

Reimagine Math Education

Tiffany Gibson
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ST Math

- What is ST Math?
 - ST (spatial-temporal) Math is a visual math instruction program that was created by the Mind Research Institute. It is game-based, and is designed to boost math comprehension and proficiency. It consists of language free math concepts. Students work at their own pace. They only advance to the next level when they have mastered the previous level. Students are given immediate feedback when they answer a question. Animations explain why an answer was correct or incorrect.
- What is spatial-temporal reasoning?
 - It is the ability to hold visual and mental representations in short-term memory and evolve them in both space and time.

How Does ST Math Support the Vision for Technology Use in our District?

- “Polk School District schools are creating learning environments in which technology is naturally blended into teaching and learning. This process has been labeled “*The Mobile Minds Program*”. For students to live successfully in this world, they must be able to use technological tools to communicate, explore and learn. Our schools are responsible for educating our students to use these tools proficiently, effectively and ethically.”(Hunter, n.d.)
- ST Math allows students to learn to use the technology by trial and learn at the same time. Even at an early age, students are learning how to navigate the technology tools proficiently that are available to them. ST Math is an effective curriculum based tool that allows students to experience learning in a way they have never been able to before.

Vision Support (continued)

- Polk School District has 6 elementary schools, 2 middle schools, and 2 high schools. All of the schools within the district are Title 1 Schools.
- The school system strives for excellence through rigorous instruction and age appropriate technology use. We must meet students where they are at in order to help bridge the gaps in learning.
- ST Math allows students to work at their own pace and at their own level. Students can spend time and really focus on the skills that they are lacking, or that need strengthened.

Objectives

- The main objective for using ST Math in the classroom is to help all students reach math proficiency through self-paced, language-independent, mastery-based objectives.
- To help students demonstrate mastery of the state standards and the mathematical practice standards.
- Allow teachers to gather data to drive instruction based off each student's individual needs.
- Allow all students to be successful at the level they are on.

How will this benefit students and teachers?

- Students can work independently and at their own pace.
- Students can be remediated while other students excel.
- Teachers are not weighted down with differentiating each lesson. ST Math allows students to work on different levels topics and standards at the same time.
- The program is presented as a game. Students actually want to complete levels in ST Math.

What age/grade can use ST Math?

- ST Math has age/grade appropriate programs for students in grades K-12.
- The version for elementary aged students (K-6) covers standards across each grade level.
- The version for middle school aged students (6-8) includes on-grade-level content as well as intervention content that can be used with students who are at a variety of levels of math understanding.
- The version for high school aged students (9-12) is designed as an intervention for high school students performing below the math proficiency needed to succeed.

How can we ensure all students have access?

- Technology is such an important part of the educational process. In Polk School District, we are very fortunate to have a 1:1 iPad initiative. Students in all grade levels and sub-groups have access to an iPad during the school day. Students in middle and high schools can take the iPads home with them. All students have access to the technology while at school. ST Math is a subscription that the district would have to purchase. At this time, students at Westside Elementary School have piloted this program, and have seen growth in every grade level. Westside Elementary used Title 1 and Special Education funds to purchase the subscription for Westside. This could also be a path the district could look into for funding for ST Math for the entire district.

Will we need any other hardware or software?

- Students already have access to the iPads on a daily basis, which is a platform that ST Math is available on.
- ST Math has an application on the Apple App Store that can be downloaded for free. If students have an Android or Kindle device at home, the Google Play Store and Amazon Appstore also have apps available for ST Math.
- Devices must be connected to the internet for ST Math to operate. All the schools in Polk School District have high speed wireless internet connection throughout their campuses.

How does ST Math provide support for teachers and administrators?

- ST Math provides each account with a MIND Research Institute Implementation Project Manager or Education Consultant.
- The Project Manager or Consultant will come to each school and meet with faculty and staff and train them on how to use and teach with the ST Math program.
- The Project Manager or Consultant is available by phone or email for additional help after the training.
- Teachers and Administrators can also contact Technical Support by calling (888) 491-6603 or emailing support@mindresearch.org.

