Exploring out-of-school contexts in primary school mathematics textbooks and classroom teaching in Delhi, India

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- Ethnomathematics
- Utilitarian purposes
- Affect
- Meaningfulness
- Social Justice
Mathematics textbooks (Book 4 and 5)

- Story based: Long or short
- Contextual objects
- Students’ everyday lives
- Narratives
- Social justice
Mathematics textbooks
(Book 4 and 5)
Context: Stories

Long story

Building with Bricks

Brick Patterns for Jagriti School

This is the true story of Jagriti School in Murshidabad (West Bengal). When its building was being made, there was a plan to make brick patterns on the floor and walls. Jamaal, Kanti and Pyaar were the masons for the brick work. They wanted to get new ideas for the school building. So they took their other friends to see the old tomb of Mumshid Kuli Khan. (See photos.)

This building has a big floor with about two thousand beautiful brick patterns. These were made by masons long back – about three hundred years ago.

Look how the bricks are arranged in these five floor patterns.

Short story

Ramu’s Vegetable Field

Ramu’s vegetable field has 9 equal parts. What vegetables does he grow?

1) Which vegetable grows in the biggest part of his field?
   What part?

2) On what part of the field does he grow potatoes?

3) What part of the field is used to grow spinach?
   What part is used for brinjals?

4) Now you write some questions by looking at this picture.
Do you like sky watching? If yes, then this one should interest you:

a) At what time does the sun rise at your place? ———

b) When does the sun set? ———

Dose the sun rise and set at the same times every day?

Look at a newspaper and see the time of sunrise and sunset in different months.
Context: Objects

Schematised

Half a Turn

Once there was a king. He was upset because thieves kept stealing costly jewels from his locker. Here is what the locker looked like:

The locker could be opened by giving its handle half a turn. Another half turn and the locker would be locked again.

The king would often leave the locker open thinking it was locked. Can you guess the reason?

Illustrated

1) Look at the angles in the pictures and fill the table.

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<thead>
<tr>
<th>Angle</th>
<th>Right angle</th>
<th>More than a right angle</th>
<th>Less than a right angle</th>
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Context: Social justice

Explicit: Caste discrimination

Implicit: Gender representation

People laughed and teased us about our work. They called it *ganda kaam* or 'dirty business'. But I did not think so. I knew this idea would work.

Now we have a *pucca* house with electricity. We have a fridge, a TV and a gas stove. My husband's brothers, sister and also my daughter go to school.

I have 9 rickshaws of my own. I give the rickshaws on rent, each for Rs 20 a day. On Sundays I do not take any money for them.

How Much does Kiran Earn from 9 Rickshaws in a Day?

On hearing this, doctors from all over the country came. But only Dr. Vaidika could cure him.

Oh great! My pain has gone. Thank you, Dr. Vaidika.

So, can I have my reward now, sir?

Vaidika was unhappy when she reached home. She told her daughter the whole story.

Don't worry Ma. I have an idea ..... tell the king to arrange an elephant and a big boat.

How can I weigh an elephant? Where will I get such a big balance?
Classroom observations: Analysis

- 72 Activities
- 42 Contexts
  - 20 Students everyday
  - 2 Long stories
  - 8 Short stories
  - 5 Narratives
  - 8 Contextual objects
  - 1 Non-mathematical
Students’ everyday lives

T: Have you been to the bazaar with your mother to buy clothes?
T: Then your mother must be saying that – give 1 m cloth or 2 m cloth. Does she?
S: Ma’am some even measure saaris. It is 7 cm long.
T: Yes, you get saaris measure too.
T: How long should saaris be?
S: Seven, six
T: Yes, it should be 6. But how long do they turn out to be?
S: Ma’am, five
T: Yes, sometimes they turn out to be 5 as well. So will your mummy take such a saari?
S: No
T: Kajal has taken one apple for 2 rupees. okay? So how much will be 6 apples for?

T: If one rope is for three rupees, then, four ropes will be for how much?
Contextual objects

The Mouse and the Cat

The hungry cat is trying to catch Kunjan the mouse. Kunjan is now on the 14th step and it can jump 2 steps at a time. The cat is on the third step. She can jump 3 steps at a time. If the mouse reaches 28 it can hide in the hole. Find out whether the mouse can get away safely!

a) The steps on which the mouse jumps —

b) The steps on which the cat jumps —

c) The steps on which both the cat and the mouse jump —

d) Can the mouse get away?

Find out

If the cat starts from the 5th step and jumps five steps at a time and the mouse starts from the 8th step and jumps four steps at a time, can the mouse get away?

Bangles

There are 18 bangles on the rod. Meena is trying to group them. She can put them in groups of 2, 3, 6, 9 and 18 — without any bangle being left.

How many groups will she have if she makes groups of 1 bangle each?

Children should be encouraged to make similar questions with different multiples and ask each other to solve.
Conclusion

• Students experiences are being included in the classroom to an extent

• Multiple representations

• Contextual short stories are being used (Lubienski, 2002; Boaler, 1993)

• Social justice is not being explicitly addressed (Gutstein, 2006)
THANK YOU!!

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