**How the SMART Board helped me find the solution**

Modeling Technology Activity

**Integrating Technology in the Mathematics Curriculum**

When students graph the system of equations on the SMART Board graphs, their work will be much neater since the graph is made to scale. The neatness of the graph will help students identify the correct solution because the lines will pass through the correct points as opposed to a hand-drawn graph which may not be drawn to scale. If students learn the concepts and practice them using a neat graph, then they will gain confidence in solving systems of equations because they will more likely find correct answers. Using the SMART Board to graph lines will help students reach the CCSS-Math during a quiz because it allows students to pin-point the correct solution on a graph satisfying:

[*CCSS.MATH.CONTENT.8.EE.C.8.A*](http://www.corestandards.org/Math/Content/8/EE/C/8/a/) Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

[*CCSS.MATH.CONTENT.8.EE.C.8.B*](http://www.corestandards.org/Math/Content/8/EE/C/8/b/) Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.

**Integrating Technology in the Mathematics Curriculum**

The 800 series SMART Board has a feature that allows up to four students to interact with it at a time. Therefore, for my lesson, there will be four students (half of the class) graphing linear equations on the board while the other four work at their desks. This way, all students are engaged in classwork and they are all given the opportunity to practice solving systems of equations on paper and using technology. Also, all students are to participate using mathematical language while explaining their answer on the board. If more mathematics educators used the SMART Board, they would successfully engage more students in learning and participating during class because students are not expected to go up to the board alone, which may cause anxiety to some. Using the SMART Board during an activity in a mathematics classroom also elicits better communication with regards to the learning targets among students because they are working together to solve a system of equations with minimal assistance from the teacher.

**Ability to Contribute to Program and School Improvement**

I would recommend for mathematics educators to get together to practice using the SMART Board after school. Perhaps someone who proficiently knows how to use the SMART Board and its features can train them after school. Learning how to use the SMART Board proficiently will help teachers get straight to the point without wasting time during class trying to figure out how to get it to work. Subsequently, students will be impressed by the teacher’s ability to use a remarkable technology which will spike their interest and desire to participate in the class activity. I would also suggest that teachers who have SMART Boards in their classrooms plan a lesson specifically on teaching students how to use the SMART Board so that they can learn how to use it proficiently. This way, students are more confident when they are asked to solve a problem on it.

**Planning for Mathematical Understanding**

I am using the lesson template from SMART Exchange for solving systems of equations. During instruction, I will demonstrate how to create a system of equations by graphing two intersecting lines on the board’s graph and then create the equations for the two lines. Next, I will use the smart board to show students how to estimate a solution to a system of equations using the graph I have previously created. Students will understand that where the lines intersect is the solution of the system of equations. I will also demonstrate that the solution is written as an ordered pair. At the beginning of class, students will have written the learning targets:

* I know what a system of equations is and I know how to manipulate linear equations into slope-intercept form.
* I can graph a system of equations.
* I can identify the solution of a system of equations on a graph and explain my answer using proper mathematical language.

Therefore, students know what is expected of them for this lesson and they understand how the concepts build on each other as they progress through the learning targets, which is also explained in the beginning of the class period.

**Planning to Support Varied Student Learning Needs**

All students are asked to speak out if the directions are not clear enough, or if a certain method did not work for them, so that the teacher can address their needs. One student, in particular, needs help with understanding the classwork and homework directions, so I will assist this student by explaining directions and concepts in further detail or in Spanish when needed. This is a form of language accommodation. Another student cannot hear well with his right ear, so he is seated toward the front of the classroom and to the left. These accommodations tie in to the learning targets because students will clearly understand what they are expected to do, so it will help them follow directions and solve systems of equations properly. For example, the student with poor hearing will be able to hear better when asked what the intersection of two lines is, so he will be able to provide an answer, as opposed to not understanding or answering the question because he could not hear it. When this student clearly hears the question and answers it, he is closer to reaching the CCSS-Math. Also, some students in the classroom are kinesthetic and/or visual learners so the both types of learners will benefit from viewing the graphs on the SMART Board and physically touching it as well as from writing the problems at their desks. There are a couple of students in class that often need clarification of directions and/or instant feedback on their answers. This activity using the SMART Board addresses their needs because it allows the class to swiftly go from the lesson to practicing problems of their own, and it allows me to clarify any initial misconceptions or misunderstandings of directions since we are working together.

**Using Knowledge of Students to Inform Teaching and Learning**

Jeffrey H. Shamatha (2004) from the Department of Mathematics and Statistics in Northern Arizona University wrote an article titled “Technology-Supported Mathematics Activities Situated within an Effective Learning Environment Theoretical Framework,” where he addresses how mathematics activities are impacted by the support of technology. Shamatha believes that technology can transform what is possible in the teaching and learning of mathematics through an approach that focuses on reasoning with a variety of representations and the relationships between them. Additionally, Shamatha points out that students can effectively use technology to repeatedly make conjectures, test applications, and evaluate their results (2004).

The information Shamatha presents concords with my reason for using technology for this lesson. The SMART Board helps students and teachers reason concepts relating to solving systems of equations as it is a form of different representation, allowing them to find a relationship between using the graphing method and future methods (substitution and elimination) to solve the systems. A reason I am using the SMART Board for this lesson is because I have had good experiences with asking this group of students to show their work on the board and explain to the class their answer through reasoning. However, in the past, when I have asked students to work a problem out on the board alone, they got nervous and did not speak loud enough or even want to finish the problem, so asking four students to accompany each other and work a different problem out on the board will help get rid of the nervousness and anxiety of getting in front of the class to demonstrate their knowledge. That applies to myself as well because I have experienced anxiety with getting in front of a class alone to demonstrate knowledge about a topic I had barely learned. Had I attempted the same problem along with other classmates, I would have probably had a different experience.

The SMART Board allows me to use knowledge of students’ conceptual understanding as I get to see their work on the board and hear their reasoning afterward, which will help me determine whether students are on track to reaching the learning targets. This also informs me of what I need to teach students next, and what they learned from the initial lesson/activity. Depending on how effective the SMART Board’s use during class was, I will determine whether students would benefit from using it in this type of lesson again.

**Planning Assessment to Monitor and Support Student Learning**

Students will be given a brief introduction of the lesson at the beginning of class, which includes the expectation of them being respectful of each other whether they find the correct answer or not. Therefore, the foundation of the learning environment will be set at the beginning of class. Students will be assigned to work out similar-level problems on the board because they will have just learned how to solve systems of equations on this day. Students will be given more challenging problems according to what level of understanding they demonstrate through their work on this day and on the following couple of days. Students will be asked to help classmates during the lesson without giving out the answer so that they help each other reach the learning targets and develop mutual respect meanwhile.

The assessment will take place on Friday. Students will be assessed on their ability to use the assistance of the SMART Board to solve systems of equations using the graphing method. Students will demonstrate their knowledge by properly plotting the y-intercept and using the slope to create their lines on the SMART Board graph. If students correctly graph the linear equations and identify the answer at the intersection of the lines, then they will be given full points. If they show partial understanding of the concepts, then they will get partial points, and so on.

Students will be assessed on their achievement of the language targets during class when they work on the SMART Board as they correctly label and identify terms and provide the answer in proper form. They will also be assessed on their achievement of the language targets when they explain their reasoning using correct mathematical terms.

Source:

Shamatha, J. H., Peressini, D., & Meymaris, K. (2004). Technology-supported mathematics activities situated within an effective learning environment theoretical framework.*Contemporary Issues in Technology and Teacher Education* [Online serial], *3*(4). Available: <http://www.citejournal.org/vol3/iss4/mathematics/article1.cfm>