Students Creating Stories in Math Classes

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From: glanfiel@gpu.srv.ualberta.ca
Subject: School Mathematics Program Review
Dear Jean:

As I sit down to write this e-mail message, I can't help but tell you how the story that I am going to share with you keeps being replayed in my mind. It has become a part of my lived experience and history—it has become a part of my life.

Last November I had the chance to spend five days in a K–9 school as part of a school mathematics program review. During these five days, I talked with many wonderful teachers and students, and this story emerged from a conversation I had with the Grade 7 math teacher.

During that particular week, the Grade 7 math classes were studying decimals and fractions, and the teacher and I were discussing ways that we could have students think about how decimals and fractions are used in "real life." We decided to ask the students to write a story about what it would be like to spend a day without decimals and fractions in their world.

The next day this idea was shared with students. I was lucky enough to be in one of the Grade 7 classes as the idea was broached—and I was blown away at how taken the students were. Hands shot up and students moved toward the board as the teacher recorded the types of things that would be affected if decimals and fractions did not exist. They enthusiastically offered their ideas—picture a group of about 20 Grade 7 students sitting on the floor around the teacher, eagerly wanting their ideas to be put on the board. "Eagerly" is probably not even a good word to use to describe the action that was happening in that room—students kept talking about their ideas, and they physically kept moving with excitement. When I saw this, I was reminded of being in a crowd at the end of a bicycle race. One of the sponsors was giving away free products by standing on the stage and tossing the products into the crowd—the crowd would shift and disperse in the excitement of possibly getting one.

In this Grade 7 classroom, no idea was rejected; they were all written on the board. The following list was generated from the class discussion:

- Grocery store—groceries, money
- Time
- Transportation—gas, speed, bus fare, mileage, odometer, roads, lanes, no cars
- Tests—percentages, no marks, anecdotal, no math
- Business—graphs
- Food—sharing
- Athletics—no time keeping, no distance running, penalties
- Weather
- Cooking
- Entertainment—movies, radio, TV stations
- Age
- Construction
- Calendar
- Mass
- Criminal penalties
- No science
- No numbers at all because all numbers can be written as decimals

At one point in the activity a student turned to me and said, "Our whole world would be affected—my father is a doctor, he wouldn't have a job." As I think about that statement, I realize that telling this story on paper misses the multidimensional thinking and interacting that was happening in that classroom when the list was being generated. The list only became a short script of the conversations that students were having with one another and with themselves as they were thinking about the implications of not having decimals or fractions. I was amazed at how quickly the 40-minute period passed. The students were asked to write their story for homework to be read in class the next day.

So what happened the next day? All students completed their homework and were ready to share their story—even the student whose first language is not English. I have only selected two stories to share with you, I hope you enjoy reading them.

Story 1

Today I arrived on Galorp. This planet does not have a decimal and fractions system! It is most

peculiar, and confusing. To explain how life goes on without this, I give you a day in the life of the Galorplings. Without further ado, here it is.

The alien wakes up, and chooses whether the nine on its clock means it is late or early for work; they don't understand 9:30! The alien then gets into its car thing, (very primitive) and goes. When I—in my role as the child—asked how fast we were traveling they were unable to figure out the answer. They bought gas and were ripped off because they cannot compute without the decimal system. I then assumed my role as the young school child. In terms of marks all they could tell me was how many were right and wrong. When I asked the teacher what my percentage was, she asked if I was feeling okay, and sent me to the nurse. These Galorplings sure are strange! It must be uncouth to ask to share food, for when I did I received this evil stare. After I arrived back at our family shelter (another grueling trip in the car), I found their entertainment unbearably limiting. They cannot pick up even half the 620 channels we have, because theirs are all in whole numbers. These Galorpians do not even know how old they are, all they know is they turn from one whole to another when the weather warms up. If one asks what is in between, one is told not to be so impudent. The science here is only to the level of grade schools, and the university students have problems with that. I conclude that this underdeveloped civilization poses no threat to Saroah.

<div align="right">
Reporting,
"Anglark Saremp"
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Story 2

If there were no fractions or decimals in the world there would be many problems. For example if we were at the grocery store and we wanted half a melon we couldn't get it. Also there would be no cents. You need a decimal to show $6.38. Transportation would also be affected. You wouldn't have any gas, because you need to see a sign that says 53.9 cents per litre, but you wouldn't be able to because there is no decimal. You would not know the time at a sporting event because time wouldn't exist. There would be no distance running because you couldn't keep track of time or mileage.

No criminal punishment could be enforced because you couldn't send people to jail unless they were sentenced there for a set amount of time. Most importantly there would be poor medical care because doctors and nurses couldn't prescribe a certain drug. Also, in an emergency situation a doctor would inject too much or too little of a life-saving drug to a patient because he or she would not be able to know the proper amount. In conclusion, the world would pretty much be a wreck without fractions and decimals.

I selected these two stories because of the difference between them—the first student created a "fictional" space to write his story, and the second student wrote about the world that he currently knows and what it would look like.

This experience has caused me to think about three ways in which this type of activity would "fit" into our new curriculum. First, think about this activity as being used to help students achieve the goals of a mathematics education as stated within the *Alberta Program of Studies for K–9 Mathematics* (Alberta Education 1996). These goals indicate that students should appreciate and value mathematics (p. 2), that "students should also gain an understanding and appreciation of the contributions of mathematics, as a science and as an art, to civilization and to culture" (p. 3), and that students should "contribute to mathematical discussions, exhibit curiosity, and show some enjoyment of mathematical experiences" (p. 3).

The second way is through the Nature of Mathematics Dimension of Number. Within this dimension, the curriculum document indicates that number sense includes "a development of an appreciation of the need for numbers beyond whole numbers" (Alberta Education 1996). Although this activity limited the numbers to fractions and decimals, all students in the class, through their participation in talking about and writing about fractions and decimals, developed an appreciation for their role in our culture.

The third way is the obvious connection to the mathematical processes of Communication and Connections. This activity has students using a form of communication to think about and represent connections among the symbolic notations of decimals and fractions with their daily experiences (Alberta Education 1996, 6–7).

I'm left wondering what else I could learn about these students' mathematical thinking by using activities such as this one. Not only that, how do these students' stories relate to my life as someone who thinks about and appreciates the role of mathematics in the development of our culture. Barbara Kingsolver (1996, 256), in her most recent book *High Tide in Tucson*, says that once the reader and viewer have read and viewed a story that "the story no longer belongs to the author," the story has become a part of the reader's and viewer's life.

What do you think?

I look forward to the next time we "talk."

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Florence
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References

Alberta Education. *Alberta Program of Studies for K–9 Mathematics.* Edmonton: Author, 1996.

Kingsolver, B. *High Tide in Tucson: Essays from Now or Never.* New York: HarperCollins, 1996.

National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics.* Reston, Va.: Author, 1989.

One day, the British mathematician G. Hardy visited the Indian mathematician Srinivasa Ramanujan (1887–1920) with a taxi that was identified with the number 1729. "A very boring number," remarked Hardy. "Quite the opposite," replied Ramanujan. "It is a very interesting number in that it is the smallest number which can be expressed in two different ways as the sum of two cubed numbers." What are the two numbers and the two different ways?