



Julie E. Young

Hays Consolidated Independent School District, TX

Why are we reading a book during math time?: How mathematics and literature relate

The students' resistance to math occurred daily during the beginning of my first year of teaching. At the beginning of the school year, I observed my students' math skills and how often they were asking where and how we use math. Noticing that the students asked these questions frequently, I thought my students did not understand the importance of math. This frustrated me because I love math. Math was my favorite time of the day, and I wanted it to be my students' favorite time, too. I realized my students loved reading, thus I decided to see what the benefits of connecting literature and mathematics to a student's everyday appreciation and application of math might be.

"Oh no! It's time for math," Michael yells at the beginning of math class. Then Rebecca asks, "Ms. Young, can't we just read instead? Math is boring." I answer by telling her we just finished reading for half an hour, and math may seem boring, but it won't be today. Another child states, "Why do we need to know how to do math anyway? We never use it outside of school." I explain they do use math outside of school, and as a class, we brainstorm about where.

relationships, classifications, and problem solving. Ezell (1997) points out the strong similarities between mathematics and literature, both in structure and in content.

Using literature to help teach mathematics deepens children's understanding in numerous ways. When we read stories to children, we not only entertain them, but we also engage them in mathematical tasks, such as problem solving and reasoning. This experience boosts their confidence and develops positive attitudes toward math (Thiessen, Matthias, and Smith, 1998). Furthermore, children's literature provides students with a human perspective about mathematics. Whitin and Wilde (1995) point out that "through stories children see people putting mathematics to good use" (p. x). For example, the following poem, "Take a Number" from **Marvelous Math: A Book of Poems**, (Hopkins, 1997) shows the children that math surrounds us.

Stories carry mathematical concepts. Unless children have stories that reinforce those con-

RELATED LITERATURE

One of the best ways for educators to promote mathematics is to integrate it with literature. Mathematics and literature have numerous common bonds. They both order the world around us. Mathematics and literature both involve patterns,

cepts, they truly do not understand those concepts. If we teach children mathematics through literature, the stories they remember hearing will help them understand the math concept. After all, children's literature "helps portray mathematics as it really is: a tool for helping us tell the stories of our lives" (Whitin and Wilde, 1995, p. ix).

Imagine a world
Without mathematics:
No rulers or scales,
No inches or feet,
No dates or numbers
On house or street,
No prices or weights,
No determining heights,
No hours running through
Days or Nights.
No zero, no birthdays,
No way to subtract
All of the guesswork
Surrounding the fact.
No sizes for shoes,
Or suit or hat . . .
Wouldn't it be awful
To live like that?

RESEARCH QUESTIONS

Based on the review of the related literature, I implemented a teacher inquiry project based on the following question: What are the benefits of connecting mathematics and literature to a student's everyday appreciation and application of math? More specifically, I addressed the following subquestions:

1. How do students become aware of everyday math applications in their journals?
2. How do students relate literature to math skills?
3. How do students connect math skills to everyday needs?
4. How does using literature make math more enjoyable for students?

METHODS AND PROCEDURES

I conducted this teacher inquiry project at Dahlstrom Intermediate School in Hays Consolidated Independent School District. Dahlstrom Intermediate houses approximately 736 students in grades four through six, where approximately 36% of the students come from low socioeconomic backgrounds. I conducted this project in a fourth-grade classroom containing twenty-two

students (eleven girls and eleven boys). Of the twenty-two students, one received special education services, and one was identified with ADHD.

I conducted this inquiry project during the spring semester. I first asked my students to complete two surveys—an occupation survey, where students checked off which careers they think use math, and a math interest inventory), where students answered questions about their liking of and thinking about math. Upon completing these surveys, and before starting the research, my students and I read from three different books—**Math Curse** (Scieszka, 1995), **Math in a Bath (and Other Fun Places, Too!)** (Atherlay, 1995), and **Marvelous Math: A Book of Poems** (Hopkins, 1997). We read for the purpose of identifying the times and the places we use math. After we finished reading, we had a discussion as to where the students discovered math being used.

At the beginning of math class everyday, I asked the students to look for a math skill that today's book mentions or points out. (The skill mentioned was not always obvious!) Then, I read the students a picture book that went along with that day's math lesson. After reading, we would do an activity that involved that skill and work sample problems. Once the lesson was completed, students worked teacher-created problems which covered that day's lesson plus review problems from previous lessons in their math journals. At that time, students took out their 3 x 5 index card labeled with their name, date, and week number in the top left hand corner. The night before the students had recorded one to two word phrases about where they saw math being used at home on the card. Using their index cards to jog their memories, students then wrote in their math journal using complete sentences how they had used math the previous night. The children also reflected on the previous day's lesson and answered questions about what they had learned and how they could apply their new knowledge at home.

