



## Turn Left, Turn Right: An Embodied Perspective on Children's Difficulties with Left/Right Spatial Orientations

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The Australian Curriculum: Mathematics includes the expectation that Year 1 (6/7 years) children can effectively discriminate left/right, enact left/right-turning directions and use the language of left/right to give directions (ACARA, n.d.). Directional discrimination requires children to understand the meaning of relative directional words in reference to their own viewpoint (egocentric) as well as from another's viewpoint (allocentric). This study utilised two scenarios to investigate the question: *How do Year 1 children respond to, and give, verbal instructions to turn-left and turn-right?* - through individual task-based interviews with 36 children from three schools. The *You be the robot* task involved the egocentric frame of reference relating the child's own body-movement as they responded to verbal instructions. The *Direct a robot* task required the child to take the perspective of someone else by giving movement directions to a toy robot (animated by the interviewer).

Analysis focused on whether each child was aware of their left/right, could correctly physically turn left/right, and use verbal left/right turn language to give directions. Most children found following left-right directions easier than giving left-right directions, though, surprisingly, a few had the opposite preference. Only four children had a completely correct score on both tasks, and five were unable to follow any directions appropriately. We found that the children interpreted the meaning of 'turn' in a variety of ways, such as stepping sideways, with some even responding in different ways within the same task. Few children told the robot to turn left/right, instead gesturing or using non-specific language (e.g., "go there").

We conclude that the curriculum expectation is problematic for this age-group. Three propositions were identified for further investigation: a) the mastery of the viewer-centric terms of left, right and turn is problematic for both spatial/cognitive (Kocher et al., 2020), and cultural/linguistic reasons (Abarbanell & Li, 2021); b) the tendency of children to preference embodied representations and 'landmark' cues may offer a starting point for instructional practices ; c) further attention should be given to the differing meanings of 'turn' when enacted in different contexts, such as a 'robot turn' being 'on the spot' in contrast to turns made during forward movement (Bakala et al., 2021).

### References

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