

Teaching Mathematical Concepts Through Storytelling

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For the last two years, I have been travelling across Yergol, one of the educational zones in the Yadgir district of Karnataka. Here, I observed the untapped potential of learning maths through storytelling activities in schools. The process of finding stories which can aid maths learning, aligning it to the learning outcomes of classes IV and V initially turned out to be difficult. However, I found a story titled *Muttajjiya Vayasseshtu?* (How Old is Muttajji?)ⁱ by Roopa Pai. The story, along with its curious characters and complex subplots, throws up situations in which students need to unpack the problems and find solutions.

The story is about the adventurous journey of two children who try to discover the exact age of their *Muttajji* (great-grandmother). The storytelling activity provided our government school children with opportunities to unpack clues and arrive at answers using the operations of addition, subtraction, and logical reasoning.

Though students found the story and its problems interesting, they initially asked me direct questions, such as which operation to use to arrive at the answer. Through the dialogue – of asking the right questions and providing alternative cues, students tried to symbolise their thought processes in their notebooks, which was different from the traditional way of practising operations. In this article, focusing on my dialogues with the students and their note-taking process for abstract thoughts, I have attempted to unpack the potential of storytelling in learning maths.

I began the story with a basic introduction of the storybook in class V in the presence of the class teacher. During the initial conversation about *Muttajji's* age, a few students said that her age would be 200 years as expressed by Putta, one of the characters in the story. I felt if students give answers in haste without applying logic, then the aim of learning the addition and subtraction of four-digit numbers would not be served. Keeping this challenge in mind, I instructed the children to note down anything that they felt was important

for solving the problem and the situations as they occurred in the story. These responses later made me realise how children process their thoughts when they write.

Methodology

Students were given the clue that 1916 was the year when the Kannambadi Damⁱⁱ was built, and this was somehow linked to the year *Muttajji* was born. A few students asked me which operation to follow for the calculation. A student tried this (*figure 1*) to find the answer.

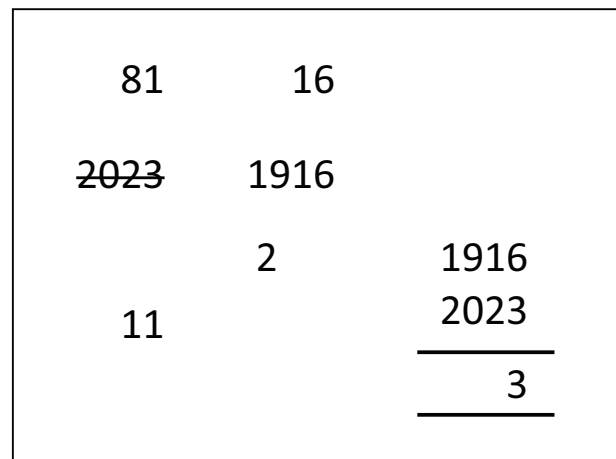


Figure 1.

Observing this, I felt that maybe as facilitators, we need to observe the problem students face when they encounter a situation where they need to apply logic and derive answers. To make it easier, I asked the following question: 'If your age is 12 years in 2023, what should you do in order to know how old you were in 2014?' The children gave various answers, such as add both years, subtract 2023 from 2014, etc. Before continuing, I asked them about their current age and the year of birth. I received many responses, and I chose a random year after their birth year and asked them to tell me what their age would be in that year. For this, the students came up with the following responses (*figures 2, 3, and 4*), which created bliss in me as I was expecting such creative work from them.

2023
11 - 2023
10 - 2022
9 - 2021
8 - 2020
7 - 2019
6 - 2018
5 - 2017
4 -

Figure 2.

2023 - 10
22 - 9
21 - 8
20 - 7
19 - 6
18 - 5
17 - 4
16 - 3
15 - 2
14 - 1

Figure 3.

Understanding the process

With this thought process through writing, students understood that they should work backwards from their current age towards the birth year to know their age in a particular year. Though this seems to be common sense, not introducing students to such basic logical reasoning skills makes us reflect upon the quality of education in general, and of mathematical dialogues, in particular.

I continued to narrate the story. Students came across one more clue from the story where they

2009 -
2010 -
2011 -
2012 -
2013 -
2014 - 3
2015 - 4
2016 - 5
2017 - 6
2018 - 7
2019 - 6
2001 2020 - 7
2002 2021 - 8
2003 2022 - 9
2004 2023 - 10

Figure 4.

got to know that the grandmother’s age would be 81 years in 2023, now, what would be the year of her birth? Surprisingly, many children did the right operations and wrote their answers in their own way. As a narrator, I was mesmerised not by their doing the operation, but by the way children tried to write their answers in their notebooks. It was not the traditional way of noting the numbers and writing the answers below them.

As we see in *figure 5*, a student tried to subtract 81 from 2023. Since the aim was to find out *Muttajji’s* age, a few students did not write the grandmother’s age separately but wrote it in a vertical tree of mother, grandmother, and great-grandmother.

In every step of finding the answers, students were becoming inquisitive about what would come next and how they would tackle it. As I proceeded with the story, children found another clue - the great-grandmother gave birth to her five daughters one after the other, every two years after her marriage. Then, students started subtracting the number 2 repeatedly from the year 1942.