Two or three times a week the students read a different literature book related to math. They then answered four different questions in their math journals. The children wrote what book they read and the author's name, what math skill the book brought out, how they could use that concept later, and gave a brief summary of the story. They repeated this procedure for four weeks.

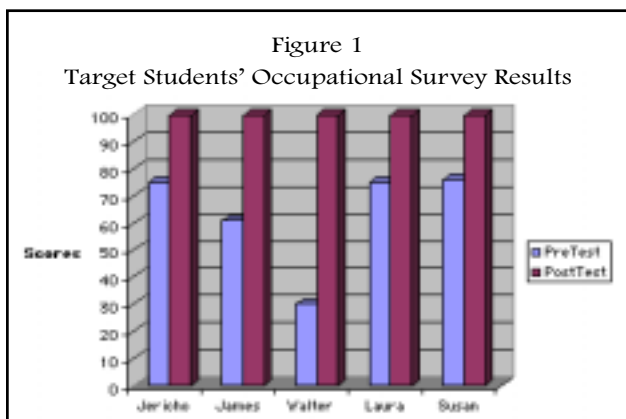
At the end of my research project, students

again completed the occupation survey and the math interest inventory.

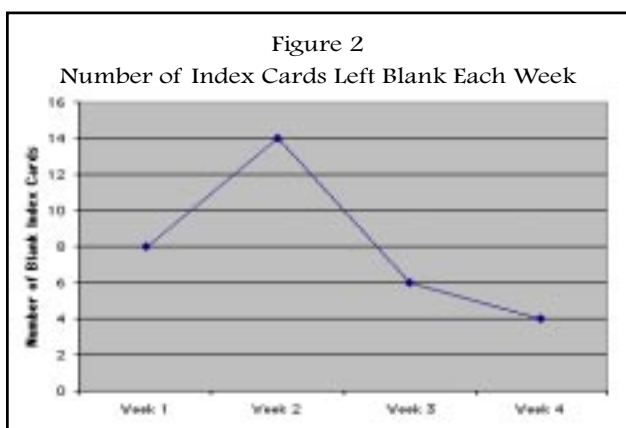
DATA ANALYSIS AND FINDINGS

Data analysis showed students’ improvement in several areas. For example, they increased their (a) awareness of math in their everyday life, (b) daily math scores, and (c) enthusiasm about math.

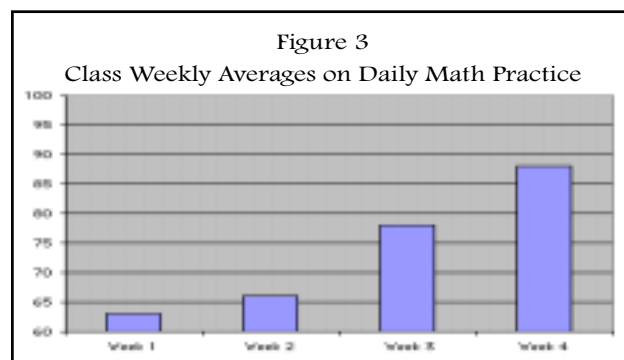
Before and after conducting my research, students completed an occupational survey. This survey demonstrated student awareness of math in their everyday lives. A comparison of the pre- and post-survey results shows that all twenty-two students grew considerably in their math awareness and enthusiasm. The five target students (i.e., students closely observed during the project) displayed the most growth (see Figure 1).



Another way I determined that students grew in their daily awareness of math was by noting the number of blank index cards they had at the end of each week. A blank index card meant that they did not see math being used the previous night. The number of blank index cards dropped each week. According to Figure 2, week four had the fewest number of blank cards.



I also collected data from the students’ daily math practice in their math journals. Students had anywhere from five to twenty different problems from that day’s lesson and review to solve on a daily basis. At the end of each week, we graded the problems and placed a score at the top. I then figured the class’ weekly average. As shown in Figure 3, each week the class’ average increased.



Student expressions of enthusiasm increased as the weeks passed. In the beginning of the research, students expressed disinterest about math time. The beginning of the third week, students would come dashing into the classroom in the morning asking, “Ms. Young, what are we going to read today for math? What are we going to be talking about or learning about?” Hearing this from the children indicated a heightened interest in math.

Furthermore, students completed a math interest inventory at the beginning and ending of the research. One question I asked on the inventory was “Do you like math? If you answered yes, why? If you answered no, why not?” On the beginning surveys, over 75% of all students stated that they liked math because math is fun, math helped them on their homework, or knowing math made them smart. At the end of the study, however, over 50% of the students responded in a more meaningful way. For example, Susan wrote, “Yes I do like math. Why? Well, you need math to be sucesful in life.” Numerous other students answered in a similar way.

