Role play and mathematics – a problem or a solution?

Helen Williams describes using role play to deepen children's understanding of number

> *"There is a danger that mathematics is seen by children as a subject in which they learn about other people's ideas, particularly yours, and that it has little to do with them."*
>
> (Straker 1993, p.10)

For some years, research has pointed to collaborative tasks and talk being important in learning mathematics (Mercer, 2000; Barnes, 2008; Monaghan, 2010). The focus of this article is whether role play has the potential to support collaborative activity and mathematical conversations and my study for my PhD examined how role play was used as a vehicle for learners to explore some mathematical problems (Williams, 2014).

'Role play' is a particular form of play encompassing socio-dramatic, imaginative and fantasy play and in my experience young children in particular seem attracted to this type of play. In my view it involves 'walking in another's shoes' (Williams, 2006). In this article I use illustrations from my research in one Reception class to examine what contributes to making role play mathematically effective. The example I have chosen is a scenario familiar to many classrooms, the role play café. In the following transcripts, speech is in *italics*, [...] indicates missing speech, / a pause and // a longer pause.

The Reception Dinosaur Café

A café for dinosaurs had been set up indoors as part of an 'Explorers' theme and as a result of children being sure that explorers and dinosaurs would not require the same refreshments. On a large whiteboard children had listed the numerals 1 to 10 under two headings, 'Hunters' Menu' and 'Dinosaurs' Menu'. The numerals specified the menu number associated with each item. On the right-hand side, a list written in children's handwriting under 'Dinosaurs' Menu' read:

1 meat, 2 chicken, 3 pears, 4 fish, 5 ice cream, 6 (illegible), 7 choclat (sic), 8 (illegible), 9 big chicken, 10 (illegible).

In the following extract the dinosaur (Luke, 5y 2m), being unable to speak, indicated what he wanted to eat by tapping two sticks together a number of times to indicate his chosen menu item. The waitresses (Lucy, 5y 1m; Sabina, 4y 10m and Cathy, 4y 6m) had to interpret the taps and serve the dinosaur to his satisfaction. Ice cream (5 taps) was a popular order.

Lucy: *Are you full up now?*
Luke shakes his head. Lucy roars at him. Luke picks up two sticks, holds the two sticks apart, ready to hit them together.

Sabina: [holding up a coin] *Lucy, our, this is* ***our*** *money*
Luke strikes the two sticks together firmly 8 times. Lucy is listening to Sabina and then glances at Luke.

Sabina: *Only one explorer's, that's one bit of money [...]*

Lucy: [to Luke] *Is that nine?*
Luke nods and Lucy turns to fetch him something.

Lucy: [....] *ten. It has to be one of these* [laughs and hands plastic chicken to Luke]
Luke 'eats' the chicken. Edie is smiling.

Lucy*:* *Are you full up?* [laughs]
Luke shakes his head (no) and holds sticks to signal, strikes them 10 times. Lucy can be seen counting alongside.

Edie *He'll eat all the food in a minute!*

Lucy: *Ten?*
Luke nods. Cathy shows him a pineapple, Luke doesn't take this.

Lucy: [consults the price board, laughing] *Sweet corn!*

Lucy hands Luke a corn on the cob. Luke acts out gobbling the corn and roaring.

Edie: *Are you full up now?*

Luke shakes his head and Lucy laughs. Cathy offers him something, which is 'eaten' greedily. Luke strikes the sticks together seven times. Lucy can be seen concentrating on counting.

Lucy: *Six?*

Luke nods.

This is the opening minute and a half of a six-and-a-half minute video recording. It is an interesting example of café play because the mathematics, rather than being about payment and exchange, concerns accurate counting and communication of amount. The problem, which emerged from children talking with the teacher, is, how can dinosaurs order food if they can't speak? Perhaps, suggested the teacher, they might have to tap or stamp? Together, over a few days, a numerical code was decided upon and practised, both in group-carpet sessions and independently by the children when playing, and the menu board changed daily according to who played in the café.

