

Reluctant to think for herself

Mellony Graven says pupils must find maths answers on their own before they can ask for intervention from their teachers

Mellony Graven

Over the past three years I have been conducting research into student learning dispositions, particularly grade three and grade four pupils in the Eastern Cape. While there is an emerging field of international research, focusing on the importance of learning dispositions and mind-sets, and indeed “productive disposition” is one of Kilpatrick, Swafford and Finkel’s essential strands of mathematical proficiency, there has been little local research on this topic.

Apartheid legacy

South Africa’s apartheid legacy systematically undermined pupil independence and agency. Indeed Hendrik Verwoerd, regarded as one of the key architects of apartheid, expressly argued that Bantu Education should prepare African pupils for manual labour (and thus to follow instructions) rather than to become critical and creative thinkers. Much has been achieved in South Africa since the end of apartheid in terms of access to education, but our quality of education – and particularly mathematics education – is still “in crisis” as indicated across international, regional and national assessments. Large-scale studies point to a wide range of contributory factors including, for example, challenges of poverty, language of instruction, teacher knowledge and opportunity to learn.

Learning dispositions

Addressing this wide range of factors is of course key, however I argue that student learning dispositions in particular (and the mechanisms by which they are promoted and perpetuated) needs further research. In 2012 I conducted research with 1 208 Eastern Cape pupils (of whom the vast majority were from previously disadvantaged backgrounds) in the form of an orally administered but written response questionnaire on learning. Despite clear limitations to the instrument in terms of low levels of literacy noted in student responses, some clear trends emerged that confirmed my own experience of working with and observing pupils in a range of classroom and after-school maths club contexts. The research indicated that pupils predominantly viewed a peer being good at mathematics as someone who is “innately clever” and/or someone who “listens to the teacher” and/or someone who is “well behaved”.

Perseverance

There was little evidence of the need for sense making, willingness to

engage or perseverance and resilience that is noted in literature on key learning dispositions. When asked what they do when they don’t know an answer to a mathematics problem, a third of the pupils responded with “ask the teacher” and some indicated they would put up their hand and “have to wait”. I have often witnessed several pupils spending significant parts of maths lessons doing nothing other than holding their hand up. While seeking help from the teacher is not a bad strategy, it should preferably come after persevering with a range of strategies for overcoming the challenge oneself.

“Resist the temptation”

John Mason (a world famous teacher and mathematician) once said in a workshop to teachers in the Eastern Cape: “Resist the temptation to make mathematics easy. Keep it challenging, and help the pupils to rise to it.” This advice resonated strongly with my experience that pupils tended to resist challenges and, in the face of difficulty, rather searched for simple “just tell me what to do” methods rather than “can I generate my own method?” My biggest challenge as a teacher was to resist “helping” students if they had not already tried themselves and to then find ways to create scaffolding questions that would then help them towards a solution method rather than to simply tell them what to do.

Anecdote

Below I share an interaction between myself and a pupil I call Nandi*. The interaction took place in a grade four after-school club that I ran with seven pupils from three schools in Grahamstown in 2012. I share this anecdote to illuminate the challenge teachers face when pupils are reluctant to persevere with a problem themselves, and who are sometimes (although of course not always) simply refusing to “tell them what to do” and pushing them to “think for themselves”, as drawing on their own resources is all that is required. The excerpt has also been reported on in a broader article on quantitative dispositional data gathered by Graven and Heyd-Metzuyanin.

The activity

Seven grade four after-school maths club pupils were given the following activity on a sheet of paper and asked to find the value of each of the shapes. As a group I asked if anyone could find the circle (as this was the easiest one to find and was needed to be solved before other shapes could be considered).

Nandi, almost immediately, called out that circle is five. I then asked the

pupils to work individually to find the value of the other shapes.

The transcript of interaction

It seemed clear to me that Nandi’s initial “inability” to solve the problem had nothing to do with her mathematical skills, nor with her ability to interpret what the problem was asking and required. Of course this would not necessarily be the case for other pupils, who might genuinely not be able to access the question and might need scaffolding in order to do so.

What the excerpt illuminates is that Nandi’s initial inability instead had everything to do with her learning disposition in this situation and her unwillingness to be resourceful and to persevere independently in the face of an unfamiliar problem where the solution strategy was not immediately evident. She lacked the key learning disposition of resilience, which is defined as “the inclination to take on (at least some) learning challenges where the outcome is uncertain, to persist with learning despite temporary confusion or frustration and to recover from setbacks or failures and rededicate oneself to the learning task”. (Carr and Claxton, 2002, p.14).

I have shared this anecdote and transcript in the hope that it will stimulate reflection for the readers of The Teacher as to the extent to which this resonates with their own experiences. More importantly however, I hope that it stimulates reflection as to the



Maths clubs are a fun way to learn. Photo: Supplied



extent to which as teachers we promote or allow “teacher-dependent” and “avoidance of independent sense-making” dispositions to flourish in our own teaching.

Furthermore I hope this anecdote stimulates discussion about how we might proactively work towards developing productive mathematical dispositions that foreground independent and creative problem solving and mathematical sense-making. I

say this with no judgement, as it was not that easy to avoid simply telling Nandi what to do. As a teacher I kept a sign on my board reminding me to: “Resist the temptation to make maths simple – help pupils rise to the challenge themselves!”

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*Not her real name

		What is said	What is done/Remarks
1	Mellony 20:28	So how are you going to figure out the club and triangle?	Nandi walks to a desk away from the group to work on it.
2	Nandi and Mellony 21:16 – 21:42	Nandi shows Mellony her answer of three for the triangle and Mellony engages her in why it doesn’t work because the column will then give a total of 16 not 26.	
3	Nandi 21:42	I don’t understand.	Mumbles as she walks away from Mellony.
4	Mellony 21:44	It isn’t that you don’t understand you need to keep trying.	A lot of children are wanting Mellony’s attention.
5	Nandi 22:18	Teacher, teacher - I don’t understand!	In a complaining, emphatic tone. Stands in front of Mellony and looks confused.
6	Mellony 22:20	No, it is not that you don’t understand it is that you have to think. You do understand, because you found the circle. But, it’s not so easy to find the club, and the triangle, you have to think. You have to problem-solve. So stop thinking you don’t understand and think.	
	Nandi 22:32	Shoo	She turns her head away, seemingly unimpressed by the instruction
	Mellony 22:33	You have to problem-solve. So stop thinking you don’t understand and think.	
	22:33 – 23:35		Mellony works with other pupils individually. Nandi sitting looking at her problem-solving sheet and doing some counting with her fingers against her cheek
	Nandi 23:36	Teacher, teacher, teacher, teacher.	Nandi comes running from her side of the table to show Mellony what she has got. She is very excited.
	Nandi 23:38	I found it. It is ..	Nandi gives her card to Mellony and points to her answer of eight for the triangle.
	Mellony 23:50	Shh. Ahhhh! Very good!!! Now who told me they didn’t understand? And all she had to do was think.	Nandi goes out of the camera’s sight but you can hear her excitement.

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