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# "Best Practice" in the Classroom: Teaching Poetry and Mathematics

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For the last twenty years, reading teachers have been torn between two conflicting approaches to teaching: phonics and whole language. Politicians, publishers, parents, professional organizations and preachers have expressed strong views regarding which approach was the more desirable. What eventually evolved is a research based approach often referred to as "best practice" resulting in the Standards Movement of the 1990s.

In *Best Practice: New Standards for Teaching and Learning in America's Schools 2nd ed.*, Zemelman, Daniels and Hyde discuss what research indicates are desirable classroom practices. These practices include:

> Reading means getting meaning from print.... Reading is a process. An active, constructive, creative, higher-order thinking activity that involves distinctive cognitive strategies before, during, and after read ing.... An effective reading program ex poses students to a wide and rich array of print and goes beyond the use of the basal. (30-31)

The concepts of "best practice" are not limited to language arts instruction, however. The basic research framework addresses how children best learn, and is applicable across the curriculum, therefore making the integrated or interdisciplinary curriculum feasible.

In *Classrooms That Work: They Can All Read and Write* (2003), Cunningham and Allington, well known for their advocacy of the 4 Blocks Approach to reading and writing, advocate including content reading, or reading for knowledge, into the primary grades.

In school after school, in which the primary emphasis in grades K-3 is on skills,

> children perform adequately on standardized tests through the second or third grade and then show steady declines from fourth grade on. Teachers from fourth grade on are supposed to try to teach the knowledge subjects such as science and social studies. They often find, however, that even their average students cannot read the textbooks or can read the words but do not understand what they are reading. Children who can read the words but cannot understand what they arereading are not really readin.(174).

Cunningham and Allington advocate making "informational resources the centerpiece of your instruction" noting that they promote vocabulary development, develop background knowledge, help develop critical thinking skills, and reduce the "fragmented curriculum day by creating links to math, science, and social studies." They continue:

> The difficulty children experience reading their content-area textbooks can be partially traced to the fact that they have spent most of their time learning how to read stories.... When presented with a story problem that requires them to decide which operations to perform on which numbers, however, their mathematics abilities are abysmal. (185)

They warn that "children who cannot apply their reading, writing, and math skills to real-world situations are not being educated to succeed beyond the walls of their classrooms."

Just how dire is the problem? Nell Duke of MSU (2000) conducted a major research study to investigate just how much information text is available to children in 20 first grade classrooms over a period of four full days. Her investigation included observing in the classrooms, writing examples modeled, wall displays, categorizing books in classroom libraries, and teacher interviews. She found that on average 3.6 minutes per day were spent in some way dealing with informational text. 9.8

percent of the classroom library books and 2.6 percent of the displayed text were informational in high SES schools. In low SES schools, 1.9 minutes per day were spent dealing with informational text with 6.9 percent of the classroom library books and 1.5 percent of the displayed text were primarily informational.

Current cognitive research applies to content areas other than reading. In mathematics, for example, Zemelman, Daniels, and Hyde, comment that "Mathematics is not a set of isolated topics, but rather an integrated whole. Mathematics is the science of patterns and relationships" and an emphasis should be on problem solving. Yet, classroom teachers are busy people, and there is little time to search out and develop creative curriculum that integrates the acquisition of knowledge while still promoting problem solving skills and comprehension.

Greg Tang's creative books engage even the most reluctant readers with poetry, illustrations, and mathematics. His books promote reading as a "constructive, creative, higher-order thinking activity that involves distinctive cognitive strategies before, during, and after reading." According to Tang, "I don't consider myself a writer. I'm a math guy."

This self-proclaimed math guy uses poetry and children's literature as a way to help children learn mathematics and reading while serving as an example of "best practice in the classroom." His books are informative as well as entertaining. They teach reading and mathematics without the typical format of textbooks. Tang states that his main goals for students are: 1. "Be open-minded." 2. "Think strategically." 3. "Use a variety of skills when solving problems." 4. "Organize information by identifying patterns and symmetries."

