# Mathematical PlayWorld: A New Practice of Teaching Young Children's Mathematics in Play

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Empirical studies have been undertaken to further understand children's mathematical learning in play-based settings (Worthington et al., 2020; Magnusson & Pramling, 2018; Worthington & van Oers, 2016; Poland & van Oers, 2007;). However, there is little know on how imaginative play can be intentionally interwoven into children's mathematical teaching programs. Thus questioning how preschool teachers can design programs which foster young children's mathematical problem-solving and thinking in imaginative play.

To better understand children's mathematical problem-solving process and actions and how this is supported by joint imaginative play between children and teachers, this paper draws upon the Vygotskian concepts of play and imagination to study how imaginative play can be designed to promote children's mathematical problem-solving and thinking. The lens in this study centred upon how imaginative play becomes a meaningful context to motivate children's exploration of the concept of measurement in play.

In extending on previous literature, the study specifically reports a new practice, drawing upon Fleer's (2018) Conceptual PlayWorld approach, which supports children's mathematical thinking and learning, titled a "Mathematical PlayWorld" (Disney & Li, 2022; Li & Disney, 2023). This approach starts with a selected story, where children and teachers build emotional connections with the story characters, taking character roles while they enter the playworld space to investigate an emotionally charged mathematical problem. Through the visual narrative methodology, 14 hours of video observation, focus group discussion and reflective interviews have been used to analyse two teachers and a group of 11 preschoolers' joint imaginative play in the *Mathematical PlayWorld*. Within the joint imaginary situation, children actively engaged with concepts of measurement to solve the mathematical problem of "*how to design a broom to fly to the witch's sister's birthday party…how long does it need to be*?". As children constructed a broom out of large blocks, their understanding of measurement allowed them to make comparisons of the attributes to be measured, such as long and short and allowed teachers to introduce concepts such as comparing, ordering, and matching while imagining the length of the new broom.

This study found that Mathematical PlayWorld creates motivating conditions to support children's mathematical learning in imagination and support the quality of intentional mathematics teaching in play-based early years settings. We argue that joint imaginative play should be promoted to support children's mathematics learning as it motivates children's active exploration of mathematics concepts, thus increasing the quality of mathematics education.

## References

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