WHAT REALLY MATTERS?

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Surely the core business of education is to equip all students with the knowledge, skills and self-esteem that will allow them to participate effectively in their community. In a society where a school’s success is increasingly being measured by its student’s TER scores and the percentage of university places offered to its VCE graduants, education appears to have lost the plot. Are schools preparing students for university or adult life? How well equipped for life are our students and more particularly how well equipped are those who leave school early to assume their place in the community?

Background
I recently stopped at a remote country pub for a counter lunch and was surprised to see one of my Yr 5 students from a decade ago, taking orders and handling the till. After re-kindling acquaintances, we discussed her life since leaving Yr 5. I was distressed to find that her family life had deteriorated rapidly to the extent that she’d left school and home at age 13 and was now living with a boyfriend somewhere in the surrounding hills. She was on the third day of a 7 day trial for the pub job and was obviously nervous as she took my order totaling just under $35. I handed her a $50 note and as she gazed into the till she quite unconsciously moaned ‘…now… maths!’ She stared at the notes and coins in the till and I watched as she struggled to determine the change. I leant over and murmured, “Count up from 35 to 50 for the notes, and then give me the loose change for the rest”. As my thinking obviously made no sense to her, she ignored my suggestion and instead I listened as she softly verbalised a traditional subtraction beginning with the cents column.

The change she gave was correct but I as I left the counter I wondered how she would cope with the maths requirements of the job if the pub suddenly had a ‘rush’ of customers. I also wondered what contribution I’d made to this girl’s situation. During our earlier discussion she’d described the fact that she’d spent most of her school life sitting by herself in class because the teachers said she didn’t get her work done. I asked if I too had done that and she smiled embarrassedly and said, “Yes, all the teachers always made me sit by myself”.

Soon after, a teacher from WA emailed me to make a horrible confession. Earlier that day at the launch of a lesson, he had asked a Yr 9 student to imagine that the teacher was holding a thin slice of ham in his hand. He asked the student to suggest whether the slice would be more appropriately weighed in grams or kilos. The teacher was overwhelmed with shame as he realised that the student had not the slightest idea which answer would be correct.

Learning Rather Than Being Taught
The Essential Learnings Framework (Victorian Curriculum Assessment Authority 2004, p2) highlights the need for the school curriculum to “… equip all young people with the knowledge, skills, self-esteem and attributes to participate fully and effectively in their community”. I hazard to guess that determining whether one wants to buy 100kgs or 100gms of ham for lunchtime sandwich making and being able to easily calculate change for a pub meal fits into the realm of participating effectively in the humblest dealings of our community. As teachers we need to reflect seriously on what is important and what needs to be at the forefront of what occurs in many of our mathematics classrooms.
We seem to be doing a lot of ‘teaching’ if one reads the mathematics outcomes of the CSF 11 and examines the lucrative sales in mathematics textbooks. But the question begs - are all our students ‘learning’ and are they understanding the basic concepts that will allow them to handle their pay-check, pay their bills, calculate the amount of linoleum needed for the kitchen, select the most efficient credit card, and/or determine which mobile phone plan is a ‘rip-off’, for surely this short lists constitutes at least some of what it takes to participate effectively in the community.

**Authentic tasks make learning easier**

The case for using authentic tasks is strong when I think about the two students in these tales. How much more powerful is the learning if the task fits into the student’s schema relative to their interests in the world at the time of learning? Bland algebraic equations, sagging under the weight of x and y stare out from a classroom whiteboard or (worse still) from pages and pages of mathematics textbooks, daring students to solve them by producing a similar mix of (often seemingly non-sensical) pro-numerals and numerals. How much easier these would be if they related to 4 orders of spaghetti at one price and 3 orders of sausages and a $3 tip (4a + 3s + 3).

Similarly I have seen Preps stun their teacher by drawing maps that included locating a set of specific features on the map relative to each other and link some of these features by either a long path or a ‘short cut’ track. Why were they able to do this activity without much preliminary work on maps? The context was familiar to them; I told a version of the well-known tale Little Red Riding Hood making sure that specific landmarks were involved along with directional and situational language.