All are examples of "best practice." In order to help students develop these cognitive strategies, he presents mathematical problems in poetry format. These poems are enhanced by brightly colored pictures, which invite readers to integrate pictures and poems to solve math problems. Thus a visual cueing system is combined with pragmatics, higher order thinking skills with problem solving and children are invited to construct meaning.

**Be Open-minded**

Tang explains that by reading his books, "Children will learn to look beyond the obvious in search of smarter solutions." Being "open-minded" means using creative problem solving. It means looking at problems in different ways and using a wide variety of methods to solve problems. Tang's primary method of helping students become "open-minded" is to give them visual and verbal clues. These clues guide students to look at problem solving in non-traditional ways. For example, in *Math for All Seasons*, the poem "Amazing Grain" states:

**This self-proclaimed math guy uses poetry and children's literature as a way to help children learn mathematics and reading while serving as an example of "best practice in the classroom."**

This type of corn is far from plain,
In fact it's wild for a grain.

Brown and gold and sometimes blue,
Even red and purple too!

Can you count each colored ear?
A smart approach is very clear.

Please consider many ways,
Then add across to solve this maize!

On the page opposite this poem is a picture of 15 ears of corn. The corn is positioned in groups of one or two. These groups are lined up in three rows. While many beginning students may attempt to count each ear of corn one by one, Tang's hint at the end of the poem suggests that children think of different ways to look at the problem. This includes looking at the three rows. Each row has 5 ears of

corn, so students can quickly add 5 three times (5 + 5 + 5) to get the final answer of 15.

Another way Tang teaches children to be "open-minded" is to use a cueing system such as looking at pictures to decode unknown words. In *Grapes of Math*, there is a line which says "A sticky tongue right on your back, Soon you're just a tasty snack!" The word "tongue" may be a challenge for students to read. If they are creative problem solvers when attempting this difficult word, they can look at the illustration of a frog with his "sticky tongue" hanging out of his mouth. This aids them in decoding the unknown word. Tang encourages students to be "open-minded" when they come across problems, whether they are in mathematics or reading.

In *Mathterpieces*, Tang models creativity for children by integrating poetry, art, and mathematics. Each poem and mathematical problem in this book is based upon a famous work of art. Students may recognize a reproduction such as Vincent van Gogh's *The Starry Night* and read the following poem, "Star Power":

See the nighttime all aglow?
It's the vision of van Gogh!
Bright exploding, swirling stars,
Cosmic forces from afar.
Can you group the stars in heaven?
Find four ways to make a 7!

The students then count up groups of stars modeled after the stars in van Gogh's work. Each page contains a reproduction of a famous work of art, a poem, the mathematical problem, the title and date of the painting, the name of the artist, and the style or period of the work of art. At the end of the book is an "Art Notes" section which briefly describes each of the styles or periods included in the book. By incorporating these elements, Tang promotes creative problem solving.

**"Strategic Thinking"**

Tang's second goal for students is to "think strategically." Tang wants students to be efficient in their problem solving. One method Tang suggests in order for children to "think strategically" is to find convenient sums which make adding easier. For example, students may readily know that 8 plus 2 equals 10 because they are accustomed to using the base 10 number system. Conversely, when adding 7 plus 6 children may have to use an inefficient method such as counting on their fingers, because 13 is a less convenient sum than 10. To solve this problem "strategically" children can break 6 into 3 + 3. Then they can add 7 plus 3 to get 10, and add 3 more to get the final answer of 13.

A second method of "strategic thinking" is introduced in Tang's only book about multiplication, *The Best of Times*. On the page that teaches students to strategically multiply by five, the poem "Five Alive" reads

Five will yield the right amount
if by 5's you always count.
Or else just multiply by 10,
Half will get you there again!

