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The Teacher Model in Singapore: What Matters Most

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- Bill Jackson
Math Teacher, Scarsdale NY

"Learning Must Be Experiential, Participatory, Visual, Communicative and Relevant"
An American Math Teacher's Travel Journal

by Bill Jackson
Singapore
Day 2

Today was the official beginning of the Marshall Cavendish Singapore Mathematics Global Forum 2010. I am participating as one of about 40 delegates from 18 nations that are using Singaporean materials and teaching techniques to teach mathematics, often referred to as "Singapore Math." Today we visited an elementary school and the National Institute of Education (NIE) where teachers are trained.

Visit to the Huamin Primary School

The Huamin (Hwah-meen) School is a typical public school that serves local students in grades 1 through 6. The principal of the school is Mr. Edmund Lim who has also taught courses at the National Institute of education. I was especially happy to meet Mr. Lim because I recently read an American Educator article he co-wrote with Dr. Patsy Wang-Iverson (who also is participating in the forum) entitled "Beyond Singapore Math Textbooks: Focused and Flexible Supports for Teaching and Learning" that examines the many factors that have lead to the success of Singaporean schools, including a focused and rigorous national curriculum, a flexible educational structure that accommodates the needs of individual students, a top-notch teacher preparation system, and a structured system for ongoing teacher training and evaluation.

Huamin School aspires to provide a "holistic education for our children in an engaging and supportive learning environment" by nurturing the "cognitive, holistic, affective and aesthetic, moral, physical and social dimensions of our pupils." In order to achieve this goal, the Huamin School's "niche area" is the visual arts. (Other schools in Singapore have different niche areas such as sports, music, and dance; a fairly recent phenomenon that rose out of a perceived need to develop creativity in Singaporean students and society.)

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At the Huamin School students' colorful artwork and creativity is in evidence everywhere and the school has three large rooms that comprise an extensive art gallery with beautiful paintings, ceramics, and other arts and crafts. There are several art teachers and we received a lesson in ceramics from the ceramics teacher who was introduced by the principal as one of the school's "resident artists." (I couldn't imagine a typical U.S. elementary school devoting so much time, space and effort to the arts, especially in the current "accountability" driven environment.)

We observed two mathematics lessons - a second grade lesson on money and a fifth grade lesson on percent. In the second grade lesson the teacher began by asking the students how they could make certain money amounts such as $4.85. The students came up with many different ways to make up the amounts with coins and "notes" (bills). Next, she showed the students and discussed the different Singaporean coins and bills by projecting them on a screen. Then, she gave pairs of students play money and asked one of them to make different money amounts and the other partner to check the answer. Although there is nothing particularly novel about teaching this way it was a solid lesson and it exemplified the "concrete to pictorial to abstract" approach of Singapore math (Ed Note: see The Daily Riff's "Singapore Math Demystified" to read more about this approach).

In the fifth grade lesson, the students were given newspaper advertisements with pictures of items that had discounts of various percentages and groups of four students worked together to choose 20 items and find the discounted price. Students used calculators to do the calculations, which is common in fifth grade and beyond in Singapore. By the time students get to fifth grade their calculation skills are already solid. Also, in Singapore math the focus is on thinking so tedious calculations (those that cannot be easily done mentally) are done using a calculator. This lesson was also a good example of the emphasis on collaborative group work and real life applications in Singaporean schools.

After the lesson, principal Lim along with the assistant principal and several staff members sat down and talked to us and answered our questions about the school. One thing that struck me was a sixth grade math teacher's comments on the importance of the bar model method for solving problems. He said that he was against parents sending their children to after school tutoring and test-prep centers because there they were learning to use algebra to solve the problems and he felt he had to help students "unlearn" what they had learned. He said that the Singapore bar model method is really simplified algebra presented in a concrete and visual way that students can comprehend and use to solve math problems "without having to know or memorize rules" of algebra which are too abstract for young students. (I couldn't help but think about how the formal teaching of algebra keeps getting pushed lower and lower in U.S. schools and how this is actually having negative results on our students evidenced by the fact that fewer U.S. students are electing to take higher level mathematics courses in high school because they are so turned off to mathematics.)

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Another major emphasis in the school is on ongoing teacher professional development through lesson study where groups of teachers collaborate to study, plan, teach, observe and discuss actual classroom lessons. Lesson study is helping the teachers at the Huamin School to "not just enact the curriculum but experience it." It also has fostered increased collaboration among the teachers.

