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Numeracy Vs Mathematics

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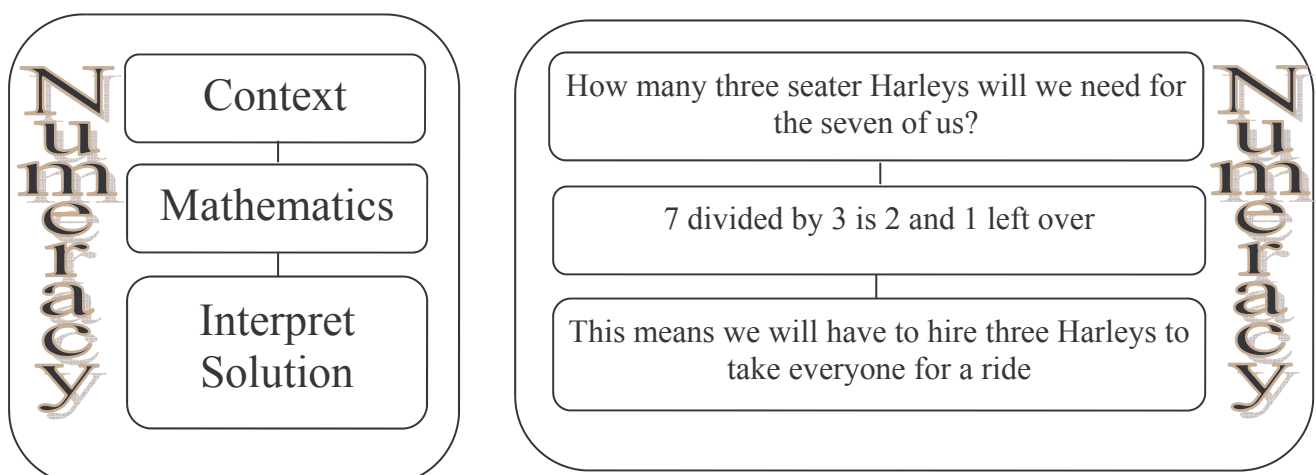
Numeracy Vs Mathematics

I often ask primary teachers of mathematics and secondary mathematics teachers if they believe the terms numeracy and mathematics are interchangeable. I hear many yes replies. I also hear other departmental officers using the terms as if they mean exactly the same thing. When I enquire further as to what teachers might think numeracy is I hear it is part of mathematics.....I also hear mathematics is part of numeracy!!!

Explanations of the term numeracy usually include the word number or the word numeration. After some discussion on the topic I refer teachers to page 9 of the 2002 Stages 4 and 5 Mathematics Years 7-10 Syllabus and page 11 of the 2002 Mathematics K-6 Syllabus.

Prior to those references the discussion includes some or all of the following:

If I asked you to divide seven by three what would be the correct way of writing the answer. Stage 4 and above teachers will say a fraction or a decimal. Stage 3 teachers will say I don't let them use the r notation because I know when the kids go to high school they won't be allowed to use it. So, I wean them off r pretty quickly and get them to use decimals. Below Stage 3 teachers are generally very comfortable with students using r. Sometimes someone will suggest (thankfully) that it will depend on the question being asked. This leads into, OK, make up a question that requires seven to be divided by three (cf Working Mathematically Process: Questioning). The last time I tried this with a secondary mathematics staff they quickly realised it is quite difficult to make up a question which requires a fractional answer. Many of their questions required the r notation. In other words, it depends on the context of the question as to which notation is appropriate. The choice has little to do with stages of schooling. Some examples: Seven hard boiled lollies shared between three children...r notation. However, seven metres of material cut into three equal lengths...decimal notation. How about: Seven Year 12 Schoolies want to hire Harley Davidsons that carry three passengers on a raised rear bench seat. How many Harleys will they need to hire? This brings in the need to interpret the answer. Initially, mathematics skills are required to carry out the division, using an r notation and then adjust the answer based on the context.



Discrete and Continuous

What we are really considering here is whether the seven things to be divided are **discrete** (separate items, not able to be sub divided) or **continuous** (time, mass, length, liquids, temperature).

Interestingly, this concept was assessed in SNAP 2005 Task:2 Energy in the Home Part A Question:5

“Why is a line graph the best type of graph to show this information about time and temperature?”

If the items are discrete (marbles, humans...) the r notation is the correct notation.

Whereas continuous items in the context lead to fractional or decimal notation.

A good discussion can come about if the seven is in money. The solution needs to be interpreted carefully, making reference back to whether the money is in notes only, coins only, cheques to be written. It is a useful exercise to create a different context for each of the above: notes, coins, cheques.

My claim then is that when we consider a context, carry out a mathematical procedure and interpret the result based on the context then we are dealing with numeracy. In the past we may have considered ourselves good mathematics teachers. Does this naturally flow through to us being good teachers of numeracy? I don't think so.

I think we need to use tried and true literacy strategies to assist students read, comprehend, etc the contextual problem, translate that into an appropriate and hopefully efficient mathematical procedure, using known mathematical skills, then use literacy strategies again to interpret, and finally, communicate the solution.

This is sounding a whole lot to me as if within the maths block in a primary school or within the mathematics lesson in a secondary school teachers of mathematics will have to suspend their teaching of mathematics and guide students through literacy strategies.

Teachers of mathematics may need some assistance to do this.

One technique I have been successfully using in professional development is to take a wordy BST or SNAP or School Certificate question and work through some or all of the following:

Present the contextual problem in small chunks

Only present the data to the students

ie Don't ask the question just yet

Act out the problem, one chunk at a time

Make a freehand sketch of the problem

Have students make up questions based on the data

Finally, present the question to the students

Teachers trialling this approach have been very enthusiastic, making comments like: Most of the students gained success. The students really enjoyed acting it out. The students' freehand drawing skills increased quickly. I am enjoying my teaching of ma, I mean, numeracy much more than ever before.

The contextual problems on the following pages lends themselves nicely to chunking, acting, drawing and making up different questions that can be answered with the data.

NSW Year 5 BST 2004 Q:39

Isobel ran around the oval 3 times.

The first time took 3 minutes.

All of the other runs took 1 minute more than the run before.

Altogether, how many minutes did the three runs take?

Write your answer in the box.

minutes

NSW Year 5 BST 2006 Q:7

A class collected exactly 500 books.

Tina collected 120,

Kia collected 100,

Lou collected 80, and

Marco collected 130.

How many books did the rest of the class collect?

70

170

330

430

NSW SNAP 2006 Short Questions Q:11

The opal, *Olympic Australis*,

was found at Cooper Pedy

in August 1965.

It has a mass of 3450 grams.

Which operation shows the correct way

to convert the mass of this opal

to kilograms?

3450×100

3450×1000

$3450 \div 100$

$3450 \div 1000$

NSW SNAP 2006 Short Questions Q:21

Mia drove her car
at an average speed
of 80 km/h
for 320 km.

What time did she finish her trip?

- 4:00 pm
- 4:20 pm
- 5:00 pm
- 5:20 pm

NSW SNAP 2006 Short Questions Q:36

Some plastics shrink when heated.

In a science lesson, Jamie had a plastic chip packet which measured 12 cm X 12 cm.

Jamie then heated the chip packet in an oven.

After heating, the chip packet measured 5 cm X 5 cm.

By how much had the area of the chip packet changed?

- 25 cm²
- 49 cm²
- 119 cm²
- 144 cm²
- 169 cm²