LITERACY AND NUMERACY ACROSS THE CURRICULUM

LECTURE 1 | LITERACY AND NUMERACY ACROSS THE CURRICULUM

The challenge for subject teachers: subject experts v. shared responsibility for students’ literacy and numeracy.

English and Maths vs Literacy and Numeracy

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<tr>
<th>English has its own discipline:</th>
<th>Mathematics has its own discipline:</th>
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<td>a. Understanding self, people, society, culture through literature and media.</td>
<td>a. Understanding systems/patterns of our world through algebra, geometry, statistics.</td>
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<td>b. Developing communication skills incl. literacy (reading and writing).</td>
<td>b. Developing numeracy and spatial skills.</td>
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“Understanding, using, reflecting on and engaging with written texts... to achieve one’s goals, to develop one’s knowledge and potential, and to participate in society.”

“An individual’s capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and... engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen.”


International Imperatives

PISA Programme for International Assessment – every 3 years, for 15 year olds, 72 countries (OECD and partner). PISA assessment domains:

- Reading Literacy (PISA 2000 and PISA 2009 major domain)
- Mathematical Literacy (PISA 2003 and PISA 2012 major domain)
- Scientific Literacy (PISA 2006 and PISA 2015 major domain)
- Collaborative problem solving (innovative domain)


Reading Literacy in Australia

Average score of 503 points, significantly higher than the OECD average of 493 points. Significantly below 11 countries (Canada, Estonia, Finland, Ireland, Japan, Korea, New Zealand and Norway, Singapore, Hong Kong (China) and Macao (China)). Not significantly different from that of 13 countries (Belgium, Denmark, France, Germany, the Netherlands, Poland, Portugal, Slovenia, Sweden, the United Kingdom and the United States, Chinese Taipei and B-S-J-G (China)).

Numeracy in Australia

Average score of 494 points, significantly higher than the OECD average of 490 points. Significantly below 19 countries (Japan, Korea, Switzerland, Estonia, Canada, the
Netherlands, Denmark, Finland, Slovenia, Belgium, Germany, Poland, Ireland and Norway, Singapore, Hong Kong (China), Macao (China), Chinese Taipei and B-J-S-G (China). Not significantly different from that of 10 countries (Austria, New Zealand, Sweden, France, the United Kingdom, the Czech Republic, Portugal and Italy, Vietnam and the Russian Federation).

National and State Imperatives

National Curriculum: Literacy

- ‘Literacy encompasses the knowledge and skills students need to access, understand, analyse and evaluate information…
- All teachers are responsible for teaching the subject-specific literacy of their learning area...
- Literacy appropriate to each learning area can be embedded in the teaching of the content and processes of that learning area.’


National Curriculum: Numeracy

Teachers are required to:

- Identify the specific numeracy demands of their learning area
- Provide learning experiences and opportunities that support the application of students’ general mathematical knowledge and skills
- Use the language of numeracy in their teaching as appropriate.


Numeracy Across the Curriculum

Numeracy: “competence and disposition to use mathematics to meet the general demands of life at home, in paid work, and for participation in community and civic life” (Willis, 1998).

Three perspectives on what numeracy is:

- the mathematical concepts, procedures and skills students should know how to use;
- the capacity to complete practical tasks and meet social goals that make mathematical demands;
- the generic and strategic processes students need for applying mathematics in different contexts.

An emerging blending perspective whereby a numerate student would be able to use mathematical, contextual and strategic knowledge.

Is numeracy the same as mathematics?
Mathematics: the science of patterns (Steen, LA, 1998) e.g. rules of maths such as adding two even numbers produces an even number. Numeracy is the application of these rules e.g. in checking that a restaurant charge is correct. School mathematics provides a context for numeracy opportunities.

With shift from ‘industrial’ to ‘knowledge’ society, numeracy education needs to pay attention to new numeracies – technological numeracies, numeracies and financial numeracies.
Effective numeracy to be embedded in curriculum practices (as literacy has been since 1970s). To do a subject a student must learn the literacy of that subject → should also learn the numeracy of the subject.

**A Numeracy Framework (Willis & Hogan, 2000)**

Becoming numerate involves blending mathematical, contextual and strategic knowledge and taking on three roles:

- The fluent operator – being a fluent user of maths in familiar contexts;
- The learner – having a capacity for the deliberate use of maths to learn;
- The critical mathematician – having a capacity to be critical of the maths chosen and used.

**Strategies for teachers**

- Be alert to numeracy demands as they arise in class (listen purposefully) and be aware of potential numeracy demands in planning.
- Allow students to work it out (individually and collaboratively) and support learning by questioning; practice in class.
- Debrief the numeracy – ask open questions about key mathematical ideas used and where else they might use them.
- Promote critical use of mathematics – is this appropriate use of mathematics here? Was this the best method?
- Teach the framework to students.
- Share strategies amongst colleagues.

**National and State Imperatives: NSW Government Initiative**

Minimum literacy and numeracy standards for HSC – described clearly, taught explicitly, assessed meaningfully, reported regularly.

_NSW Education Standards Authority (2016)._

**Quality Teaching Framework (QTF)**

3 domains of competence, with 6 elements of each –

1. Intellectual Quality
   - 1.4 Higher order thinking
   - 1.6 Substantive communication
2. Quality Learning Environment
   - 2.2 Engagement
   - 2.3 High expectations
3. Significance
   - 3.4 Inclusivity
   - 3.5 Connectededness


We are the experts in our own subject area → we are the best placed to explain language speciality and mathematical dimensions.