/bdscomm/list/mathpanel/report/final-report.pdf.

Prensky, Marc. "Digital Natives, Digital Immigrants." *On the Horizon*. MCB University Press, Vol. 9, No. 5, October 2001. http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf.

About Strategic Education Solutions

Strategic Education Solutions provides comprehensive research, development, evaluation, and marketing services to public and private education entities, with expertise in:

- At-Risk Students;
- Dropout Prevention and Recovery;
- Scientifically-Based Research Practices;
- No Child Left Behind Policy and Compliance;
- Technology-Based Education;
- Curriculum and Instruction.

Led by Cynthia Burrow, an education professional with over 15 years of experience, Strategic Education Solutions has completed large-scale research and evaluation projects for state and regional education agencies, and has provided market research and curriculum development support for educational publishers in a variety of content areas.