CONCLUSION

My classroom-based teacher research indicates that children need constant reminders of the importance of learning. They need to understand how they will use that same information in the future. With the help of trade books, children begin to understand that math surrounds them on a daily basis. Therefore, children who know how they will use their education in the future are more interested in learning.

After seeing improvements with these students,

the intent is to use literature to enrich the math curriculum. I would like to continue to research this topic with my next class over a longer period of time. I am now wondering what the benefits of using the two together over a longer period of time would do for our children. Toward the end of the research, I would like to have the students write their own math story based on the concepts they have learned and how those concepts relate to the real world.

These students have discovered that math surrounds them twenty-four hours a day. Without an understanding of math, they may have difficulty with their chosen profession.

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BOOKS AVAILABLE FOR STUDENTS TO READ

- Adler, D. (1996). **Fraction fun.** New York: Holiday House.
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SUGGESTED CHILDREN'S LITERATURE FOR TEACHING MATHEMATICS

Addition

Quack and count by Keith Baker, Harcourt Brace

Number one, number fun by Kay Choraio, Holiday House

Mission: addition by Loreen Leedy, Holiday House

Animals on board by Stuart Murphy, Harper Trophy
Counting Books

Count your way through China by Jim Haskins, Carolrhoda Books

Counting wildflowers by Bruce McMillan, Lothrop Lee & Shepard

Monster math by Anne Miranda, Harcourt Brace

One woolly wombat by Rod Trinca, Kane/Miller Book

Division

The great divide by Dayle Dodds, Candlewick Press

Divide and ride by Stuart Murphy, Harper Collins

One hundred hungry ants by Elinor Pinczes, Houghton Mifflin

A remainder of one by Elinor Pinczes, Houghton Mifflin

Fractions

Fraction fun! by David Adler, HolidayHouse

Fraction action by Loreen Leedy, Holiday House

Eating fractions by Bruce McMillian, Scholastic

The Hershey's milk chocolate fractions book by Jerry Pallotta, Scholastic

Geometry

The greedy triangle by Marilyn Burns, Scholastic

Spaghetti and meatballs for all by Marilyn Burns, Scholastic

A cloak for the dreamer by Aileen Friedman, Scholastic

Changes, changes by Pat Hutchins, Greenwillow

Graphing

Get up and go! by Stuart Murphy, Harper Collins

Lemonade for sale by Stuart Murphy, Harper Collins

Caps for sale by Esphyr Slobodkina, Scholastic

Measurement

Pigs in the pantry by Amy Axelrod, Aladdin

The chocolate chip factory by Barbara Douglas, Lothrop, Lee & Shepard

Much bigger than Martin by Steven Kellogg, Dial Press

How big is a foot by Rolf Myller, Atheneum

Money

Pigs will be pigs by Amy Axelrod, Four Winds Press

If you made a million by David Schwartz, Scholastic

Alexander, who used to be rich last Sunday by Judith Viorst, Atheneum

Multiplication

- Bats on parade** by Kathi Appelt, Morrow, Jr.
Bunches and bunches of bunnies by Louise Mathew, Scholastic
Amanda's beans amazing dream by Cindy Neuschwander, Scholastic

Number Sense & Numeration

- One grain of rice** by Demi, Scholastic
Baseball fever by Johanna Hurwitz, William Morrow
How much is a million by David Schwartz, Scholastic
2095 (Time warp trio series) by Jon Scieszka, Viking

Pattern

- The very busy spider** by Eric Carle, Philomel
The light in the attic ("Reflections" pg.29) by Shel Silverstein, Harper & Row
The mirrow puzzle book by Marion Walter, Tarquin Publications

Probability

- Journey** by Arnold Lobel, Harper & Row
Mouse tales by Arnold Lobel, Harper & Row
Elephant buttons by Ueno, Harper & Row

Sorting

- A house is a house for me** by Mary Ann Hoberman, Viking-Penguin
A pair of socks by Stuart Murphy, Harper Collins
Those green things by Kathy Stinson, Annick Press

Subtraction

- Number one, number fun** by Kay Choro, Holiday House
Elevator magic by Stuart Murphy, Harper Collins
A fair bear share by Stuart Murphy, Harper Collins
Starting to subtract by J. Tyler, EDC Publications

Time

- Pigs on a blanket** by Amy Axelrod, Simon & Schuster
Monday I was an alligator by Susan Pearson, Lippincott
Cookie's week by Cindy Ward, Scholastic

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