The context was real, the features to be included were familiar, and an understanding of directional language was built up during the lesson. Not only was the task authentic but it was made explicit to the students from the outset that other than the location of certain features in relation to others, everyone’s map would look different because of the openness of the task. Hence ‘on opposite sides of the forest’ allowed for North/South or East/West alignment, etc. Diversity and creativity were celebrated as the ideal.

**Building shortcuts in thinking through the sharing of ideas**

With hindsight, I was amazed at how I had suggested to my ex-student that she solve the problem with my change. I am sure that in my classroom a decade earlier, we spent far more time doing the standard subtraction algorithm devoid of context or purpose and yet in real life, I broke all the classroom rules to offer her the shortcut. Why did I wait so long? Classrooms are full of students thinking in diverse and creative ways. What a waste of their time to hear the solution according to the teacher and only that solution. The summary phase at the end of a lesson (based on the plan of ‘Launch, Explore, Summarise’) can be a rich and exciting time for building links and consolidating understanding if we as teachers step back and allow the students to share their thinking. I never cease to be amazed by some of the divergent thinking going on within groups who have been posed the same task.

Even at professional development sessions when I’ve asked teachers to verbalise their process for mentally adding a series of two digit numbers, I have been amazed at some of the differences in thinking. The fact that this divergent thinking exists among teachers in such a simple task as mental addition confirms my belief in the need for students to share and hear a myriad of ways for thinking about and solving mathematical problems. I once heard it said that we, as teachers, can never teach them in all the ways that they can learn. If we accept this statement then the practice of sharing strategies becomes critical. This is not to say that some strategies aren’t more efficient than others but it will be up to each of us to select the strategy that is most appropriate for us, at this time, for this particular situation.
What do the calculations mean?

Thinking about the whether a slice of ham has a mass nearer 100gms or 100kgs exposes another frequently overlooked domain in mathematics teaching and learning. With out eye firmly fixed on the CSF outcomes and the threat of the closed questions presented in the unfamiliar context of the AIM test, it is easy to decide that formula retention, errorless calculations, and disconnected algorithms should be our focus if we are to receive approval from the DE&T statisticians. The VCE teachers also increasingly seem to suggest that anything other than a watered down version of VCE in the Yrs P-10 can only damage final TER scores, ignoring the fact that in the current system the majority of students opt out of the more complex streams of mathematics as soon as legally possible.

I asked a middle years classroom recently to tell me what I might see if there were 8 vehicles on Westgate Bridge with an average of 2 people per vehicle. Some students stumbled at this point, having been taught to calculate average but not apply it to a situation when the average had been given. This was evident in the number of students who called out “there would be 16” but were unable to talk it through any further. Another group suggested there would be 8 cars with 2 people in each but couldn’t suggest any other alternatives. A smaller group decided that some cars might have 3 people and then another car would have 1. They toyed with this idea for 8 cars and were pleased with their result.

One final group decided that vehicles could be anything from trucks to motorbikes and began making ad hoc suggestions as to how this might look for different combinations. Meanwhile one student sat alone and quietly began with a small pattern of 1 bus with 9 people on board and 7 vehicles with one person in each, then 1 bus with 8 people and 6 vehicles with one person and 1 vehicle with 2 people. He came to me at the end of the lesson and asked if he drew a pregnant lady and a man hanging half out of a vehicle, would I allow the ‘fetus’ and the half man as 2 halves in 2 vehicles.

This is the level of deep thinking that we would hope for in our mathematics classes.

Not only could this student calculate ‘average’ but he could understand it in a three dimensional way that allowed him to manipulate all the components in interesting ways. It seems most appropriate that we get students to this point by incorporating real life situations into the mathematics classroom that support students to understand and participate effectively in their world today.

When teachers take the step towards making the mathematics fit the needs of the student rather than making the student fit the dictates of the CSF outcomes, the textbook or some distant exam threat, we may have the beginning of a mathematics program that can be viewed as a worthwhile endeavor to equip all young people to participate fully and effectively in their community, whether that be as a tradesperson, a housewife, a waiter or a doctor.

References