The Australian Association of Mathematics Teachers and Early Childhood Australia

Position paper on early childhood mathematics

Rationale

The early childhood period, from birth to eight years, is critical for learning and development in all areas, but particularly in mathematics. In 2006, the Australian Association of Mathematics Teachers and Early Childhood Australia published a *Position Statement on Early Childhood Mathematics*, which recommended 'appropriate actions to ensure that all young children have access to powerful mathematical ideas and learning in their early years, and to learning that nurtures success and positive dispositions'. This position paper is a revision and update of the original, taking into account the progress that has been made in the ensuing years in policy, research and practice.

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Early Childhood Australia
A voice for young children

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Position

The Australian Association of Mathematics Teachers (AAMT) and Early Childhood Australia (ECA) believe that all children in their early childhood years are capable of accessing powerful mathematical ideas that are both relevant to their current lives and form a critical foundation for their future mathematical and other learning. Access to these ideas through high-quality, child-centred, and strengths-based activities in their homes, communities, prior-to-school settings, and schools is a fundamental right for all children. The following recommendations recognise actions designed to reach the outlined position.

Curriculum

Alignment with Australian curricula

Belonging, Being & Becoming: The Early Years Learning Framework for Australia and the *Australian Curriculum: Mathematics* are the relevant curriculum documents for early childhood mathematics learning and teaching in Australia. The position statement recognises these documents and aligns with them, particularly through their principles, outcomes, and general capabilities.

Everyday mathematics

Mathematics learning occurs in homes, cars, public transport, parks and many other venues frequented by young children outside of early childhood education settings and schools. The position statement recognises such 'everyday' mathematics learning as critical learning to be nurtured both for its own sake and because it can assist the learning of mathematics in educational settings.

Continuity of curriculum

The position statement encourages educators and teachers in both prior-to-school and school sectors to facilitate continuity of mathematics learning between and across the sectors through the use of appropriate challenging, open-ended and contextual tasks, play, sustained shared thinking and other appropriate pedagogies. The position statement encourages all involved to see the value of the content and pedagogical approaches encountered in both prior-to-school settings and the early years of school, and to utilise these across the transition to primary school.

Being and becoming

During the early childhood years, young children learn a great deal of mathematics that is relevant to them in the present as well as mathematics that will assist in their future learning. The position statement dismisses any need for privileging either current or future mathematical development in early childhood as both are critical.

Dispositions

The position statement recognises the importance of the development of young children's productive dispositions to mathematics and mathematical learning. This includes the inclination to see mathematics as useful and worthwhile, confidence that mathematics is within their reach, and an attitude of curiosity, inventiveness, and persistence. While young children show a natural curiosity about and enjoyment of mathematics, their experiences shape their attitude. Adults have a crucial role in providing a positive, engaging and encouraging environment that promotes imagination, problem-solving and sense-making. A child's disposition towards learning mathematics is key to their educational achievement and future success in and out of school.

Pedagogy

Powerful mathematicians

Young children see the world through a mathematical lens and explore a range of mathematical ideas through their play, everyday experiences, and interactions with others. The position statement considers all children as powerful mathematicians who are capable of expressing themselves mathematically, communicating their thinking and applying their mathematical knowledge to their everyday world.

Recognise, celebrate, and build

Children learn from what they already know, using methods that they have already experienced through meaningful tasks. The position statement takes a stance that recognises, celebrates, and builds upon the mathematical learning that young children have developed and uses their strategies for solving mathematical problems as the basis for future development. Mathematics is a cultural practice and educators need to be aware and responsive to the cultural understanding of the children.

Play

Child-initiated, child-centred play is accepted as a key pedagogical approach in the early years. This paper recognises the importance of play for all aspects of learning and development. The position statement encourages the utilisation of such play as a key context for mathematical exploration and learning, and recognises that educators and teachers have a critical and intentional role in promoting and extending mathematical play opportunities.