A problem is something you have not come across before and here, children in their second term of the Reception year, applied their developing counting skills in a complex, social context. They read and recorded numerals, counted something they could not see with varying degrees of success and related the two, with resilience, perseverance, independence and collaboration, important learning qualities (Ollerton 2010). Aubrey identifies nine sub-skills necessary when successfully applying one's counting knowledge, including keeping track of what is counted and knowing when to stop (Aubrey 2003). Whilst Lucy was successful when counting objects she could touch, in this context she consistently under-counted the taps she heard, saying the number *after* hearing each tap.

This was a successful role play mathematically because it *made sense* to these children. They were involved in both its creation as well as a possible solution. It was also successful because it was well-pitched in terms of the level of mathematical challenge for this class at this time, being "... *initially tantalisingly out of reach*" (Hewitt 2004:3); neither too easy nor so far out of reach that it would appear impossible. In addition the teacher used whole-group carpet sessions to ask about what was happening in the café and how children were tackling the problem of the non-speaking dinosaur, as well as to practise counting different sounds. This increased the children's accuracy and confidence when counting when role playing.

Rich role play scenarios are valuable for problem-raising in that they provide a meaningful context in which to place some mathematics. Through working collaboratively within these, learners' mathematical understanding is enriched by seeing how mathematical content is applied in different situations. Problems might not be authentic (a café for dinosaurs?) but they do have to be real to the children. Allowing time for children to immerse themselves in the context (play!) appears to lead to an increased willingness on behalf of children to become involved in some complex mathematics. Dilemmas can then be built into the scenario as it develops. Whilst mathematical problems might not be solved at one attempt, regular class discussions about what was happening in the role play played an important part in both classrooms in both preparing for likely complications and revisiting some significant mathematical moments. The role play, rather than being 'time off' mathematics, played a

central part in the mathematical experience of children.

Children valued the opportunity to tackle some mathematics independently of an adult, positioning them as problem solvers and decision makers (Hendy and Toon 2001). They tackled difficulties that arose with gusto, rarely seeking adult help. This appeared to positively affect their view of themselves as mathematicians.

Finally, role play is not about dressing up and complex props. It is about allowing playful participation in some social situations with a mathematical edge. It is an unpredictable cocktail, and the mathematical muddle that results is often complex. It is possible that the social interaction keeps children glued to the mathematics. In addition, role playing mathematical problems affords children the opportunity to be in control of some mathematics and to play at being mathematicians in a current climate where all mathematics could be seen as under the sole control of the teacher.

References

Aubrey, C., (2003) 'When we were very young: The foundations for mathematics' in I. Thompson (ed.) *Enhancing Primary Mathematics Teaching.* Maidenhead: Open University Press

Barnes, D., (2008) 'Exploratory talk for learning' in Mercer, N., and Hodgkinson, S., *Exploring talk in schools: Inspired by the work of Douglas Barnes.* Los Angeles: Sage

Hendy, L & Toon, L. (2001) Supporting drama and imaginative play in the early years. Abingdon: Open University Press

Hewitt, D., (2004) 'Reflections on a problem' *Mathematics Teaching* 187 (June) 3-7

Mercer, N., (2000) *Words And Minds: How we use language to think together*. London: Routledge

Monaghan, F., (2010) 'Thinking aloud means talking allowed: Group work in the primary school mathematics classroom' in I. Thompson (ed.) *Issues in teaching Numeracy in Primary Schools.* Maidenhead: Open University Press

Ollerton, M., (2010) 'Using problem-solving approaches to learn mathematics' in I. Thompson (ed.) *Issues in teaching Numeracy in Primary Schools.* Maidenhead: Open University Press

Straker, A., (1993) *Talking Points in Mathematics.* Chrisbridge: Chrisbridge University Press

Williams, H., (2006) *Let's Pretend Maths*. London: BEAM Education

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