Most children learn at an early age to count by fives. However, in a problem such as the challenge problem given on this page (48 x 5), counting by fives would take a long time; there is also a significant possibility for error. If students use the hint given at the end of the poem and multiply 48 x 10 they get 480. They can then divide 480 in half to get the desired answer of 240. Rather than using rote memorization, Tang wants children to understand why multiplication works the way it does.

**Using "Timesaving Methods"**

The primary "timesaving method" Tang utilizes in his books is "subtracting to add." This goal is repeated in six out of his seven books. For example, on the Halloween themed page "Scary Squash" in *Math for All Seasons*, children are asked to count the number of jack-o'-lanterns with faces. There are 10 jack-o'-lanterns all together, but 2 of them do not have face.

Instead of counting the 8 faces one by one and skipping over the ones without faces, Tang

encourages students to "Add the pumpkins, every one, Subtract the plain ones and be done!" This way students add up all 10 pumpkins and subtract 2 to get 8. Tang encourages students to focus on the heart of the problem and the fundamental processes of mathematics instead of performing rote steps during problem solving.

**Patterns and Symmetries**

Tang's final goal for students is to "simplify problems by looking for patterns and symmetries." Tang models this in his poetry. His poems generally have 6 or 8 lines and follow a consistent rhyme scheme, which is demonstrated in the example, "Flowery Attire":

Flowers try to look their best,
They're always very smartly dressed.

They add such color to a scene,
While other plants wear only green.

How many petals do you see?
It helps to think of symmetry.

Instead of counting every one,
Double twice and you'll be done!

This poem illustrates how Tang integrates the pattern of a rhyme scheme with teaching children symmetry in mathematical problem solving. This poem is accompanied by a picture of a flower with a symmetric design of petals. Students may attempt to count each petal of this flower one at a time. However, Tang gives a problem-solving and time-saving hint by suggesting that students look for symmetry. In mathematics, symmetry occurs when an image can be folded in half along a line and the two sides are exactly the same. Even students who do not know what the word "symmetry" means can read on to the next line. This line directs children to look for a way to "double twice". This is equivalent to finding two lines of symmetry.

Finding patterns is also a useful skill for students who are learning both reading and mathematics. When reading, students can see patterns in words such as "-ing" or words ending in "y" or "ly." They can use this method to quickly add more words to their knowledge base. Students can use "chunking" to see patterns of repeated syllables. Furthermore, students can see the pattern of the words and sounds of the rhyme scheme to help them recognize words.

**Advantages**

Tang's books are accessible to students of different reading levels and various learning styles. For struggling readers, the creatively illustrated pictures can help students comprehend the text. Also, the structure of the poems is textually redundant. The rhythm and rhyme of Tang's poems facilitate reading. Poems are written in a predictable format: 6 to 8 lines with a rhyme scheme of AA BB CC DD. In several of the books, the line of the poem in which the question is asked is printed in a different color font. This illustrates for children which line is the mathematical problem.

Tang's books appeal to different age groups. Students can choose simpler or more advanced books based upon their reading and mathematical levels. The mathematical topics in Tang's books range from simple skip-counting to addition to multiplication of large numbers. For example, in *Math for All Seasons*, which focuses on younger readers, children are asked to work with numbers only as large as 15. The poems are also simpler. They are comprised of words which children can decode by chunking or using illustrations. Some of the more advanced mathematics are included in *The Best of Times*. An example of a challenge problem is 9 x 34 . When memorizing multiplication tables, students often only learn up to 9 x 9 or 9 x 12. Tang's methods teach students to multiply much larger numbers efficiently. Even those who already know how to count, add, and multiply can benefit from reading Tang's helpful hints and strategies.

**Summary /Conclusion**

Rather than rote learning, Tang urges teachers to help students become active problem solvers, to comprehend the essence of what they are learning, and to internalize that process. The strategies he proposes can be used in language arts, as well as mathematics and other content areas. The recognition of patterns, creative problem solving, strategic thinking, and time-saving methods are valuable in every subject. Tang's creative approach utilizing poetry and mathematics models this. Tang's books are enjoyable and useful for both teachers and students.

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