Annotated bibliography and further resources

Journals

Keyword internet search

Many journals are available through the internet. 'Mathematics teaching and learning associations' is useful as a keyword search to gain access to national and international associations of mathematics teaching.

Australian Association of Mathematics Teachers journals

The following three journals are available through Australian Association of Mathematics Teachers (AAMT):

- **The Australian Mathematics Teacher**

  This journal is a medium for the exchange of national and international teaching ideas. The AMT is published quarterly and is directed at teachers of mathematics in Years 7 to 10.

- **Australian Senior Mathematics Journal**

  This journal is published twice a year and is aimed at mathematics teachers of Years 11 and 12, and the first few years of education at university, college and TAFE.

- **Teaching Mathematics**

  This journal of the Queensland Association of Mathematics Teachers is published four times a year.

Journal articles

Anthony, G. & Walshaw, M. 2004, 'Zero: A "none" number?', *Teaching Children Mathematics*, August, pp. 38–42, National Council of Teachers of Mathematics, USA.

The authors examine the importance of providing meaningful opportunities for students to explore zero. By developing an understanding of zero, students establish a foundation for the introduction of algebra and the authors outline a possible sequence for exploring it.

Bell, A. 1993, 'Principles for the design of teaching', *Educational Studies in Mathematics,* 24 (1), pp. 5–34.

A theory for designing teaching based on mathematical activity, situations, tasks and interventions, exposing and resolving cognitive conflicts, changes of structure and context, feedback, reflection and review is explained in this article. The ways that children make connections between concrete experiences and the formalisation of mathematical principles is also discussed.

Boulton-Lewis, G., Wilss, L. & Mutch, S. 1997, 'Analysis of primary school children's abilities and strategies for reading and recording time from analogue and digital clocks', *Mathematics Education Research Journal*, vol. 9, no. 2, pp. 136–151.

A research-based paper that outlines stages of understanding needed to read analogue time. Students from Years 1 to 6 were tested for their ability to read analogue time, and asked to discuss the strategies they used. A sequence of learning to read time is proposed based on research and the findings of this study.

Callingham, R. 2003, 'Improving mathematical outcomes in the middle years', paper presented at the Mathematics Association of Victoria annual conference.

This paper considers ways to improve the performance of students' mathematical performance in the middle years. The focus is on mental computation strategies and the need for students to practise their numeracy skills in a range of mathematical and social contexts.

Clarke, D. 2004, 'Making mathematics challenging and enjoyable in the middle years', *Australian Journal of Middle Schooling*, vol. 4, no. 1.

Doug Clarke outlines a range of strategies, classroom activities and assessment tasks that aim to provide challenging learning experiences for middle years students. The focus is on discussion and involvement of students in their own learning and valuing, and building upon students' methods of solving problems. The value of open-ended tasks and posing higher order questions are also discussed.

Clements, D. 1999, 'Geometric and spatial thinking in young children', *Mathematics in the Early Years*, pp. 66–79.

This article discusses a number of aspects related to how children learn about space and geometry. It provides information about the importance of developing children's spatial sense, orientation, visualisation and imagery. It also describes materials that are useful for teaching and learning about space.

Copley, J. 2000, 'Geometry and spatial sense in the early childhood curriculum', *The Young Child and Mathematics*, Washington.

This paper outlines how to enhance young children's exploration of geometry. It includes suggestions for providing a mathematics-rich environment, specifically outlining the type of manipulative materials that enhance learning about geometric shapes and developing spatial sense.

Diezmann, C. 1997, 'Developing spatial ability in young children', *Teaching Mathematics*, vol. 22, no. 2, pp. 3–7.

In this paper, Carmel Diezmann provides examples of ways to develop spatial ability in young children. Four recommended primary focuses for teaching geometry as stated in the National Council of Teachers of Mathematics Standards (1989) are discussed. These include exploring the properties of geometric figures, geometric relationships, spatial sense, and the use of geometric ideas throughout the curriculum.

Ell, F. 2001, 'Strategies and thinking about number in children aged 9–11 years', *Technical Report 17*, October, University of Auckland.