What if students struggle?

- ST Math has built in features for teachers to know when and how to help students.
- ST Math has a teacher dashboard that connects you with students in their class. It allows the teacher to see exactly what students are working on.
- Students have a virtual hand they can raise that can be seen on the teacher dashboard. It can also be seen by the red frame that will be around the students iPad.
- If there is an orange frame around the students screen, the student is struggling to master a concept.
- ST Math has made a huge effort to make identifying struggling students quick and easy.

Are there any limitations?

- If ST Math is used at home, students will need to have internet connection at home.
- Students will also need a device if they are in elementary school since they do not take the iPads home with them at this time.
- Students who are in high school that do not need intervention may not benefit from the ST Math program.
- iPads older than the iPad 2 are not supported by this program.

How much does ST Math Cost?

- ST Math costs approximately \$90 per student. The price varies depending on the number of subscriptions that are purchased.

How can Polk School District pay for ST Math?

- . Westside Elementary used Title 1 and Special Education funds to purchase the subscription for Westside. This could also be a path the district could look into for funding for ST Math for the entire district.

How can we use ST Math?

- With ST Math, teachers can supplement the math standards and push students towards a deeper understanding of the curriculum.
- Teachers can use the data generated by ST Math reports to use for RTI documentation.
- The teacher dashboard allows you to easily see where each student is and what concepts they struggled the most with.
- Students and teachers can log in on a desktop computer or a handheld device. This makes it accessible anywhere there is internet connection available.
- Teachers can teach lessons to the group using the program or students can work on ST Math independently.

How can we use ST Math (continued)?

- Teachers can assign ST Math for homework so students can access the program at home as well as at school.
- ST Math supports students who have difficulty with language, or who have mild autism, dyslexia or other special needs.
- Pre and post-assessments are built into the game. Students are given the opportunity to tell if they are sure or unsure about an answer to an assessment question.
- ST Math requires students to use critical thinking, problem solving and transferring information (being able to recall without prompting). It develops higher order thinking skills.

How does ST Math promote specific learning goals?

- ST Math promotes research-based learner-centered strategies. It puts learners at the center of the learning. By allowing students to do the hard work and figure out what to do with little to no input from the teacher, they are learning much more than a teacher could ever tell them. ST Math puts students in control of their learning. They have the opportunity to use trial and error to figure out the concepts.
- ST Math allows students to experience authentic learning. ST Math allows students to create a meaningful, useful, shared outcome. It uses simulated tasks that provide the learner with opportunities to connect directly with the real world.

How can ST Math help with differentiation?

- “Students progress through the software’s gently scaffolded games at their own pace, advancing to the next level only through mastering the previous level. The latest research in learning and motivation informs game design to build intrinsic motivation in students along with a thirst for challenge and life-long learning.” <http://www.mindresearch.org/stmath/features/>
- Since ST Math levels require mastery before allowing students to move to the next level, teachers can rest assured that students completely understand the material before they can move on.
- ST Math allows students to work at their own pace. The process will be unique for each student.
- Students can view their progress. The game map allows students to see how far they have come and how far they still need to go.

How can ST Math help with Communication?

- ST Math has created several resources to send home to parents that explains how the game works, how they can check their students progress, and their rate of progress.
- They have also created a Parent Guide to assist parents in learning about ST Math.
- Students can talk at school within the classroom about their understanding of Math topics learned on ST Math.
- Students can access ST Math anywhere, so this will provide an opportunity for students to share their learning with their parents.

What does the research say about ST Math?

