Identifying great teachers

The Atlantic magazine, in its January/February 2010 issue, delved into the makeup of great teachers by focusing on the selection process for the Teach for America program; because, as the article “What Makes a Great Teacher?” states, a key finding of education research in the past decade is that the quality of teachers matters most.

After 20 years of experimentation by Teach for America, a nonprofit that recruits college graduates to spend two years teaching in low-income schools, the program’s results are specific and surprising (read “Teaching as Leadership” by Stephen Farr and Teach for America for more information).

The most successful teachers in Teach for America frequently checked for understanding with their students. However, it should be noted that simply asking “does anyone have any questions?” does not constitute a “check for understanding.” Instead, teachers had processes for randomly calling on students individually (also see Page 1, “NCTM: How to ask good questions”). They also continually looked for ways to improve their effectiveness and constantly re-evaluated what they were doing. The teachers who had a history of perseverance in life, showed “leadership achievement” in college and reported they were content with their lives during the testing process had much more success as well.

Over the past year, President Barack Obama and his education secretary have been focusing on great teaching. Their Race to the Top program entices states with money and asks them to make radical changes in order to identify great teachers, figure out how they got that way and then create more of them (see Page 5 for an article on Nebraska and Race to the Top). In short, teachers matter. To read the full article in The Atlantic, visit: http://www.theatlantic.com/magazine/archive/2010/01/what-makes-a-great-teacher/7841

In this Issue:
- Identifying great teachers . . . . . . . . . . . . . . . . . . . . . . . . . . Page 1
- NCTM: How to Ask Good Questions . . . . . . . . Pages 1, 5
- Math Challenge Corner . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Page 2
- Resources: WestEd . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Page 2
- Minding the Excellence Gap . . . . . . . . . . . . . . . . . . . . . . . . . . . . Page 3
- Build your skill set through NMSSSI . . . . . . . . . . . . . . . . . . . . . Page 3
- NebraskaMATH Summer Calendar . . . . . . . . . . . . . . . . . . . . . . Page 4
- Achieve report shows shift in education reform . . . . . . . . . . . . . . . Page 4
- All teachers fired at Rhode Island high school . . . . . . . . . . . . . . Page 4
- Nebraska performs poorly in Race to the Top . . . . Page 5

NCTM: How to ask good questions

NCTM recently ran a series of articles in their newsletters offering advice on how to pose good questions in the classroom that prompt student thinking and discussions. We think the information shared in these articles is worth repeating in the NebraskaMATH newsletter. So, whether you missed the information in the NCTM newsletter, or would benefit from a refresher, here are some of the highlights as cited by NCTM on quality questioning strategies.

NCTM: As a teacher, you probably spend a lot of time preparing engaging lessons, grading student work, and attending professional development. But, do you take the time to think about the questions you are asking your students? Do you pay particular attention to what they are asking you? Asking good questions and promoting discourse is an integral part of the teaching and learning in a classroom. It is worth your time! See some tips below on how to get started:

Observe another teacher. Pay particular attention to the questions the teacher asks the class and also individual students. Were the questions effective? How can you tell? Did the questions result in single answers or explanations from the students? Were you able to tell if the students had

Continued on Page 5
Math Challenge Corner

The Game of Bridg-It
Featuring the work of Sandy Dean (Elwood, Nebraska)

Bridg-It, originally referred to as “Game of Gale”, is a simple connection board game created in the 1960s by Berkeley mathematician David Gale and has some fascinating connections to the mathematical field of Graph Theory. It is a two-player game in which the game board consists of two rectangular arrays of dots, one array for each player, distinguished by color.

The players move by alternately connecting two dots within their array to form a line or bridge. The objective for each player is to build a bridge which spans the width of the board (one player in the vertical direction, the other in the horizontal direction). Players take turns connecting two adjacent dots on their array (as indicated by color) observing two stipulations: (1) bridges are always placed either vertically or horizontally (not in a diagonal fashion), and (2) a newly formed bridge cannot cross an existing bridge. The first player to form a bridge connecting opposite edges of the game board, wins (see picture - the “blue” player wins).

Playing the game leads to some interesting questions: Is there always a player which wins this game? Is there a strategy which always results in a player winning? What does Bridg-It have to do with “circuits” and “cycles” and “disjoint spanning trees”? How can I introduce the game in my classroom?

To answer these questions and more (including a ready-to-go worksheet for classroom use), read Sandy Dean’s paper at http://scimath.unl.edu/MIM/mat.php. Sandy earned an MAT degree from UNL through the Math in the Middle program in 2008.

