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Rethinking Block Play:

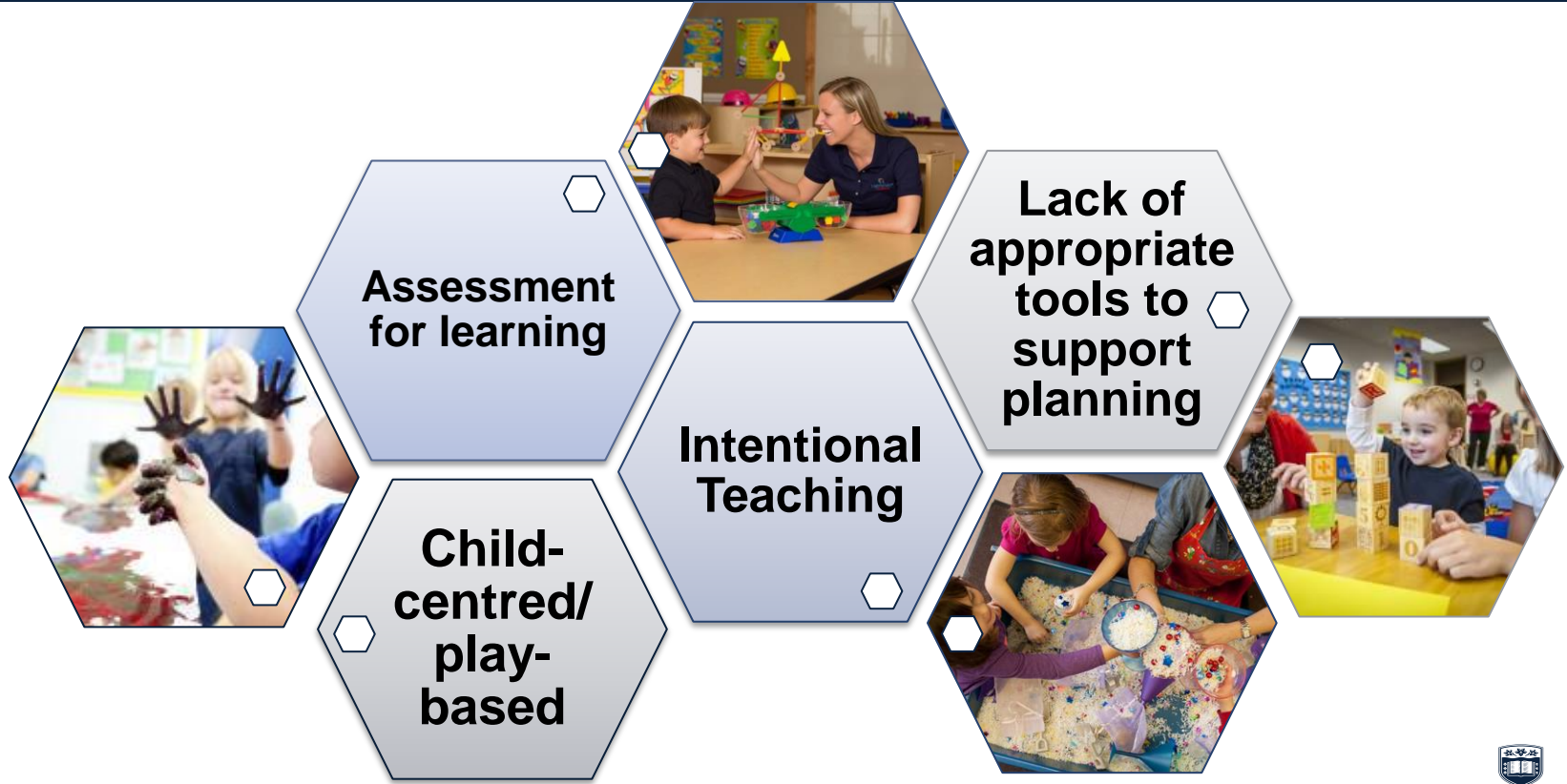


The Development of the Numeracy and Mathematics
Block-Based Assessment (NUMBBA) for Preschool
Children Jo Grimmond, Dr Cathrine Neilsen-Hewett, Dr Steven Howard