- ST Math is relatively new. It was first implemented in schools in 2005. Much of the research that was found was from the creators of ST Math.
 - In one study, “researchers found the proportion of students who scored either Proficient or Advanced (i.e., above the No Child Left Behind requirement) after fully implementing ST Math to be, on average, 6.38 percentage points higher than students in the comparison grades, a 0.47 effect size.” (Wendt & Rice, 2014)
 - “Since 2008 MIND has conducted comparative analyses for geographical cohorts of 5 or more elementary schools as they use ST Math for their first one-to-three years. The cohorts typically number 1,000 students or more. The schools are generally from the lower 30% of statewide math performance, and are matched to comparison schools similar in location, math performance, and demographics. The growth in grade-average math proficiency for grades using ST Math is compared to grade-average math proficiency growth at comparison schools not using ST Math.” (“Results at Scale” n.d.)
 - There are many studies listed on the MIND Research website that gives a great picture of what ST Math has done for school systems across the country. In my own experience, students love to work on ST Math. They learn concepts in a way that is easy for them to remember and truly learn.

What does the research say about ST Math?

- Mary Jo Madda from EdSurge reviewed ST Math and listed some strengths and weaknesses of ST Math based off research and interviews with school administrators and teachers who have used the program.
- “When it comes to effectiveness, an October 2014 WestEd study found that students in grades 2, 3, and 5 that fully implemented the ST Math program had significantly higher mean mathematics scale scores on the CST compared to the CST scores of students who did not use ST Math.” (Madda, 2015)
 - In the three months my school has been piloting ST Math for our district, I have seen great results. We have not taken a standardized test yet to see the difference. I do believe that we will see positive changes in our scores based off the changes we have seen in the classroom.

What does the research say about ST Math?

- “Their data dashboard is a nightmare; it’s too simplistic, in the way they represent the students that are struggling, and the reports are also cumulative, meaning I can’t look at individual days or weeks,” said Brandon Pheonix of ReNEW Schools.
(Madda, 2015)
 - I have also noticed that the teacher dashboard is lacking a little. I would like to be able to see what a student did on a particular day or week. It has some great information available on the teacher dashboard, however it is missing a few aspects as well.

How can we implement ST Math?

- Since Westside Elementary has began to pilot ST Math, they will start the implementation process.
- The consultant for Polk School District will be invited to train the faculty and staff of the other 5 elementary schools in Polk School District.
- Once the training is complete, teachers and technology coaches will get students set up in ST Math.
- When students have been added into ST Math successfully, the majority of implementation will be complete.
- Technology coaches will check in with teachers to make sure they are not experiencing issues. If issues arise, technology coaches will be responsible for contacting the consultant to figure out solutions.

How will teachers be trained to use ST Math?

- “We are dedicated to providing school and district leadership and teachers with the tools, knowledge and information needed to maximize their success with ST Math. Educators using ST Math receive initial training to get up and running on the software and to learn the best practices of implementation. Ongoing professional development workshops are available and designed to deepen teachers’ pedagogical content knowledge for teaching math through the use of ST Math. Each school site receives ongoing technical and curricular assistance from an assigned MIND Education Consultant and educators have access to Technical Support.” (Features, n.d.)
 - When Westside Elementary School began to pilot ST Math, I was able to attend a training presented to teachers and administrators. The consultant was very knowledgeable and helpful. He taught us how to use the program as a student so we would know what to expect from our students. During the training our consultant provided a manual for us to refer to later.

Reflection

- When I was first introduced to ST Math, I did not really understand how it was different from any other math programs we have used in the past. I have become more familiar with ST Math and have seen students work in the program. I see the difference. ST Math allows all students to have the opportunity to show how well they understand a concept. By taking away the words and allowing students to work hands on with the different game elements, I have seen tremendous improvements in dispositions toward math. It is so exciting to see students who actually want to work on math because they are experiencing success that they have never experienced before.

Reflection

- I was able to really take a deeper look into a program that is being implemented in my school and discover characteristics about it that I had not noticed before. With ST Math students are excited to learn math. The interesting thing is, many students do not even realize they are doing math. They see it as completing levels in a game.
- I will advocate for ST Math to be implemented into other schools throughout Polk School District. I have seen the difference it is making in the students at Westside Elementary School. I want others to experience the success we have had with ST Math.

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