

**The Australian Association of
Mathematics Teachers Inc.**

Policy on Numeracy Education in Schools

The current focus¹ on numeracy education is timely. There is no doubt that the increasingly technological society in which we live is making different, and greater, demands on our numeracy. This is true in our lives at work or in education, at home and as citizens. The workforce which this country needs for the next millennium is one which is technologically capable. A high level of numeracy is inherent in this.

This Policy statement is designed to provide a clear statement of the position taken by the Australian Association of Mathematics Teachers on the nature of numeracy, the kind of developments in numeracy education which schools and others need to implement and the nature of and foci for assessment of numeracy in schools.

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1. A description of numeracy'

The AAMT adopts the following working definition of Numeracy

(from the October 1997 report of the Numeracy Education Strategy Development Conference)

To be numerate is to use mathematics effectively to meet the general demands of life at home, in paid work, and for participation in community and civic life.

In school education, numeracy is a fundamental component of learning, discourse and critique across all areas of the curriculum. It involves the disposition to use, in context, a combination of:

- **underpinning mathematical concepts and skills from across the discipline (numerical, spatial, graphical, statistical and algebraic);**
- **mathematical thinking and strategies;**
- **general thinking skills; and**
- **grounded appreciation of context.**

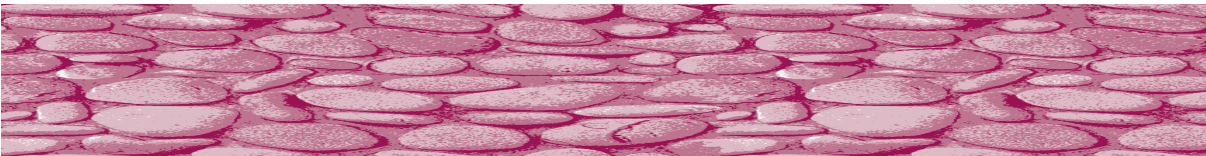
Numeracy = everyone's business (p 15)

It may be that, in the past, the term 'numeracy' has been used as a synonym for 'school mathematics' and 'being numerate' as resulting from success in school mathematics. Whilst the role of school mathematics is critical in providing the underpinning mathematical skills, such usage is inappropriate and inaccurate in the light of the broad view of numeracy adopted by the AAMT.

The International Literacy Year (1990) defined literacy such that 'literacy... includes numeracy'. The view of numeracy in this policy is premised on the notion that literacy and numeracy are distinct areas. Literacy and numeracy are underpinned by fundamentally different areas of learning. The identification of numeracy as a priority area requires distinct and substantial application of funding.

1 The Australian Association of Mathematics Teachers (AAMT) has taken a keen interest in the issues around numeracy education since it came onto the national agenda in early 1996 when political leaders began consistently using the 'pigeon pair' of terms literacy and numeracy in commenting on education, particularly in the areas of early intervention and maintaining standards of student achievement.

2 Throughout this Policy Statement 'numeracy' is taken to be the personal attribute; 'school numeracy' is the numeracy inherent in schooling contexts, which may be different from other contexts within which students operate; and 'numeracy education' is the collective term for the actions which educators take to help students develop their numeracy.



This DEFINITION means that:

Numeracy is context specific

An individual is numerate (or not) on the basis of their performance — solving problems and interpreting and producing text, arguments and conclusions — within a given context. Numeracy in schools is just that — numeracy in the contexts of schooling.

Numeracy is relative

Judgements of relative levels of numeracy need to be made within a context(s). Knowledge of, and skills with, mathematics are not sufficient to assure 'numeracy'. Describing 'levels' of numeracy is possible in relation to a particular situation. These levels are not necessarily graduated in terms of the levels of sophistication of mathematics used. That is, individuals are more or less numerate when solving problems when cooking, or planning finances, and so on.

All teachers are responsible for contributing to their students' numeracy development.

Teachers should have knowledge of the numeracy demands and opportunities inherent in their teaching, and are able to discern and respond to an individual student's numeracy learning needs, particularly for those students whose progress is at risk because of limited numeracy skills.

The teaching of mathematics has a key role to play — school mathematics must be taught well.

The mathematics curriculum is fundamentally about learning in the discipline that is mathematics. This means a focus on building knowledge and understanding of the concepts, and the connections between these and to our cultures. Mathematics must be well taught, through practices which are sensitive to students' backgrounds and interests. The curriculum and its teaching should aim to develop this conceptual understanding and build the capacity and confidence to use mathematics. These conditions need to be established if the mathematics in our schools is to most effectively fulfil one of its roles — that of introducing and developing the mathematics which is the essential underpinning of students' numeracy.

2. The development of numeracy education

The AAMT is committed to maximising all young people's numeracy development.

The work of educators is to affect that part of a person's numeracy that is 'numeracy in schooling', in the expectation that this will inform their capacity to deal with the quantitatively based demands of their lives — their numeracy. Hence, school numeracy (the focus of this Policy) is seen as part of, and a contributor to, an individual's overall numeracy.

Development in numeracy education needs to be cognisant of the diversity of students, communities and educational settings present in this country. This diversity includes cultural groupings as well as settings in which young people are exposed to numeracy in action, such as helping on the farm where non-school methods are often used, and parents' methods of estimating and calculating when shopping. It is imperative that numeracy be inclusive and empowering for all students and this is clearly part of 'maximising all young people's numeracy development'.

