

Pretend play and mathematics – informing the ‘school readiness’ debate

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Introduction

This brief article contests the current ‘school readiness’ debate and dominant discourses through a focus on pretend play and mathematics.

It argues that curriculum imperatives, targets and ‘goals’ – especially for mathematics and literacy – have achieved a high-status, almost mythical position that ignore the holistic nature of learning and the real value of play, resulting in play either moved to the margins of the children’s experiences, or reduced in its scope and lacking quality. Rogers and Evans contend that in reality, ‘the contribution of play to early learning continues to be highly variable and dependent on a range of external political, structural and managerial factors’ (2008: 19).

Children’s ‘funds of knowledge’

Research by Moll et al. has identified the significance of the cultural knowledge or ‘funds of knowledge’ (such as knowledge, skills and ways of doing things) that children develop in their home lives (1992). At home young children engage in a range of social and cultural experiences, some of which are mathematical, and cultural knowledge has also been identified as important for learning mathematics. Munn and Kleinberg emphasise that children need to learn the cultural rules that tell ‘how to use a system, and what its role is in our culture’. Without this understanding children ‘risk becoming stranded in a sea of meaningless activity’ (2003: 51/53).

From a socio-cultural perspective one of the most effective contexts that can support rich cultural learning is social pretend play (Vygotsky, 1978). However, reflecting on her informal observations Gifford noted, ‘children’s role-play was concerned with the larger themes of life, like love and power, rather than mundane things like the price of potatoes’. (2005: 2). Other researchers have identified a similar lack of mathematics in play: for example, a study of ten Scottish nurseries found children’s use of number without adult involvement was very rare, and no maths in role-play was observed (Munn and Schaffer, 1993). Ewers-Rogers and Cowan found that children did not use any numbers in their play, observing, ‘For ordinary English pre-schoolers, money may have little significance’ (1996), whilst Brannon and van de Walle concluded ‘Numbers may not be salient to young children’ (2001). If we accept that pretend play can provide contexts in which children can explore their cultural knowledge, why is evidence of children’s mathematics so rarely observed in role-play?

Whilst a common concern among teachers is the dominance of literacy and mathematics, in ten classes studied, Moyles and Worthington found a paucity of mathematics in both teacher-planned activities and play (2011): this study also mirrors the findings of the earlier study (Adams et al. 2004) that teacher-led mathematics largely focused on a narrow set of 'skills' to be transmitted.

Problems with pretence

Moyles and Worthington's study confirms the misunderstandings and pressures concerning play, revealing that there were few opportunities for 'sustained, complex and imaginative play' (2011: 3). Perhaps the answer lies in the nature of role-play in educational settings?

Firstly it is an almost universal practice for the 'ownership' of play to be the adults': commonly *adults* choose, plan and resource themed role-play areas, revealing *adults' perceptions* of children's interests, rather than children's authentic and immediate interests that have personal cultural meaning for them (Worthington, M. and van Oers, B., *forthcoming*). This, argue Rogers and Evans, 'creates tensions between children's 'natural and powerful propensity to play in ways that transform and find new meanings... the pedagogical imperative to reproduce real life – the café, the shop, the doctor's surgery – so that requirements in literacy and numeracy can be met' (2008: 37). However, a move to a more equitable distribution of power can promote children's greater participation (Dahlberg, Moss and Pence) in which children are viewed as 'rich' and learning 'a cooperative and communicative activity' (2007: 50). The real paradox is that given genuine opportunities for free and spontaneous play, children will naturally draw on all their knowledge, including their cultural knowledge of mathematics.

Researching pretend play and mathematics

The research on which this article draws, aims to uncover the emergence of mathematical thought and representation in early childhood, and arises from previous research into *children's mathematical graphics* (e.g. Carruthers and Worthington, 2006). Using longitudinal, ethnographic case studies of 7 young children aged 3-4 years, data were collected in a nursery in an inner city Children's Centre in the south west of England. They include written observations, examples of the graphics they chose to use to communicate ideas, and home visits including informal discussions with children and parents.

Summary of findings

Analysis of the data shows that children engaged in a total of 134 pretend play episodes over three terms¹¹. For all the children their engagement in role-play increased throughout the year.

The children's use and understanding of mathematics

The data exemplify the extent and richness of the children's home cultural knowledge and the embedded nature of the children's mathematical thinking

¹¹ For full details see Worthington, M. and van Oers, B. 'Play and the cultural foundations of mathematics', (*forthcoming*).

and communications. For some children their understanding was rooted in such daily experiences as shopping, cooking and aspects of childcare relating to siblings. Others drew on their cultural knowledge of work related experiences with a parent, or shared family events. These understandings meshed with 'new' cultural knowledge in their nursery including both graphicacy and mathematics.