In the discussion, students themselves expressed that since the great-grandmother had five

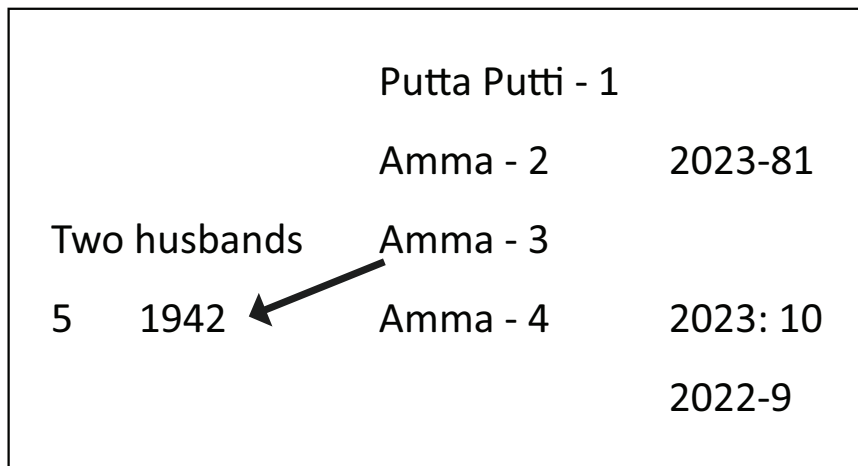


Figure 5.

daughters and the fifth daughter was born in the year 1942, we would get the birth year of siblings of the grandmother by subtracting 2 from 1942 for 4 times, because there is a 2-year gap among the daughters of Muttajji.

Without using signs of subtraction, students processed their thoughts in the notebook as in figure 6. This tells us that as we reinforce the methods of calculation, we tend to come up with the solution with our intuition by avoiding the steps. For example, figure 6 indicates that the fifth daughter of the great-grandmother was born in 1942 and the student continued the subtraction of 2 from 1942 until the third daughter. The student skipped the calculation for the second daughter and finally jumped to the first daughter which they felt was important to find out the age of Muttajji. Then, they found that the birth year of the first daughter is 1934 (1942 minus 8 if there are five daughters with a 2-year age gap each).

Now, I asked students what they should do to move towards the age of Muttajji. A few students said

they should subtract 8 from 1942. One student said they should add 8 to 81 (the age) which means that Muttajji is more than 89 years old. Students started guessing Muttajji's age now. They recalled another clue that was given during the story narration which hinted that Muttajji did not have a child marriage. Hence, students added 16, the age when she got married (the minimum age of marriage was 15 years in those times). They added 16 years to 89 and said that Muttajji's age could be 105 years.

A student logically thought that Muttajji must have waited one to two years before having her first child in 1934. Later, collating all the clues that they were given, all of them added 2 years to 105 and declared that Muttajji's age could be 107. All of us agreed that Muttajji's age would be 107. Finally, they subtracted 107 from 2023 and got the birth year of Muttajji.

As we have seen here, engaging students in a story through discussions and logical reasoning using real-life contexts arouses their curiosity and motivates them to solve maths problems.

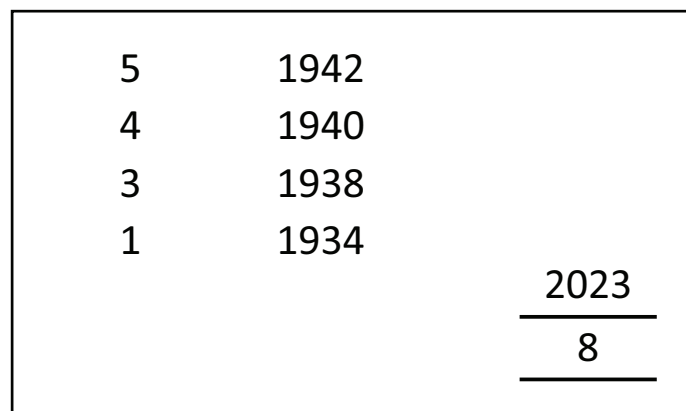


Figure 6.

Note: Images of children's work included in the article have been recreated for use in English.

Endnotes

- i This story is set in 2016 when it was first published. The age of *Muttaji* has been changed to use the story in a class in 2023.
- ii Also known as Krishna Raja Sagara Dam.

References

How Old is Muttaji? Written by Roopa Pai; Illustrated by Kaveri Gopalakrishnan. Pratham Books. <https://storyweaver.org.in/stories/5699-how-old-is-Muttaji?mode=read>



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When we select a book to read to or discuss with children, we must ask ourselves, 'What is so special about this book that will connect with the children and also give them a different perspective, or some new ideas and opportunities to think about?' It is similar to the notion that by reading literature, we become 'new'; that we are no longer the people we were. This is the pleasure of a good book. It is also possible that a specific book may come to occupy a special place in their long-term memories; one that cannot be forgotten.

Kamlesh Chandra Joshi, Lightning (Big Book) | The Story in Class, page 35