This article is a review of international literature related to number knowledge, number strategies, and frameworks for classifying the learning of number for children aged 9 to 11. It is rich with information about researchers and their findings in the area of mathematics in which they specialise.

Heirdsfield, A. 2000, 'Mental computation: Is it more than mental architecture?', paper presented at the annual meeting of the Australian Association for Research in Education, Sydney.

This paper reports a study of Year 3 children's addition and subtraction mental computation abilities, and the complexity of affective factors that supported and diminished their ability to compute efficiently. The part memory plays in mental computation is also investigated. Finally, some implications for teaching are discussed.

Hyde, M., Zevenbergen, R. & Power, D. 2003, 'Deaf and hard of hearing students' performance on arithmetic word problems', *American Annals of the Deaf*, vol. 148, pp. 56–64.

This paper examines research into the performance on arithmetic word problems of deaf and hard of hearing students in the south-east Queensland region of Australia. It was found that performance on word problems was similar for deaf and hearing students, but that deaf students experienced delays in achieving successful performance on word problems relative to their hearing peers. The results confirm the findings of other studies showing that students who are deaf or hard of hearing experience delayed language acquisition which affects their capacity to solve arithmetic word problems.

Inskeep, J. 1976, 'Teaching measurement to elementary school children', *NCTM Yearbook — Measurement in School Mathematics*, pp. 60–86.

This article outlines principles for teaching measurement to young children. It explores theory related to how young children learn to measure and explains the basic objectives of teaching measurement in the early years.

Irons, C. 2001, 'Mental computation: How can we do more?', *Teaching Mathematics*, Queensland Association of Mathematics Teachers, vol. 26, no. 1, pp. 22–26.

This article describes how to increase the focus on metal computation by adding simple number sense activities to your curriculum. It explores the prerequisite skills required for mental computation, describes the characteristics of number sense, and emphasises the importance of students understanding that there is often more than one method of determining an answer.

Irons, R. 2002, '"I like working with numbers" — early years numeracy', *Prime Number*, vol. 17, no. 2, June, pp. 21–24 and vol. 17, no. 3, September, pp. 6–9.

This article explores how number tracks and hundreds boards may be used for learning about number as position and the relationships between numbers. It links the exploration of number through hands-on materials to children's development of mental computation strategies.

Malloy, C. 2002, 'The van Hiele framework', National Council of Teachers of Mathematics.

This article examines how the sophisticated development of understandings associated with geometric relationships develops. It explains the van Hiele levels — developed by mathematics educators Dina van Hiele and Pierre van Hiele — as a continuum of conceptual understandings along which students must progress in order to prepare for the deductive reasoning required in higher levels of geometry.

McIntosh, A. 2004, 'Developing computation', Department of Education, Tasmania.

A resource that was produced as part of the collaborative Numeracy Research and Development Initiative Developing Computation (2001–2003). It provides definitions associated with mental computation and includes children's work samples.

National Council of Teachers of Mathematics, 2003, 'Teaching children mathematics', *Focus Issue: Computational Fluency*, vol. 9, no. 6.

A compilation of articles that looks at ways to develop children's computational fluency from differing perspectives. It analyses a variety of strategies relating to teaching and learning computation methods.

N'gotta, L. 1998, 'Time', *Child Education,* December, pp. 36–39.

This article provides examples of activities designed to help young children make sense of time.

Owens, K., Leberne, P. & Harrison, I. 1999, 'Framework for elementary school space mathematics', *Reflections*, vol. 24, no. 1, pp. 26–31.

This paper presents a framework to identify children's understandings of spatial concepts. Emphasis is placed upon students' exploration of imagery and concepts related to the mathematics of position, movement, two-dimensional and three-dimensional shapes.

Siemon, D. 2002, 'Partitioning — The missing link in building fraction knowledge and confidence', pp. 1–8, RMIT University, Bundoora.

This paper outlines a sequence for teaching fractions in the middle years and contains practical examples of the ideas discussed.