Supported interaction

Mathematics learning is not a solo performance. The position statement recognises that mathematics learning requires meaningful interaction with 'knowing' others, investigation, problem-solving and sustained shared thinking. Such interactions will involve provocation, modelling, and inquiry. Sustained shared thinking occurs when two or more individuals interact to share ideas and co-construct new knowledge and understanding. Educators and teachers support the development of children's complex thinking and problem-solving skills by genuinely engaging children in open-ended and exploratory conversations and modelling their own thought processes.

Communication of mathematical ideas

An important component of mathematical learning is the communication of the ideas explored and learned. While mathematics has its own language and symbolism, these will not always be readily available to young children. Mathematical symbolism is abstract and can be daunting for young children, especially if they are expected to use it before they understand the underlying ideas. The position statement acknowledges that educators and teachers play a critical role in modelling mathematical language and representation for children to communicate and justify their ideas in ways that are initially devised by the children. Oral representation of mathematical ideas can facilitate young children's learning. The position statement encourages the use of 'maths talk' among children and between children and adults for both learning and communication of ideas. Educators, teachers and 'knowing' others can support children to display appropriate levels of mathematical rigour.

‘Knowing’ others

Adult family members, early childhood educators and teachers all play key roles in the mathematics learning of young children through their determination of aspects of the learning environment, choice of tasks and resources, and both intentional and unintentional interactions with the children. The position statement reiterates the critical roles of these ‘knowing’ others as essential to young children’s mathematical learning.

Mathematical knowledge of educators and teachers

The mathematical content and pedagogical knowledge of educators and teachers in prior-to-school settings and in the early years of school may be uneven. The position statement advocates that initial teacher education and professional learning programs for these educators and teachers address current research and effective practice in early childhood mathematics learning and teaching.

Questioning

A key role for the ‘knowing’ other in learning-focused interactions is to act as an intentional provocateur in young children’s mathematical learning: someone who will interact with the learner and stimulate the continuation and complexification of learning. Usually this will be achieved through the asking of purposeful, open-ended questions and supporting the learner to seek answers. The position statement recognises the importance of such questions and that posing them is a substantial skill to be learned and practised by educators, teachers, and children.

Resources

Young children will find it helpful to have available appropriate resources to assist their learning of mathematical ideas. The position statement encourages the use of appropriate and varied materials (everyday and manufactured), space, time, and other resources to assist children to engage with their mathematical learning.

Technology

One resource increasingly available to many young children is digital technology. With increased access to a broad range of technologies both in homes and educational settings, it is important that digital tools are critically evaluated if being used in young children’s mathematics learning. The position statement encourages the appropriate use of such technology as a resource to assist young children’s access, exploration, communication, and representation of mathematical ideas.

Assessment

Gathering, documenting, and analysing information as evidence of children’s mathematical knowledge and understandings assists educators and teachers to plan for future exploration, experiences, and learning. The position statement recognises the importance of assessing children’s mathematical development through observations, conversations, and children’s representations.

Context

Different contexts

Young children live in many different contexts simultaneously. Their mathematical learning is impacted by these contexts. The position statement recognises that children's mathematical development occurs within, is affected by, and is relevant to many different contexts, including family, cultural groups, community, prior-to-school settings, and school.

Home learning environments

A young child's home and family are the first contexts in which mathematical learning is undertaken. Even when children commence early childhood education and later enter school, this home learning environment continues to be a major influence on mathematical development. The position statement recognises the importance of home learning environments in children's mathematics learning and advocates the facilitation of the development of such environments jointly by families, educators and teachers.

Diversity

Young children live in a world which is diverse in many dimensions. The position statement recognises the diversity of learners in terms of culture, ability, language and interest, and the impact of these on young children's mathematical learning.

Suggested further reading for position paper on early childhood mathematics

Curriculum

Alignment with Australian curricula

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Continuity of curriculum

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Pedagogy

Powerful mathematicians

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Recognise, celebrate and build

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'Knowing' others

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Different contexts

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Current Australian Texts

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