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MAKING MIXED ABILITY MATHEMATICS MEANINGFUL: ADAPTIVE TEACHING TO ACCELERATE PROGRESS

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Introduction

This action research investigates how adaptive teaching strategies can impact pupil progress in a mixed-ability Year 4 mathematics class. At the start of the year, our school adopted mixed-ability groupings in line with the High Performance Learning (HPL) initiative and the national emphasis on inclusive, high-quality teaching (Department for Education, 2021), following two years of set-based teaching. This change brought challenges in planning, delivery and meeting diverse learning needs.

Whole-class teaching can promote equity and shared mathematical thinking (Askew et al., 1997). However, children's gaps in prior knowledge or the variety of attainment levels can suggest that pupils may not be appropriately supported or challenged (Sherrington, 2017). In my class, the difference in attainment levels, including English language learners (ELL), highlighted the need for more responsive teaching. Therefore, I sought out to trial various adaptations using specific start points, vertical tasks and purposeful Assessment for Learning (AfL) tasks to support the needs of my class.

Background of the Problem

At Hartland International School, whole-class mathematics was reintroduced as part of the HPL initiative. Having previously taught top-set maths, I quickly saw the challenge of supporting the diverse needs of my mixed-ability Year 4 class of 26 pupils. Due to the wide range of needs in my class, I felt like I lacked the tools needed to support and adapt the learning for the needs of my class.

Early in the year, AfL and core tasks did not meet all pupils' needs. Lower attainers struggled to access the content, and higher attainers were not sufficiently stretched. Core tasks offered limited reasoning opportunities for all.

In response, I began trialling adaptive strategies, creating vertically challenged core tasks, purposeful AfL and offering varied starting points. I aimed to support progress and independence, not just in my focus group, but across the class.

Literature Review

Whole-class teaching in mathematics is associated with a more inclusive, equitable environment, where all pupils can access shared dialogue and problem-solving opportunities (Askew et al., 1997). It promotes high expectations and allows learners to benefit from modelling and discussion with peers (Sherrington, 2017), aligning with our school's HPL approach. Eyre (2016) highlighted that within HPL, we must advocate for consistent challenge and deeper thinking for all pupils.

However, whole-class teaching alone may not meet or support the needs of all pupils unless carefully adapted (Sherrington, 2017). Tomlinson (2014) further states that meaningful adaptations allow all pupils to engage with content at an appropriate level, especially in mixed-ability classrooms. Boaler (2016) highlights the importance of open-ended mathematical tasks that create access points for all learners. I have applied these ideas by designing tasks with varied depth and multiple entry points.

Vygotsky's (1978) Zone of Proximal Development emphasises the need for support just beyond current understanding. Bruner (1978) builds on this with his theory of scaffolding, stressing the gradual release of support as pupils gain independence.

Despite these frameworks, there is limited research exploring how such strategies are embedded in everyday mathematics lessons.

This study aims to explore how adaptive teaching can support a range of learners in a mixed-ability setting by addressing the following questions:

- Which adaptive strategies support my whole-class teaching?
- Can adaptive strategies help children make more progress?
- Which strategies are most effective for Lower Ability (LA), Middle Ability (MA), Higher Ability (HA), and ELL pupils?

Methodology

This research focused on how adapting my mathematics teaching could better meet the diverse needs of my mixed-ability Year 4 class. Over two terms, I trialled three key strategies:

1. Scaffolded core sheets to support lower attainers,
2. Vertical task design to stretch all learners, and
3. Targeted entry questions linking to the AfL.

The research followed a two-cycle model. In Cycle One (Autumn term), I used the initial planned fluency-based tasks and tracked the progression of work completed in a lesson to establish a baseline.

In Cycle Two (Spring–Summer), I embedded various adaptive strategies and monitored their impact on pupil outcomes. Most lessons included vertical tasks and purposeful AfL questions. I also made a personal journal of which strategies I felt worked best for my class.

