

## Using Barad's 'Apparatus' to Reconceptualise the Young Preverbal Child's Mathematical Engagement in Their Environment

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Barad's (2007) conceptions of apparatus can be used in an early learning environment is explored here. His description of apparatus can provide a valuable way to conceptualise early learning environments and, subsequently, identify further opportunities for preverbal children to engage with mathematical understandings. Barad views apparatuses as providing objectivity. In early childhood education, the environment can be viewed as an apparatus through which children's understandings can become evident. That is, the environment serves as a form of tool through which early childhood educators can 'see' children's understandings when engaging with their environment. In this way, it is as if the environment is the measuring device—and the early childhood educator needs to be able to 'read' what the 'measurement' is. For very young preverbal children, this becomes more important as understandings cannot be communicated via language.

However, the measuring apparatus needs to be finely tuned—that is, the environment needs to be carefully considered and created and conceived—and the early childhood educator well versed in interpreting the information provided via the apparatus—in other words, being able to analyse what the preverbal child's engagement with the environment, and the intra-action (where intra-action refers to the constant state of becoming that occurs due to the individual and the world within which they exist being both cause and effect [Barad, 2007]) between the child and other matter within the environment, shows about the child's mathematical understandings. As part of this fine tuning, recognition of agency in all elements of the environment is needed so that early childhood educators strengthen their identification of mathematical engagement through attending to how the environment may enable the young child's learning (Smythe et al., 2017). Likewise, a consideration of intra-actions of the elements of the environment and how these themselves contribute to the mathematical understandings that can be developed (Smythe et al. 2017) is needed. This impacts the early childhood educator in two ways—highlighting the intra-active aspect of the very young child's engagement and changing the focus from the educator as the pre-eminent force in the environment for children engaging with mathematics to the foregrounding of all elements within the environment.

Reconceptualising the environment as apparatus can emphasise how the recognition of the intra-action of the elements of the environment can provide another way to interpret what early childhood educators see in terms of young children engaging in mathematical thinking (Björklund et al. 2020). An examination of how using the ideas of apparatus enable early childhood educators to interrogate the early learning environment in terms of the impact on very young preverbal children's opportunities to demonstrate and engage with mathematical thinking is provided, together with how this may be used to assist preservice early childhood educators in developing their understandings of mathematical education in early childhood.

### References

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