This COMMITMENT means that the AAMT will:

- argue for the acceptance and implementation of the recommendations of *Numeracy = everyone's business* (the report of the Numeracy Education Strategy Development Conference, 1997) by education authorities including systems, assessment authorities, schools, institutions of TAFE and universities.
- monitor the relative application of State, Territory and Commonwealth funds to projects and initiatives directed at literacy and numeracy development in schools and report findings publicly;
- seek to form partnerships with other groups and organisations such as professional and parent associations, education systems and tertiary institutions to undertake research and development projects in numeracy education;
- promote the broad view of numeracy articulated in this policy to other professional associations, parents, the wider community and employers;
- work with colleagues from the Vocational Education and Training (VET) sector and others to build on the work of the Rich Interpretation of Using Mathematical Ideas and Techniques (RIUMIT) project in the post compulsory area, particularly in School to work initiatives;
- continue to advocate, provide advice on, support and provide programs, materials and other support which enhance the quality of teaching and learning of mathematics to ensure that the mathematics which underpins numeracy of students in Australian schools is well taught and learnt.

3. The assessment of numeracy

The AAMT will endorse, support and implement programs and practices which validly assess students' numeracy against standards, and which report on students' numeracy achievements in ways which support teachers' efforts to maximise the learning of the diverse groups of students in Australian schools.

The educational truism that 'what you test is what you get' makes it important to resolve the issues involved in the assessment of numeracy in schools. Australia has a history of, and arguably a currently increased propensity towards, large scale systemic assessment programs which allow for reporting individually and systemically on achievement within the mathematics curriculum. The identification of numeracy development as all teachers' responsibility makes the assessment of students' numeracy, in contexts across the curriculum, a part of their work. These assessments will necessarily inform planning for students' future learning. Similarly, larger scale numeracy assessment practices need to be designed to gather and report information about numeracy achievement in ways that inform teaching and learning across the curriculum. Substantial research and development is required in this area.

Large scale assessment programs involving all students of a particular age or stage of schooling attract much discussion among educators. Many see these tests as:

- lacking the capacity to accommodate the diversity of students in schools
- providing information that teachers already have
- reporting in ways which do not assist teaching

and generally undermining teachers' central role in assessment.

Accountability is an important consideration. Valid assessments against agreed standards, coupled with open reporting (both as indicated in this policy) enable:

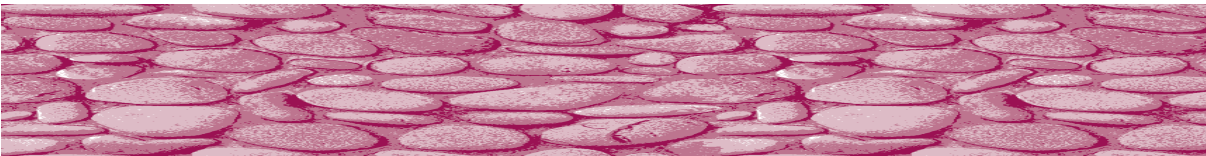
- teachers to be accountable to students and parents for their actions;
- schools to be accountable to the school community for their actions;
- education decision and policy makers to be accountable to the community for their actions.

These layers of accountability all contribute to confidence in the education system. They are needed for education to be seen to be delivering quality outcomes in relation to students' numeracy achievement.

This COMMITMENT is based on the AAMT belief that:

The purpose of assessment in mathematics is to inform and report progress in the mathematics curriculum.

It is necessary to assess students' progress in mathematics in order to make judgements about and plans for their program of learning mathematics. Assessment of progress in mathematics can also inform judgements and plans in relation to numeracy development. By their nature and focus, many assessments of mathematics — whether at the classroom, school or state level — can assess only some aspects of numeracy.



Appropriate numeracy assessment programs are multi-faceted.

Validity of assessment is achieved only when all of the domains of numeracy are attended to within an assessment program. School numeracy should be assessed as performance, and in discourse and critical thinking in contexts across the curriculum.

Setting and reviewing standards and related benchmarks for numeracy achievement is important.

Assessment necessarily involves judgement against some criteria. These criteria should be open, agreed and defensible. They should be available to students, teachers and the community. These standards and related benchmarks must relate to the many facets of numeracy, not just the mathematical underpinnings, as is largely the case with the first Numeracy Benchmarks (circa 1997). Hence, standards are challenging to express. Regular reviews of the standards should occur to ensure that they capture contemporary understanding (e.g. every two years). Standards for mathematics performance must not be taken to be standards for numeracy.

Teachers' assessments must form the basis of assessments of numeracy achievement.

No single test can meet the criteria for valid assessment of numeracy. Valid assessment of school numeracy achievement is only possible at the local level, and will be based on teachers' informed professional judgement in relation to all the aspects of numeracy identified above and relying on a range of assessment strategies.

Reporting should focus on measures of 'added value' for individuals and groups of students, not on comparisons between them.

The diversity of education settings, students and their needs makes it important to report information about how much difference the exposure to an educational program over time has made to students' achievement. This is the value added by that program. Reporting this is far more instructive than reporting comparisons between groups because it enables the program to be evaluated for its successes for the students involved.

This COMMITMENT means that the AAMT will:

- use the parameters outlined in this policy to comment on assessment and reporting programs which claim to be related to numeracy;
- advocate, provide advice on, support and implement research, development and professional development programs which enhance the validity of numeracy assessment practices at system, school and classroom level, and as used by employers;
- seek to form partnerships with other groups and organisations such as professional and parent associations, education systems and tertiary institutions to undertake research and development projects in numeracy assessment with a view to helping establish practices and programs which meet the requirements of this policy.

Additional copies of this document can be downloaded from the AAMT website.

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