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Study Context

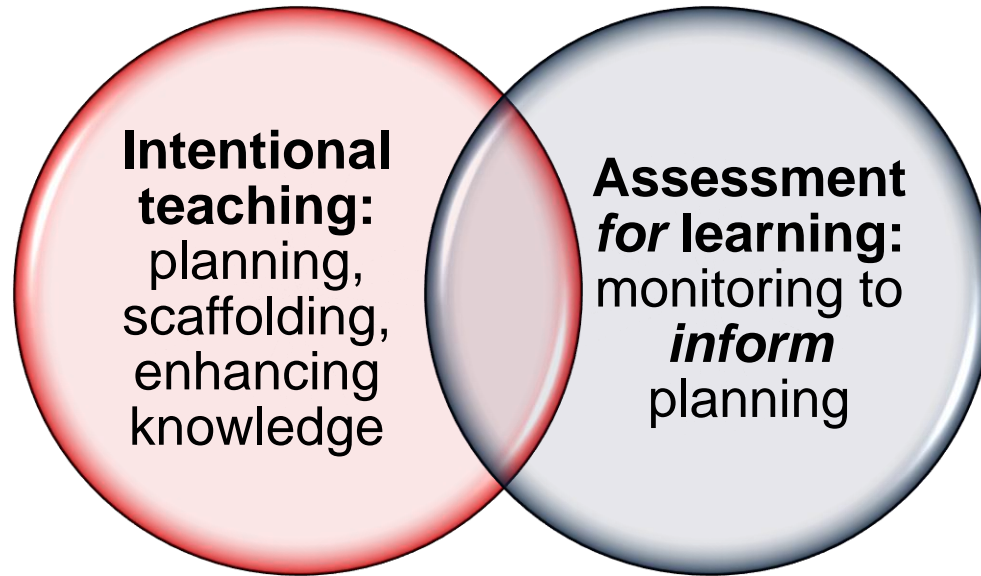


A background image showing a group of young children in a classroom setting, engaged in play with various wooden toys like blocks and sticks on the floor. A large dark blue rectangle with white text is overlaid in the center.

What do we know?



Intentional Teaching and Assessment for Learning



What does the literature say?

Assessment for Learning

(Allen, 2007; Anthony, McLachlan, & Poh, 2015; Blandford & Knowles, 2012; Dunphy, 2010; Schulz, 2015; Zhang, 2016)



Numeracy Assessment

(Papić, 2015; Politt, Cohrssen, Church & Wright, 2015; Wager & Parkes, 2016; Purpura & Lonigan, 2015)