Resources

Utilize WestEd’s Web site

WestEd, a research, development and service agency, works with education and other communities to promote excellence, achieve equity and improve learning for children, youth and young adults. WestEd is a nonprofit, public research and development agency, authorized by a California Joint Powers Agreement and governed by public entities in Arizona, California, Nevada, and Utah, with board members representing agencies from these states and nationally.

The following are three areas currently featured on its Web site:

Math Pathways & Pitfalls, K-8 intervention curriculum, is founded on core principles for how children learn mathematics and a vision of rigorous and equitable academic achievement.

- Use with the core curriculum or after-school, intersession, and resource programs
- Address key number and numeration standards (with algebraic reasoning)
- Foster academic language development
http://www.wested.org/cs/mpp/print/docs/mpp/home.html

School Turnaround Center: WestEd partners with districts nationwide to provide comprehensive school turnaround and transformation services leading to rapid improvement in low-performing schools.
http://www.wested.org/cs/schturn/print/docs/schturn/home.htm

Doing What Works (DWW): DWW offers prevention, implementation, and schoolwide strategies to reduce behavior problems that prevent elementary school students from engaging in instruction. The five recommended practices discussed are:

- Describe Behavior
- Modify Environment
- Teach Skills
- Collaborative Relationships
- Schoolwide Approach

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Minding the ‘Excellence Gap’

Has a focus on students’ minimum competency come at a price? The “Mind the (Other) Gap: The Growing Excellence Gap in K-12 Education” report, released in February, reviewed national and state assessment data through 2007 for the existence of “excellence gaps,” differences between subgroups of students performing at the highest levels of achievement.

Students scoring at “advanced” proficiency levels show gaps among the expected subgroups: racial, SES, gender and ELL. While gaps at the “basic” proficiency levels (focus of No Child Left Behind Act “NCLB”) are shrinking slowly, gaps at the upper end are not, except when top student performance is declining.

On the Web site for the Center for Science, Mathematics & Computer Education (scimath.unl.edu), you will find excerpts from the full report, summarizing the important points. While NCLB policymakers hoped “a rising tide raises all boats,” the data do not support this consistently; shrinking the gap surrounding basic proficiency does not correlate with shrinking the gap surrounding advanced achievement.

Nebraska’s results can be broken down as follows:

- NAEP proficiency level and percentile data demonstrate the existence of substantial excellence gaps for Black, Hispanic, and Free and Reduced Lunch Eligible (FRL) students. White students had higher average AP scores than Black and Hispanic students on AP tests and were more likely to make a “5” on an AP exam (weighted by enrollment) or take an AP exam.

- According to NAEP proficiency data, the percentage of students at the advanced level increased in Math across subgroups, with non-FRL and white students improving more rapidly than their peers. There was relative stability in Reading, with a decline in performance among Black students in Grade 4 and an improvement in Grade 8 as the only noticeable changes.

- NAEP scale scores at the 90th percentile increased for FRL, non-FRL, and white students in Math, with additional gains by Hispanic students in Grade 8 Math and both grades of Reading, Black students in Reading Grade 8, and white students in Reading Grade 4. The excellence gap for Black students increased considerably due to declines in performance in Math Grade 8 and Reading Grade 4, with Hispanic students also trailing in Math as well as FRL students in Grade 8 (both subjects). The gaps in math narrowed for Hispanic students in both grades and for Black students in Grade 8 on stable performance among white students.

- On the AP exams, there was a modest decrease in the gap between white and African American students and between white and Hispanic students in mean AP scores. There were also decreases in achievement gaps as measured by the percentage of tests that scored a 5, but the gaps in the number of tests taken widened during the same period.

To read the full report of “Mind the (Other) Gap: The Growing Excellence Gap in K-12 Education,” see http://scimath.unl.edu

Build your skill set this summer

Through the Nebraska Math & Science Summer Institutes (NMSSI), UNL is offering professional development and graduate coursework for Nebraska’s K-12 teachers of mathematics and science. There are 25 courses from which to choose, offered both in Lincoln and five other locations across the state. Registration is now open and fellowships are available! For information and course descriptions, please visit: scimath.unl.edu/nmssi
After a school district in Rhode Island failed to reach an agreement with the teachers’ union on a plan for the Central Falls High School teachers to spend more time with students to improve test scores, the school board voted in February to fire all of the school’s 74 classroom teachers and 19 others. The firings will be effective at the end of this school year. Of the 800 students, 65 percent are Hispanic. Half the students are failing every subject, with only 7 percent proficient in math, officials said.