Visit to the National Institute of Education

The National Institute of Education (NIE) is the only school of education in Singapore and all Singaporean teachers receive their pre-service training as well as continuing education there. It is part of the much larger Nanyang Technological University. The NIE has received accolades from educators around the world for the innovative and effectual way they train Singaporean teachers. In fact, we were shown a short video that included comments by noted Stamford University professor Linda Darling Hammond about how the NIE is an example to the world of excellence in teacher training. (In her book The Flat World and Education: How America's Commitment to Equity Will Determine Our Future, Dr. Hammond points to Singapore's highly effective education system as a model for systemic educational improvement in the U.S.) The NIE graduates about 2400 teachers per year. At the NIE, mathematicians, mathematics educators, and mathematics teachers all work together to train and develop future and present teachers. This type of collaboration is not the norm. (In the U.S. for example, mathematicians are usually housed in a separate department from mathematics education professors and they rarely collaborate.) We received talks by NIE professors about teacher preparation in Singapore, which I will summarize below.

Teacher Model for the 21st Century

In today's highly technological and globalized society, children learn differently. This new type of learner requires new teaching approaches. *Learning must be experiential, participatory, visual, communicative and relevant.* In order to accomplish this, Singapore has developed a "Teacher Model for the 21st Century" which emphasizes holistic learning, linking theory to practice, developing new and innovative teaching methods, developing effective and formative assessment and evaluation practices, and Information Technology (IT). At the NIE theory is always connected to practice so they work closely with the Ministry of Education and schools to develop teachers that have an "expert knowledge" of mathematical content, problem-based teaching methods, and how children learn mathematics.

Training math teachers is a challenge because many people are "math-phobic," and often teachers don't like to teach math. If teachers believe that they are not good at math, or if they don't enjoy math themselves, they will pass this negative attitude to their students. So the first thing that needs to be addressed in order to develop good math teachers is their attitude towards mathematics. This is accomplished in various ways. For example, professors will use the concrete, pictorial, abstract approach themselves to teach prospective teachers. Since this approach is fun, relevant and meaningful, the university students begin to enjoy mathematics. They also solve many problems using the bar model method. When teachers see that they are able to solve very difficult problems in a visual, easy to understand way, they develop confidence in their mathematical abilities and are not afraid to progress to attempting more complex and non-routine problems. There is also an increased emphasis on developing professional learning communities and Singaporean teachers are increasingly given collaborative learning opportunities such as lesson study.

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There are many more things that we learned at the NIE but it will suffice to say that Singapore is committed to and serious about training and continually developing the best teachers in the world and the Ministry of Education is investing unprecedented amounts of money in this effort, recently approving $150 billion for the NIE over a 10-year period just to conduct research into effective teaching practices. Numerous research studies point to why developing good teachers should be our priority, how effective teachers improve student learning, and the devastating effect that ineffective teachers have on students (many a parent can relate to this). I believe that the carrot and stick approach of rewarding "good teachers" and punishing "bad ones" that we are increasingly moving towards in the U.S. will not guarantee good teachers. Good teachers need quality training and this requires serious commitment and investment. The question is whether we are willing to make this commitment and investment. If not, the quality of teachers and teaching in the U.S. will only get worse.

Until next time,

Bill Jackson

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Link to Day 1 - Part 1 Singapore: Five Surprises in Education"
Link to Day 1 - Part 2 - "The Professional Lives of Teachers in Singapore"
Link to Day 2 - "The Teacher Model In Singapore: What Matters Most"
Link to Day 3 - "The Creativity & Critical Thinking Initiative"

For more on Jackson's Travel Journal to Japan:
Day 1 & 2: Link - HERE "What American Teachers Can Learn From Japan"
Day 3 & 4: Link Here - "A More Global Perspective On Teacher Assessment and Development"
Day 5: Link Here - Developing Creative Talents, Not Just Academic Skills
Day 6: Link Here - "Less Is More"
Day 7 & 8 - Part 1: Link Here - "Teaching For Students. Sounds Obvious. Not."
Day 7 & 8 - Part 2: Link Here - "Teachers Walking The Talk"

Bill Jackson is Scarsdale NY Math Helping teacher and author of the exclusive series featured in The Daily Riff, "Singapore Math Demystified!", along with his "Travel Journal" series about teaching and learning in Japan.

(Editor's Note: *Singapore is notable for their outstanding Math scores (here and here) internationally. Yet the lessons and Singaporean practices learned and shared by American Math teacher Bill Jackson during this past week's trip to Singapore, not only surprises(!) but also may seem extremely counter-intuitive to what we Americans may think about the seemingly more "Math-centric" cultures -- that produce this achievement. Not the sweat-shop robotrons we often encounter in stereotypical depictions, we find concepts such as constructivism and emotional learning of high value.)*

Tags: 21st Century education, 21st Century learning, 21st Century teaching, better teachers, engaging students to learn, experiential learning, Flat World and Education, formative assessments, global learning, good schools, great teachers, holistic learning, IT, Japan, learning math, lesson study, Linda Hammond Darling, participatory learning, Singapore, Singapore Math, teaching math, technology, technology in education, training teachers, visual learning, what makes a great school, what makes a great teacher