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STEM FOR INFANTS AND CHILDREN UNDER 2
YEARS OLD: IDENTIFYING THE MATHEMATICAL
DEMANDS AND OPPORTUNITIES IN YOUNG
CHILDREN'S PLAY AND INTERACTIONS

DAVIES, SHARON

SCHOOL OF EDUCATION

CURTIN UNIVERSITY

PERTH, WESTERN AUSTRALIA

AUSTRALIA

Dr. Sharon Davies
School of Education
Curtin University
Perth, Western Australia
Australia

STEM for Infants and Children Under 2 Years Old: Identifying the Mathematical Demands and Opportunities in Young Children's Play and Interactions

Synopsis:

This Action Research project was conducted with teachers working with infants and children under two years in an Early Childhood Education and Care Centre in Western Australia.

The presentation will share Early Learning Centre action and teacher written 'Learning Stories'. These illustrate STEM experiences (using a 'mathematical lens') and opportunities for supporting and encouraging mathematical concept and skill development during child-initiated play, routines, schedules and care giving.

STEM for Infants and Children Under 2 Years Old: Identifying the Mathematical Demands and Opportunities in Young Children's Play and Interactions

To ensure young Australians are equipped with the necessary skills for the future we need to build science, technology, engineering and mathematics [STEM] competence in early childhood. This involves, in particular, supporting and encouraging 'beginning skills' in infants and children under two years, despite the majority of STEM initiatives, programs and resources in Australia being currently directed towards supporting school age children (aged four years and above).

Numeracy includes developing confidence and competence with a range of mathematical concepts, with basic numeracy an essential requirement for critical thinking. Opportunities for developing mathematical concepts and skills are embedded across everyday experiences.

Young children learn mathematical concepts and skills by either interacting with the environment directly or through social interaction. Quality learning is often incidental and informal. For teachers of infants and children under two years it is important for them to understand early mathematical skills and concepts such as; matching, comparing, contrasting and sorting. Without targeted pedagogical direction teachers may provide caregiving or observe children as they play and not see opportunities to support young children in their development of mathematical skills and concepts (McLaughlin, Aspden, & Snyder 2016).

This six-month qualitative case study research used Action Research principles to engage teachers working with children age 0-2 years. It was conducted in an Early Childhood Education and Care Centre in metropolitan Perth, Western Australia.

Teachers were provided with resources developed specifically for use in Early Childhood STEM learning environments. They also engaged in professional learning to develop conceptual mathematical knowledge and critical reflection on learning.

Teachers completed timelines/overviews to record intentional (planned opportunities and daily schedules, routines, transitions) and incidental opportunities for learning and understanding related to mathematical skills and concepts in children under two years. Teacher written 'Learning Stories' (Carr, 2001) recorded children's gestures, actions and manipulation of objects, verbalisations and interactions. Teacher observations and reflections gave an insight into numeracy embedded in 'play' and everyday experiences highlighting where mathematical language, concepts and skill development could be supported and encouraged. The researcher compiled field notes during onsite visits, and semi-structured interviews and questionnaire data also contributed to case studies compiled for each teacher.

Teachers reported a greater ability to recognise opportunities offering potential for infants and children under age two to explore mathematical language, skills and concepts. Consequently, teachers were more thoughtful and intentional when responding to what young children 'do, say or produce' during everyday interactions and child-directed play.

References

- Carr, M. (2001). *Assessment in early childhood settings: Learning stories*. London: Paul Chapman.
- McLaughlin, T., Aspden, K., & Snyder, P. (2016). Intentional teaching as a pathway to equity in early childhood education: participation, quality, and equity. *New Zealand Journal of Educational Studies*, 51, 175-195. doi.org/10.1007/s40841-016-0062-z