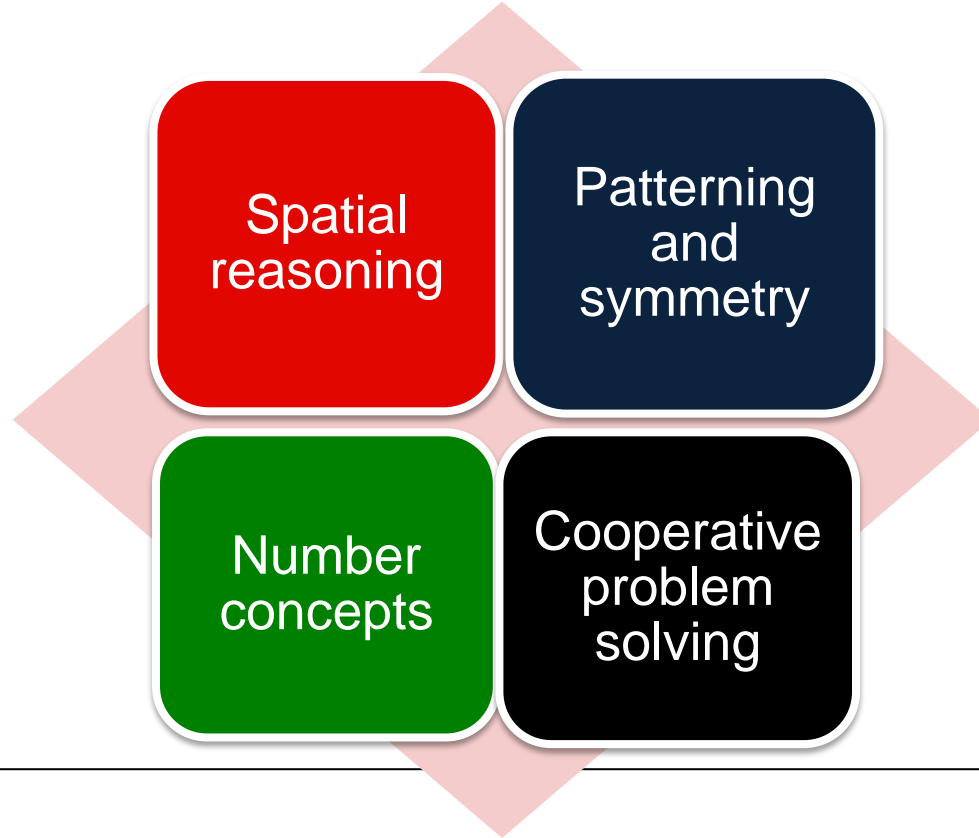


My
research:
NUMBBA

The Case for Early Numeracy



Early Predictors of Later Mathematical Success



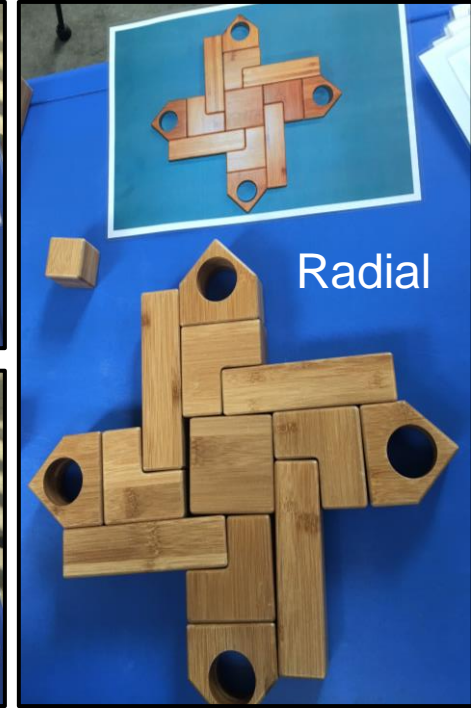
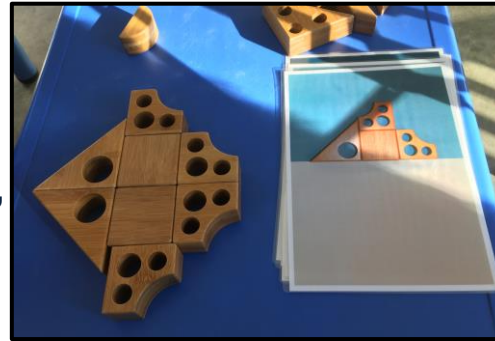
Patterning

- Fundamental to mathematics
- Numerical and non-numerical
- 3 general types: repeating, growing, relationship
- Explore patterns on 4 levels (recognise, describe, extend, create)
- Repeating patterns vary in difficulty



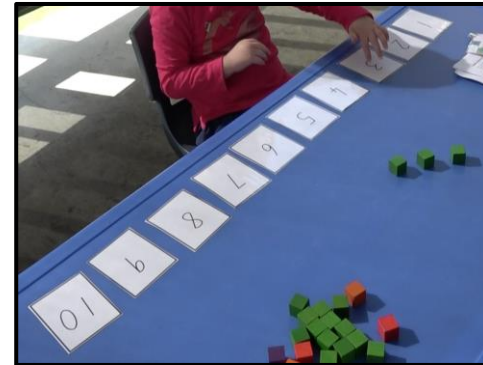
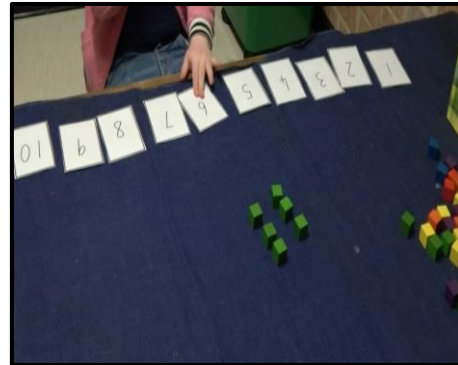
Symmetry