Thornton, S. 1998, 'Constructing geometric reasoning', *Australian Mathematics Teacher*, vol. 54, no. 3.

This article is a reflection on research into children's learning of geometry. It analyses and describes the van Hiele levels, an understanding of which can inform teaching of geometry and learning.

Warren, E. & Cooper T. 2003, 'Open-ended realistic division problems, generalisation and early algebra', in *Proceedings of the 27th Conference of the International Group for the Psychology of Mathematics Education*, eds N. Pateman, G. Dougherty & J. Zilliox, pp. 245–253, University of Hawaii, Honolulu.

This paper explores the role of open-ended realistic division problems in the development of algebraic reasoning. It discusses the advantages of providing students with contextualised, open-ended learning experiences and reports on students' responses to an open-ended realistic division problem.

Watson, J., Collis, K. & Moritz, J. 1995, 'Children's understanding of luck', *Mathematics Education Research Group of Australia Conference Proceedings*, Darwin.

This paper presents an analysis of two questionnaire items that explore students' understanding of the concept of luck in relation to the development of ideas of formal probability. The questionnaires were devised for students in grades 3, 6 and 9.

Websites

Australian Association of Mathematics Teachers, 2005, *Australian Association of Mathematics Teachers*, www.AAMT.edu.au/, (accessed 24 June 2005).

The AAMT website provides information about resources and projects along with membership options. The bulletin board on the website provides updates on the latest information and events.

Eather, J. 2004, Maths Dictionary for Kids,
http://www.amathsdictionaryforkids.com/, (accessed 24 June 2005).

An annotated, interactive dictionary for students that explains over 500 common mathematical terms in simple language.

Education Queensland Corinda District Learning Community, 2004, 'Early algebra project', *The Learning Place*,
http://www.learningplace.com.au/deliver/content.asp?pid=17153, (accessed 24 June 2005).

This page contains links to publications and is designed to assist teachers to learn more about teaching, learning and thinking of students in the area of early algebra.

Mathematics Education Department, *Intermath Dictionary*, University of Georgia, http://intermath-uga.gatech.edu/dictnary/, (accessed 24 June 2005).

This interactive mathematics dictionary provides definitions and interactive examples/problems to assist understanding. It is a dictionary for middle school students, teachers, parents/carers, and anyone else interested in learning more about mathematical topics in the middle school curriculum. Terms are grouped in categories. The navigation items provide the following: description, related terms, everyday examples, interactive checkpoints, more information, challenge.

Queensland Association of Mathematics Teachers, 2005, *Queensland Association of Mathematics Teachers*, School of Education, University of Queensland, www.qamt.org/, (accessed 24 June 2005).

The QAMT provides information about opportunities for the professional development of teachers to support and promote the teaching and learning of mathematics and encourage and promote research into the teaching of mathematics. Its website links to useful resources, membership information and the latest student competitions and activities.

Books

Booker, G., Bond, D., Briggs, J. & Davey, G. 1997, *Teaching Primary Mathematics*, 2nd edn, Longman, Australia.

This text is organised in three parts:

- Mathematics and mathematics education
- Content and processes in the primary mathematics curriculum
- Implementing effective mathematics learning

Clarke, B., Bishop, A., Cameron, R., Forgasz, H. & Tiong Seah, W. (eds), 2003, *Making Mathematicians*, Mathematical Association of Victoria.

This text is a compilation of informative articles related to mathematics teaching and learning. The articles are grouped in the text under the following sections:

- Encouraging young mathematicians
- Nurturing middle year mathematicians
- Developing independent mathematicians
- Recognising diversity in young mathematicians
- Tools and techniques for making mathematicians.

Clements, D. & Bright, G. 2003, *Learning and Teaching Measurement*, National Council of Teachers of Mathematics, USA.

This text illustrates many important aspects of measurement, and discusses current thinking about learning and teaching measurement. It covers all levels from early childhood to adult education and focuses on research and practice, as well as the combination of the two.

