



Developing and Piloting a Responsive Mathematics Teaching Observation Scale (RMTOS)

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Responsive mathematics teaching depends on teachers attending to, interpreting, and building on students' mathematical thinking as it emerges during instruction. Yet commonly used classroom observation frameworks are not designed to isolate this moment-to-moment responsiveness, and many are resource-intensive for live school-based use. This study developed and piloted the Responsive Mathematics Teaching Observation Scale (RMTOS), a structured instrument intended to make these practices observable in authentic classrooms.

The 13-item dimensional scale drew on professional noticing, responsive teaching, mathematics discourse, and instructional quality (Sherin et al., 2011; Robertson et al., 2015). A separate global anchor item yielded 14 pilot items and provided a holistic judgement of lesson responsiveness. The instrument was trialled across 24 mathematics lessons in two Year 6 classrooms in one primary school, observed twice weekly over six weeks. Ratings, field notes and weekly moderation discussions informed refinement. Reliability was examined with Cronbach's alpha and dimensional structure explored using principal component analysis with Varimax rotation.

The 14-item pilot instrument showed good internal consistency ($\alpha = .847$). Four components explained 87.6% of variance and reflected attending to student thinking, interpreting student ideas mathematically, taking up and pursuing student thinking, and structuring participation and feedback. One general encouragement item had a negative item-total correlation ($r = -.109$) and loaded independently, supporting removal because it reflected classroom climate rather than mathematical responsiveness. The refined 12-item dimensional scale showed $\alpha = .868$, with the global anchor retained separately. Moderation clarified two items and revised the response scale from five to four points by removing the neutral midpoint.

Field notes complemented the quantitative findings: teachers often acknowledged student responses but less frequently probed, extended, or used those ideas to shape subsequent instruction. The findings provide preliminary evidence that responsive mathematics teaching can be operationalised through structured observation. Given the small, single-school pilot, the factor structure remains provisional; larger multi-rater and video-coded studies are needed to test stability, inter-rater reliability, and convergent validity.

References

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