I collaborated with my year group and members of the senior leadership team (SLT). Joint planning sessions supported reflection and refinement of strategies, allowing me to reflect critically on my teaching.

Participants

The participants in this study included six Year 4 pupils: two Lower Ability (LA), two Middle Ability (MA) (including one ELL), and two Higher Ability (HA). Using 3 girls and 3 boys, 1 for each group.

Data Collection

Data was gathered through work sampling, focusing on task completion and reflective notes about my adaptive practices. The sampling was organised into 20% increments based on task completion. With further challenges introduced in lessons, this increased from 60% in Autumn to 100% during the Spring and Summer terms. Two graphs (see Figures 1 and 2) tracked and visualised pupil development in lessons. I also maintained a personal journal of trialled strategies to reflect on what worked and what did not for my class.

Data Analysis

Data was analysed by comparing a baseline in Autumn and post-adaptations in the Spring–Summer terms. The analysis tracked the work completed by 6 children in the lessons. This data was then made into graphs:

- **Figure 1**: Autumn data
- **Figure 2**: Spring–Summer data

To evaluate adaptive strategies' impact, I combined quantitative analysis of task progression with qualitative reflection. In Figure 1, Autumn data shows maximum completion was capped at 60% due to task structure: a core task, a 'going deeper' activity and one challenge. In Figure 2, Spring–Summer data shows the scale was extended to 100% as task design developed: core, going deeper, going deeper challenge 1, going deeper challenge 2, and a discussion question.

Figure 1
Data from mathematics books collected in the Autumn term

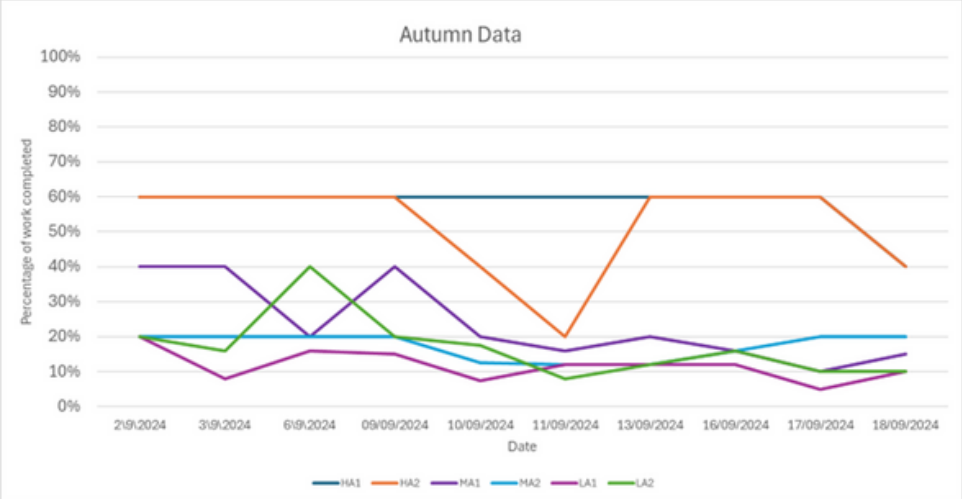

Figure 1 displays data from the Autumn term, where tasks lacked vertical challenge and pupils typically reached the highest, they could at this time, which was 60%. The data shows the Higher Attainers consistently reaching that top percentage, capping their ability to delve deeper into their learning.

