Mathematics Assessment in Primary Classrooms: Making it Count

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Mathematics assessment in the primary school

- What is meant by “assessment”
- Quality assessment of primary mathematics
- Issues for primary school mathematics assessment
- Examples of productive practice
What is assessment?

- A task
  - Test or other activity
- A report
  - To whom and for what purpose?

A judgement
- How is this made?
Quality assessment of mathematics (AAMT, 2008)

- Practices for assessing students’ mathematics learning should be APPROPRIATE

- Assessment of students’ mathematics should be FAIR AND INCLUSIVE

- Assessment of students’ mathematics should INFORM LEARNING AND ACTION
APPROPRIATE practices

- In the classroom
  - Match the assessment to the need
    - Assess only what is needed – not for the sake of it
    - Choose tasks that will provide useful information in a timely fashion
  - Use a range of assessment strategies
    - This allows for assessment of different kinds of learning outcomes
    - Don’t forget affective outcomes

- System level
  - Match the assessment to the stated purpose
  - Link with the curriculum
  - Use efficient but effective processes
FAIR AND INCLUSIVE practices

- Recognise the values that underpin the assessment
- Ensure that NO student is alienated by the assessment task
  - Assumptions are often made about students or the task
- Make the assessment clear to the students
  - Involve students in the assessment process
- Plan for assessment
  - Build this into planning classroom programs

These principles also apply at system level.
The difference between summative (assessment of learning) and formative (assessment for learning) is largely a question of timing.

It is necessary to include both of these aspects of assessment in a planned assessment program AND to take advantage of assessment opportunities during the learning process (assessment as learning).

It is appropriate to use large scale external assessments to inform changes in curriculum emphasis at the school level.
Many primary teachers lack detailed understanding of mathematics content

- Research agenda into both the appropriate level of mathematical knowledge and knowledge of mathematics for teaching
Assessment expectations may not be clear

Year 2 Achievement standard

By the end of Year 2, students are able to understand the sequence of numbers to 130, recognising patterns in units of 10 and 100. They apply this understanding to efficiently represent collections larger than 100 and to partition numbers into units of tens and ones. They describe and connect patterns of twos, fives and tens, solve multiplicative problems and model everyday simple functions. Students describe events produced by simple chance devices and understand different ways of representing data. Students compare lengths, capacities and masses using informal units and familiar metric units and areas by direct comparison. They identify and describe properties of familiar shapes and objects, can visualise and represent them, and can use simple maps. (ACARA, 2010)
Systems give mixed messages to teachers

- The importance of formative assessment strategies is stressed
- Higher order thinking and mathematical processes are stated goals
- Affective aspects are stated in curriculum documents
- NAPLAN and test results are valued and acted upon
- Lower level mathematical skills are measured
- No serious attempts are made to measure or report affective aspects

Stated aims

Reality
“Assess as we were assessed”

- **A** to **E** reporting scales
  - **A** The student has an extensive knowledge and understanding of the content …
  - **B** The student has a thorough knowledge and understanding of the content …
  - **C** The student has a sound knowledge and understanding of the main areas of content …
  - **D** The student has a basic knowledge and understanding of the content …
  - **E** The student has an elementary knowledge and understanding in few areas of the content …

Distrust of teacher–judged assessment

- Many good quality mathematics assessment programs have been removed
  - The zucchini leaf problem
Productive assessment

- is assessment that provides useful, timely and appropriate information appropriate to the purpose

- It may include
  - Productive dialogue
  - Productive tasks
  - Productive teaching practices
  - Productive reporting
Productive dialogue: Year 7
Why was this productive?

- Took the student back to the start
- Repeated opportunities for the student to demonstrate what he knew
- Persistence and patience (teacher)
- Teacher decision about when to move on when the student was clearly unable to describe the pattern
Year 1 students had been making informal maps. They were asked to imagine walking through their house, paying particular attention to where the rooms were in relation to each other.

Then they had to imagine being a bird flying over the house.

Finally they drew what the bird would see if the roof was taken off the house.
What the students did

Some could draw only an elevation although there are hints of developing a plan view.
This is a disconnected stage with an elevation framework but attempts to create a plan view.

Common in Year 1 children
Elevation framework has disappeared and students are connecting the rooms logically.
Top level achieved

- Real attempt at a bird’s eye view
- A plan frame is included
- Scale not yet correct
- Only 1 girl achieved this
Why did this work?

- This is a difficult task but one that ALL students could attempt to their satisfaction.
- It provided insights that easier tasks could not do.
- Could be used summatively (end of unit) or formatively (during unit of work).
- Follow up activity devised to address the levels of development demonstrated
Productive teaching

- Kindergarten class
- Whole class teaching
- Focus of lesson was on “9” and ways to make 9
  - $9 = 5 + 4$
  - $9 = 6 + 3$
What was productive?

- Not a lesson that we would see in this format in Australia.

- Teacher recognised the girl’s error but chose not to comment. Next task provided an opportunity to self-correct.

- Form of effective feedback – assessment as learning
Productive reporting

- Teacher staff meeting
  - Grade teams
  - Focussed discussion related to mathematics
  - Sharing maths “big books”
  - Referred to NAPLAN data
  - Plan for future action
Why was this productive?

- Professional conversations
- Common language across the school – “throughlines”
- Appropriate use of data at student and school level
- Commitment to action
Primary mathematics assessment: Making it Count

- Place teachers’ professional learning within a mathematics context rather than general approaches
- Shift the focus of teachers’ professional learning onto “next steps” with students
- Place “feedback” within a pedagogical rather than an assessment framework
- Trust teachers’ judgements
It is quality teachers, making rapid professional judgements on the run in busy classrooms, that create the “meanings and consequences” that affect children’s interest and involvement in matters mathematical.