Jones, G. (ed.) 2005, Exploring Probability in School, Challenges for Teaching and Learning, Mathematics Education Library, vol. 40.

A series of articles compiled in the following sections: Perspectives on probability and probability education; Teaching and learning probability in the elementary school; Teaching and learning probability in the middle school; Teaching and learning probability in the high school; and Teachers and probability. Issues discussed range from students' conceptions and misconceptions to assessing probabilistic thinking and reasoning.

Moore, D. & McCabe, G. 1993, *An Introduction to the Practice of Statistics*, Freeman, New York.

A text that examines probability, inference for distributions, proportions, two- way tables and regression, multiple regression, and analysis of variance.

National Council of Teachers of Mathematics, 2001, *Navigating through Algebra*, Navigations Series, Virginia, USA.

This series of texts provides practical teacher-tested activities for pre-kindergarten, grade 2, grades 3 to 5, grades 6 to 8, and grades 9 to 12. The texts are designed to help students develop a strong sense of algebraic concepts and relationships.

National Council of Teachers of Mathematics, 2001, *Navigating through Geometry*, Navigations Series, Virginia, USA.

This series of texts provides practical teacher-tested activities for pre-kindergarten, grade 2, grades 3 to 5, grades 6 to 8, and grades 9 to 12. The texts are designed to help students develop a strong sense of geometric concepts and relationships.

Perso, T. 2003, Everything You Want to Know about Algebra Outcomes for Your Class, K–9, Mathematical Association of Western Australia.

A text that discusses misconceptions about algebra and how students use algebra. It highlights the importance of learning the language and symbol system of algebra, and how the move into formal algebra must occur gradually. Activities for students are also included.

Salsburg, D. 2002, The Lady Tasting Tea: How Statistics Revolutionised Science in the Twentieth Century, Freeman/Owl, New York.

David Salsburg examines the development of ever-more powerful statistical methods for determining scientific truth.

Further resources

The following list of resources is a selection of the most recent works by some specialists in the area of mathematics learning.

Atweh, B., Forgasz, H. & Nebres, B. 2001, *Sociocultural Research on Mathematics Education: An International Perspective*, Lawrence Erlbaum Associates, New Jersey.

Australian Education Council Curriculum 1991, *A National Statement on Mathematics for Australian Schools*, Curriculum Corporation, Melbourne.

Boaler, J., William, D. & Zevenbergen, R. 2003, *The Construction of Identity*, Secondary Mathematics Education, California.

Caney, A. & Watson, J. 2002, 'Mental computation strategies for part-whole numbers', Australian Association for Research in Education, www.aare.edu.au/03pap/can03399.pdf, (accessed 22 June 2002).

Cronin, R. & Diezmann, C. 2002, 'Jane and Gemma go to school: Supporting gifted aboriginal students', *Australian Journal of Early Childhood*, vol. 27, no. 4.

Diezmann, C. & English, L. 2001, 'Developing young children's multidigit number sense', *Roeper Review*, Fall, 24(1), p. 11, The Roeper School, Michegan.

Diezmann, C. & Watters, J. 2001, 'The collaboration of mathematically gifted students on challenging tasks', *Journal for the Education of the Gifted*, Fall, 25(1), p. 7.

Goos, M. 2004, 'Learning mathematics in a classroom community of inquiry, *National Council of Teachers of Mathematics,* vol. 35, pp. 258–291.

Goos, M., Galbraith, P., Renshaw, P. & Geiger, V. 2000, 'Reshaping teacher and student roles in technology-enriched mathematics classrooms, *Mathematics Education Research Journal*, vol. 12, no. 3, p. 303.

Goos, M., Galbraith, P., Renshaw, P. & Geiger, V. 2003, 'Perspectives on technology-mediated learning in secondary school mathematics classrooms', *Journal of Mathematical Behaviour*, vol. 22, no.1, pp. 73–89.

Goos, M., Renshaw, P. & Galbraith, P. 1998, '"We're supposed to be discussing stuff!" Processes of resistance and inclusion in secondary mathematics classrooms', *Australian Senior Mathematics Journal*, vol. 12, no. 2, p. 20.

