

Difficult Progressions in Multiplicative Thinking for Primary Students

Ann Gervasoni
Monash University
ann.gervasoni@monash.edu

Barbara McHugh
CEDP
bmchugh@parra.catholic.edu.au

Kerry Giumelli
CEDP
kgiumelli@parra.catholic.edu.au

Paul Stenning
CEDP
pstenning@parra.catholic.edu.au

Many students encounter difficulties with whole number learning at some point in their primary schooling. It is helpful for school leaders and teachers to anticipate these moments in order to plan relevant curriculum and differentiated teaching, including interventions. Our research investigated *Mathematics Assessment Interview* (MAI) longitudinal data across six years for 2052 primary students to identify any difficult progressions in the multiplication and division domain, and the grade levels when these occur. Using the MAI growth point framework for the Multiplications and Division Strategies domain to measure growth, two prolonged progressions were identified at different time-points in primary schooling.

The first difficult progression occurred for students who were moving to partial modelling in the MAI growth point framework, across Grade 1, Grade 2, and Grade 3. This represented 48%, 64%, and 54% of students in these grades, respectively. This first finding suggests that learning experiences for students that focus on partial modelling or that screen concrete models need to happen earlier than teachers may anticipate. The second difficult progression identified was for those students developing basic, derived and intuitive strategies for multiplication, particularly in Grade 5 and Grade 6. This represented 35% of the students in both Grade 5 and Grade 6. This second finding suggests that supporting students' progression to multiplicative strategies in Grade 5 and Grade 6 is an important curriculum focus.

Overall, our findings highlight the need for professional learning for primary teachers to deepen their understanding of the nature of the two prolonged progressions in the multiplication and division strategies domain identified by our research, the time points when these are likely to occur, and the pedagogies and curricula that advance students learning towards these two growth points. Further, it is likely that mathematics intervention approaches for students who experience these prolonged progressions need to focus on classroom-based approaches due to the large proportion of students who experience these difficult progressions.