When Technology Integration Goes to Math Class

Brenda Dyck

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The math classes from my learning past had a definite cookie cutter appearance - row of desks, small lined scribblers, pencils, textbooks, the teacher at the front - all of this housed within the most predictable of all - a quiet classroom. Math instruction seems to be a subject that is well suited to a traditional teaching format. Due to the logical and sequential nature of this topic, math often attracts teachers whose own thinking and learning style matches the subject. So at a time when other teaching disciplines are branching out to encompass a constructivist style of instruction, full of collaboration and technology integration, many middle and high school math teachers continue to teach their subject using a more teacher-centered approach, much the same way they have for decades.

"The principal goal of education is to create men who are capable of doing new things, not simply of repeating what other generations have done-men who are creative, inventive and discoverers. The second goal of education is to form minds that can be critical, can verify, and not accept everything they are offered; we need pupils who are active, who learn early to find out by themselves, partly by their own spontaneous activity and partly through materials we set up for them; we learn early to tell what is
the power of the Web to push their students’ creative and critical thinking skills, I am noticing many math teachers looking for ways to enhance their curriculum using digital media. Realizing that digital media has the potential to facilitate critical thinking and higher order learning, many of us are looking for math-related online projects and resources that will help our students express what and how they know it and will challenge their thinking skills.

Telecollaborative Projects

"Statistics: A Curiosity Factor" was my first attempt at integrating telecollaborative project work into math class. In the past I had developed a number of Language Arts/Social Studies based telecollaborative projects with the goal of connecting learners in other countries. No one was more convinced than me that shared learning projects could challenge students’ critical thinking skills, engage their interest, and expand their global perspective, while covering curriculum requirements. The question was how could I use this style of instruction in math class? Using the unit on Collecting and Analyzing Data as a jumping off point, I started looking for Internet resources that would add pizzazz to a unit that had, in my class, been traditionally textbook driven. Here I uncovered an abundance of exciting statistics resources that I knew would grab student interest:

- Articles that shed light on how numbers can inform or misinform readers.

- Online surveys that explored hot topics such as Spam and property rights in Cyberspace.

- The Gallup Polls’ web page containing information on how the Gallup Organization uses polls to predict trends and inform the public. This site was loaded with videos examining everything from cloning to those sticky ethical questions that students love to debate.

- An online site that turned student data into a variety of colorful graphs - all by just a click of the mouse.

Visit the Statistics: A Curiosity Factor web site for links to these resources.

Jean Piaget

"I think you should learn, of course, and some days you must learn a great deal. But you should also have days when you allow what is already in you to swell up inside of you until it touches everything. If you never take time for that to happen, then you just accumulate facts, and they begin to rattle around inside you. You can make noise with them, but never really feel anything with them. It's hollow."

From "The Mixed-up Files of Mrs Basil E. Frankweiler" by E.L Konigsburg
An array of sites that provided up to date information on topics that interest all kinds of learners.

Using these resources, students developed a deeper understanding concerning how numbers can lead or mislead, the usefulness of unbiased data, the art of creating a good survey question and how to analyze data and present the results effectively. For examples of this, see the Student Work section of the Statistics: A Curiosity Factor. Without a question, using technology engaged them in a way that textbook graphs and data charts never did. Knowing that their learning would be online for everyone to see encouraged the students to put more effort into their work and to increase their global perspective as schools from Ohio, Florida, Pennsylvania, Texas and Canada joined in to share their survey results with each other.

Nestled within Houghton Mifflin’s Education Place web site I found an enticing online resource called The Data Place. After registering, teachers have access to grade-appropriate collaborative projects in which students collect and work with real data by analyzing and drawing conclusions. Included are teacher’s guides and printable worksheets for data collection and student reflection. Not only do students compare data from their own classrooms, they have access to a data bank containing project results from classrooms from all over the world. The activities were interactive, imaginative and thought-provoking.

Our first encounter with The Data Place came via a project called We’re Just "Winging" It! In this project students made their own paper airplanes, gathered data about how far they flew, compared their results with the class and then using the graphs created on the Data Place web site, compared their results with their peers and other Data Place users from other countries such as Thailand.
As far as the students were concerned, the best part of this project was being able to throw their paper airplanes down the hall. Surprisingly, these enthusiastic data collectors were totally on task and meticulous about measuring the distance their planes flew. Students took their results and, using an online metric converting tool, changed their Canadian metric measurements into the Imperial Measurement system followed in the United States. From here they calculated the mean distances (individually and as a class) and entered their data into The Data Place web site. Everyone was delighted with the colorful graphs that appeared within seconds!

During the following class I hooked up an LCD projector and together with students, we analyzed the graphs and discussed the variables that would have made some airplanes fly further than others. Student thinking was evident as they suggested that flying distances could be affected by differences in size, how airplanes were folded, weight of the paper, unexpected breezes in the hall, direction of breezes, styles of throwing, or the humidity in the air.

As a way of sharing the learning gleaned during the We're Just "Winging" It! activities, I created a web site documenting our day of data collection and analysis. No one enjoyed viewing this more than the students themselves. In their minds, throwing airplanes down the hall, using technology to analyze the learning, and having their math class up on the Web for all to see made for one of the best math classes of the year!
Resources

- Your Nation http://www.your-nation.com/

About the Author:

Brenda Dyck graduated from the University of Calgary with a Bachelor of Education degree and taught a number of years with the Calgary Public Board of Education as well as several private schools in Calgary. After staying home to raise her five children, Brenda returned to the classroom and has spent the past five years developing her newly discovered passion: technology integration and telecollaborative learning.

Brenda is currently teaching at Master's Academy and has also taught at ABC Charter Public School for gifted and talented students. She teaches Math and assists teachers in their efforts to integrate technology into their curriculum specific objectives. Brenda serves as editor of MidLink Magazine and was a finalist in the GSN Online Shared Learning Awards this year.

Email: dyckba@shaw.ca
Meridian: A Middle School Computer Technologies Journal
a service of NC State University, Raleigh, NC
Volume 6, Issue 2, Summer 2003
ISSN 1097 9778
URL: http://www.ncsu.edu/meridian/
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