Figure 2
Data from mathematics books collected in the spring/summer term

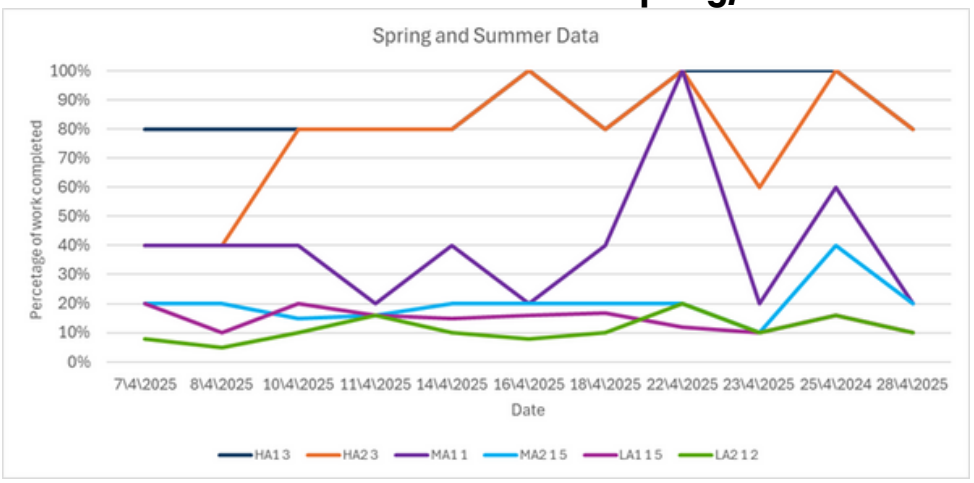

Figure 2 shows some improvement, with pupils progressing beyond the core 20% to access reasoning and problem-solving tasks. Most of the group reached between 40–80%, with pupils, at times, accessing the full sequence of tasks. The task structure allowed for greater differentiation and more visible learning progression.

In addition, I recorded qualitative reflective notes to monitor engagement and identify emerging themes such as pupil independence, reasoning ability, and the effectiveness of each strategy implemented. While I did not use a formal coding system (such as Braun and Clarke's thematic analysis), themes were developed through repeated observation, application and analysis of completed work to see which adaptation was most effective.

Results

The data clearly shows an improvement in pupil progression following the implementation of adaptive teaching strategies. In the Autumn term (see **Figure 1**), most pupils reached only 20–40% of the lesson tasks. By the Spring–Summer term (see **Figure 2**), task completion rates had improved. Most pupils progressed to 40–100% of the lesson, with middle and higher attainers regularly reaching the further challenges in the lesson. However, lower attainers rarely progressed passed the core at 20%.

Various starting points in the core provided valuable insight into pupils' conceptual understanding and allowed me to plan more responsively. The data suggest that adaptive teaching strategies not only improved pupil access to learning but also supported more progress within the lesson.

Discussion and Reflections

Adaptive teaching has led to more responsive and inclusive mathematics lessons. In every lesson I plan, I include vertical challenges and purposeful AfL tasks, providing various starting points and hinge points. I found, within my notes, that pupils are more engaged and independent. The data shows that higher-attaining pupils receive more consistent stretch due to having more challenges to reach. Meanwhile, lower-attaining pupils showed some improvement, but were less likely to access further challenges. This could be linked to the increase in challenge in the core due to it now being a vertical task.

This project made me consider how I pitch and structure tasks. It also highlighted the need for further adaptation to help lower attainers reach their full potential. I want to continue implementing visual support, entry steps and stretch in all planning, which has also influenced other teachers. Colleagues in my planning team have also seen the benefits of these adaptive practices and have implemented them into their lessons.

This project deepened my understanding of action research as a professional learning tool. Development in my pedagogy was most effective when paired with reflection and classroom application. Extending this work across more classes and over a longer period could offer useful insight into its long-term impact

Conclusion

Adaptive teaching positively impacted progress and engagement in my mixed-ability mathematics class. The consistent use of various entry points, vertical tasks and purposeful AfL developed a more inclusive and supportive learning environment. My next steps could be to explore how these strategies can support larger sample groups or analyse the impact over a longer period to better understand their long-term influence. Fundamentally, this research shows that adaptive planning, when purposeful and embedded consistently, can make mixed-ability teaching more equitable and effective for all children.

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