Harradine, A. 2004, 'Distribution division: Making it possible for more students to make reasoned decision using data', unpublished paper prepared for conference in Sweden.

Heirdsfield, A. 2002, 'Flexible mental computation: What about accuracy?', in *Proceedings of the 26th Annual Conference of the International Group for the Psychology of Mathematics Education*, eds A. Cockburn & E. Nardi, vol. 3, pp. 89–96, Norwich.

Irons, C. 2000, 'Mental computations: Why we must do more', *Teaching Mathematics*, vol. 25, no. 3, pp. 16–19.

Irons, C. 2001, 'Mental computations: How can we do more?', *Teaching Mathematics*, vol. 26, no. 1, pp. 22–26.

Irons, R. 1999, 'Numeracy in early childhood', Educating Young Children, vol. 5, no. 3 pp. 26–32.

MacGillivray, H. 2005, *Data Analysis: Introductory Methods in Context*, 2nd edn, Pearson Education, Australia.

McIntosh, A. 2003, 'Moving to mental: Seven steps', paper presented at Making Sense of Computation Conference, Brisbane.

Moore, D. 1999*, The Basic Practice of Statistics*, 2nd edn, Freeman, New York.

Northcote, M. & McIntosh, A. 1999, 'What mathematics do adults really do in everyday life?, *Australian Primary Mathematics Classroom*, vol. 4, no. 1, pp. 19–21.

Owens, K. & Perry, B. 2000, *Mathematics K–10 Literature Review*, Board of Studies, New South Wales.

Shield, M. & Swinson, K. 1997, 'Encouraging learning in mathematics through writing, *Australian Mathematics Teacher*, vol. 53, no.1, p. 4.

Smith, P. 1993, *Into Statistics*, Nelson, Melbourne.

Statistics Canada, 2003, *Statistics: Power from Data*, http://www.statcan.ca/english/edu/power/toc/contents.htm, (accessed 24 June 2005).

Sulllivan, P., Warren, E. & White, P. 2000, 'Students' responses to content-specific open-ended mathematical tasks', *Mathematics Education Research Journal*, vol. 12, no. 1, p. 2.

Sullivan, P., Mousley, J., Zevenbergen, R. & Harrison, R. 2003, 'Being explicit about aspects of mathematics pedagogy', in *Proceedings of the 27th Conference of the International Group for the Psychology of Mathematics Education*, pp. 267–274, University of Hawaii, Honolulu.

Utts, J. & Heckard, R. 2000, *Mind on Statistics*, Duxbury, Pacific Grove.

Warren, E. & Cooper, T. 2003, 'Introducing equivalence and inequivalence in Year 2', *Australian Primary Mathematics Classroom*, vol. 8, pp. 4–8.

Warren, E. & Nisbit, S. 2001, 'How grades 1–7 teachers assess mathematics and how they use the assessment data', *School Science and Mathematics*, vol. 101, no. 7, p. 348.

Watson, A. & Mason, J. 1998, *Questions and Prompts for Mathematical Thinking*, Association of Teachers of Mathematics, Derby.

White, P., Sullivan, P., Warren, E. & Quinlan, C. 2000, 'To investigate or not to investigate? The use of open-ended, content-specific mathematical tasks', *Australian Mathematics Teacher*, vol. 56, no. 2., p. 6.

Zevenbergen, R. & Mousley, J. 2003, 'The contexts of mathematics tasks and the context of the classroom: are we including all students?', *Mathematics Education Research Journal*, vol. 15, no. 2, pp. 107–121.

Zevenbergen, R., Mousley, J. & Sullivan, P. 2001, 'Using open-ended tasks for teaching, learning and assessment', *Teaching Mathematics*, vol. 26, no. 1, pp. 7–10.

Zevenbergen, R., Sullivan, P. & Mousley, J. 2001, 'Open-ended tasks and barriers to learning teachers' perspectives', *Australian Primary Mathematics Classroom*, vol. 6, no. 1, pp. 4–9.