In direct contrast to the research findings cited earlier, over 42% of pretend play episodes included evidence of children's mathematical thinking. The data revealed the children's wide-ranging mathematical problems including many aspects of number, quantity and counting, calculations, money, time, and measurement in their various play episodes.

The children explored their mathematical thinking through actions, artefacts, talk and graphicacy, often choosing to use their *mathematical graphics* to communicate and to solve problems such as writing lists and registers, representing items removed (subtraction), making orders for food, writing (play) cheques and keeping scores for various games.

'Ready for school?'

These findings highlight the potential of free and spontaneous social pretend play. Supported by a powerful pedagogy of play in this setting, the rich seam of cultural knowledge children already possess reveals their understandings and communications; co-constructed, meaningful and visible. Whitebread and Bingham conclude that their extensive review of evidence shows 'that the idea that rushing young children into formal learning of literacy, mathematics etc as young as possible is misguided' (2011: 4) and can only lead to a failure in children's diverse social, emotional and cognitive needs being met.

Moyles and Worthington emphasize the need to 'view the classroom and the curriculum experiences from the viewpoint of the child' (2011: 4). Rather than de-contextualized mathematics - from which children's understanding is assessed against 'tick lists' of a narrow set of curriculum criteria, effective pretend play can reveal their developing understanding of mathematics that often exceeds official curricula requirements. Hedges proposes that drawing on this knowledge consequently has the potential to 'move teachers' pedagogical thinking from having *information* about children to *knowledge* of children at a deeper level' (2010: 35, italics in the original). Teachers can then build on their new understandings and provide mathematical experiences that truly meet children's needs, enabling schools to become 'ready for children.'

References:

- Adams, S., Alexander, S. Drummond, M.J. and Moyles, J. (2004) *Inside the Foundation Stage: Re-creating the Reception Year*. London: Association of Teachers and Lecturers (ATL).
- Brannon, E. and Van de Walle, G. (2001) 'The development of ordinal number competencies in young children.' *Cognitive Psychology*, **43**: 53-81.
- Carruthers, E., and Worthington, M. (2006) *Children's Mathematics: Making Marks, Making Meaning*. London: Sage Publications. 2nd Ed.

- Dahlberg, G., Moss, P. and Pence, A. ((2007) *Beyond Quality in Early Childhood Education and Care*. Abingdon: Falmer Press. (2nd Ed.).
- Ewers-Rogers, J. and Cowan, R. (1996) 'Children as apprentices to number.' *Early Childhood Development and Care* **125**(2): 141-148.
- Gifford, S. (2005) *Teaching Mathematics 3-5: Developing Learning in the Foundation Stage*. Maidenhead: Open University Press.
- Hedges, H. (2010) 'Whose goals and interests? The interface of children' play and pedagogical practices.' In. L. Brooker and S. Edwards (Eds.) *Engaging Play*. Maidenhead: Open University Press.
- Hedges, H., and J. Cullen, J. 2005. Meaningful teaching and learning: children's and teachers' content knowledge, *ACE Paper* 1: 11-24.
- Moll, L., Amanti, C. Neff, D. and Gonzales, N. (1992) 'Funds of knowledge for teaching: using a qualitative approach to connect homes and school.' *Theory into Practice*. 31, No. 2: 132-141.
- Moyles, J. and Worthington, M. (2011) 'The Early Years Foundation Stage through the daily experiences of children'. *TACTYC Occasional Paper*, No. 1.
- Munn, P. and Kleinberg. S. (2003) 'Describing good practice in the early years – a response to the 'third way' '. *Education 3-13*. June 2003: 50-53.
- Munn, P., & Schaffer, H. R. (1993). 'Literacy and numeracy events in social interactive contexts'. *International Journal of Early Years Education*, 1(3), 61–80.
- Rogers, S., and Evans, J. (2008) *Inside Role-play in Early Childhood Education*. London: Routledge.
- Vygotsky, L.S. (1978) *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, Massachusetts: Harvard University Press.
- Van Oers, B. (2010) 'Emergent mathematical thinking in the context of play'. *Educational Studies in Mathematics*, 74, No. 1, 23-37.
- Whitebread, D. and Bingham, S. (2011) 'School Readiness; a critical review of perspectives and evidence'. *TACTYC Occasional Paper*, No. 2.