Some of the changes requested by Central Falls district superintendent Frances Gallo included lengthening the school day by 25 minutes, tutoring students for one hour outside of school time each week, and meeting for 90 minutes during school time to discuss educational issues. The teachers’ union wanted compensation for the extra hours of work, and the two sides could not agree on a pay rate. For some of the extra work, Gallo would have paid $30 an hour from a federal grant, but the teachers’ union pushed for $90 an hour.

Achieve report shows shift in education reform

Achieve, an education reform organization based in Washington, D.C., released its fifth annual “Closing the Expectations Gap” report on March 1. The reports shows that in the five years since the National Governors Association and Achieve co-sponsored the National Education Summit on high schools, the number of states who have aligned their high school graduation requirements with college and career readiness has increased rapidly. Achieve stated that such change can be attributed largely to state leadership.

Some highlights of the report’s findings are as follows:
- Standards: In 2005, three states had end of high school standards aligned with demands of college and career. Today, 31 states have such standards in English and mathematics.
- Graduation Requirements: Today, 20 states and D.C. require all students to complete a curriculum to earn a high school diploma, compared to just three states in 2005.
- Assessments: Today, 14 states have such assessment exams, compared to three states in 2005.
- Accountability: In 2005, no state had a comprehensive reporting and accountability system that valued college and career readiness. Today, 22 states have incorporated at least one of four indicators that Achieve has identified as critical to promoting post-graduation readiness. One state has incorporated all four indicators.

The Common Core State Standards Initiative will help to accelerate this college- and career-ready agenda.
Nebraska performs poorly in Race to Top

The results are in after the first round of applications for Race to the Top grant funding, and Nebraska did not fare well. Nebraska scored third to last among 40 states and the District of Columbia.

This major federal education grant awards money to as many as 15 states after the second round of competition, enticing states to adopt President Obama’s education agenda. States are vying for $4.3 billion, with the potential for more funding in fiscal 2011.

Nebraska Education Commissioner Roger Breed told the Omaha World-Herald that his department will have to “step back from our initial disappointment” and determine whether to enter the second round. States that lost can apply again June 1.

Nebraska scored 247.4 out of 500 possible points. Judges looked at a state’s track record in improving student achievement and future plans to implement the reforms.

Nebraska lost points for its lack of a law authorizing charter schools, its apparent lack of authority or will to employ drastic interventions when schools are failing, and what one judge described as the state’s “mixed performance” in improving student test scores, according to the World-Herald.

Nebraska scored just 0.8 points out of a possible 40 for ensuring successful conditions for high-performing charter schools and other education innovations.

Breed said Nebraska officials have debated whether the state has authority to launch drastic interventions under current state law. The state’s track record, he said, is to use state aid to help struggling schools rather than intervening.

In Nebraska, 218 of the state’s 253 school districts, enrolling 95 percent of the state’s students, signed on to the application. Delaware and Tennessee finished first and second. Delaware, which scored 454.6 points, will receive about $100 million for its overhaul plans over the next four years. Tennessee, with 444.2 points, will receive about $500 million.

To read the full article, go to: http://www.omaha.com/article/20100330/NEWS01/703309879

From Page 1

true understanding of the mathematical topics? What kind of questions would you suggest to the teacher?

Reflect on the questions that you pose in your own classroom. Use the technique of Question-Listen-Question. Get an audio recorder, and record yourself teaching. When reviewing the conversation, concentrate on the interaction after you pose a question as a means to evaluate whether your questions promote deeper mathematical thinking. Do your questions prompt students to develop deeper understanding or to get them to a desired answer? Is the student learning from the series of questions? Listen to students’ responses and guide them based on what they are thinking.

Ask questions that assess the students’ learning. Try Think-Pair-Share. Call on students by name to invite them to contribute. These questions are not, “Do we all get it?” or, “Does anyone have any questions?” Rather, these questions must give the learners an opportunity to communicate their reasoning process – why they chose a particular method and how their choices made sense. One way to encourage students to contribute to the discussion is to use the think-pair-share method. First, allow students to think alone about their solutions. Then, allow them to talk through their ideas with a partner. Next, ask two pairs of students to share their ideas with each other. Last, facilitate a whole-class discussion.

Identify, in advance, the big ideas that your lesson examines and the mathematical outcomes that students should achieve. Take time to brainstorm the multiple approaches that could be taken to work through similar problems and the misconceptions that students might have. Close each lesson with a summarizing question that reiterates the big ideas.

Use Fermi questions in your classroom to encourage multiple approaches, emphasize process rather than product, and promote non-traditional problem-solving strategies. Fermi questions are unexpected questions about the natural world whose answers are rough quantitative estimations. For example, you might ask your class, “How many drops of water are in Lake Erie?”

For more of these Part I exercises and to see Part II, go to: http://www.nctm.org/resources/content.aspx?id=25149