- 3 general types: bilateral (reflection), translational and radial.
- Understanding of spatial cognition
- Role in mathematical problem solving (Leikin, Berman, Zaslavsky, 1999)



Number Concepts: Subitising

- Ability to say how many objects are in a group without counting.
- Core component upon which all other mathematical abilities are built. (Penner-Wilger et al., 2007)
- Allows children to categorise the world.

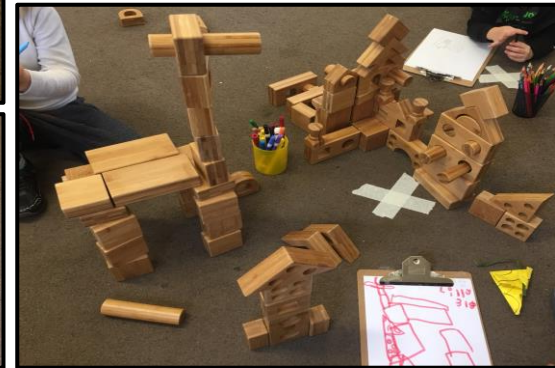


Cooperative Problem Solving: Engineering

- Develops design skills
- Role in mathematical problem solving

(Leikin, Berman, Zaslavsky, 1999)

- Provision of more opportunities for group engineering



Early Start Project: A piece in a bigger puzzle

MODEL: Monitoring and Observation for Development and Early Learning



(DeRosnay, Howard, Melhuish, Neilsen-Hewett, 2018)

Research Aims

To develop and validate the
Numeracy and Mathematics
Block-Based Assessment

(NUMBBA)

- 3 activity-based assessments
 - spatial reasoning, patterning and symmetry, number concepts and cooperative problem solving



Why Blocks?

**“Blocks are a timeless toy.
They never stop challenging,
stimulating and engaging
young children”**

(Hansel, 2017, p. 161).

**A child’s artistry in block
building is closely related to
the true mathematician’s
view of mathematics as a
creative art”***(Hirsh, 1984, p.
63).*



Why Blocks?

Many possibilities for rich STEM learning.

(Andrews, 2015; Hansel, 2016; Hirsch, 1984; Hobenshield-Tepylo, Moss, & Stephenson, 2015; Ness & Farenga, 2007; Ramani, Zippert, Schweitzer, & Pan, 2014; Wellhousen & Kieff, 2001)



Underestimated area of play as a vehicle for intentional teaching.

(Clark, 2012; Hewitt, 2001; Parks & Blom, 2013)



Block-Based Activities

Activity 1: Pattern cards to assess spatial skills, patterning and symmetry



Activity 2: Number game – subitising with blocks



Activity 3: Collaborative block building game



Development of the Scale

A scale will be developed for each activity to measure developmental difference between children aged 3, 4 & 5 years



Research Design

Phase 1: Measure
development
(2018)

Phase 2: Trial of the
measures by researcher
(1st 6 months of 2019)

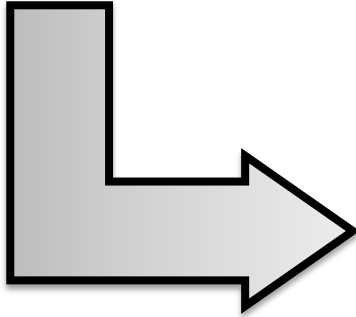
Phase 3: Trial of the
measures by practitioners
(2nd 6 months of 2019)



So why is this research so important?

Provision of
functional
assessment tools
to assess
numeracy in
preschool children

- **Formative
Assessment**



Inform
pedagogical
decisions and
planning

- **Intentional
teaching**

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Thank you for listening!



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Any Questions??

