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Lawmakers seek Singapore's help on how to best teach math



By Lisa Schencker
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Yeap Ban Har, a professor at the National Institute of Education in Singapore, explained to Utah lawmakers and educators Thursday how Singapore - a country with only 4.6 million residents and few natural resources - has managed to create the world's top math students.

Singaporean eighth-graders scored first in the world in math on the Trends in International Mathematics and Science Study in 2003. Nine countries' students outperformed U.S. eighth-graders in the study. That ranking sparked concern nationwide

about how the U.S. will remain competitive in the global economy. When Utah revised its math curriculum last year, the name Singapore rolled off lawmakers' tongues as they wondered how the small country did it.

"We only have one resource - our children - so education is the most important thing for us," Ban Har said. "If we don't do well in that area, then economically we are a doomed country."

Since 1992, math students in Singapore have been encouraged to think visually and do math in their heads. They're discouraged from using paper to compute math problems, Ban Har said.

For example, if a student is asked to multiply 1.99 times 6, the student is encouraged to round 1.99 up to 2, multiply that by six and then subtract .06 - all in their heads.

Students use calculators for more complex numbers. Singapore schools stress the importance of mental strategies versus number crunching.

"When they do not have a calculator they are not allowed to do tedious calculation," Ban Har said. "That will frustrate them and make them hate mathematics."

The country largely takes a less-is-more approach. They'll teach students how to find the area of a rectangle but leave it up to students to figure out how to use that knowledge to calculate the area of a trapezoid, rather than giving them more formulas.

Singapore schools focus mostly on math and English until third grade at the expense of other subjects such as science, he said.

Singapore's entire educational system is very different from America's in many ways. Students take tests in certain grades to determine which schools they'll go to next. Singapore schools also don't offer special education. Students have to go to special schools outside the regular education system for that. Still, Utah lawmakers and education leaders said Singapore might have some lessons for Utah to consider the next time the state revamps its math standards.

"You see the winning team or the winning strategy and you want to borrow ideas from it," said State Superintendent Patti Harrington, whose office arranged Ban Har's visit. "Our kids will be competing against kids from Singapore."

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Singaporean math

Example 1

* **Question:** From January to August last year, Mr. Tang sold an average of 4.5 cars per month. He did not sell any cars in the next months of the year. On average, how many cars did he sell per month last year?

* **Process and answer:** Sixth-graders are expected to solve this problem in their heads. First, January to August is eight months. Next, double 4.5 to nine so it's easier to work with and represents two months. There were four, two-month periods during the time he sold cars, so four times nine is 36. There are 12 months a year. Thirty-six divided by 12 is 3. Mr. Tang sold an average of three cars a month.

Example 2

* **Question:** David and Michael drove from Town A to Town B at different speeds. Both did not change their speeds throughout their journey. David started his journey 30 minutes earlier than Michael. However, Michael reached Town B 50 minutes earlier than David. When Michael reached Town B, David had travelled four-fifths of the journey and was 75 km away from Town B. What is the distance between Town A and Town B?

* **Process and answer:** A sixth-grader would be expected to solve this through visualization. Students should visualize five parts. If David traveled four-fifths of the journey and was 75 km away from Town B, then one-fifth of the journey equals 75 km. Seventy-five times five is 375. The answer is 375 km.



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