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FOSTERING MATHEMATICAL GROWTH: SUPPORTING ENGLISH LANGUAGE LEARNERS' SUCCESS THROUGH ELEVATED EXPECTATIONS

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Introduction

This action research study addresses the phenomenon of capable English language learning students who achieve passing grades whilst operating below their assessed mathematical potential. These students demonstrate what can be described as "academic coasting", completing assignments adequately but showing minimal curiosity for mathematical exploration beyond minimum requirements.

It can manifest as a disconnect between student capability and classroom engagement. In my setting, many ELL students possess strong quantitative reasoning abilities, as evidenced by their Cognitive Abilities Test (CAT4) assessment data, yet some students' classroom participation remains passive. They meet expectations without engaging in deeper mathematical thinking that would unlock their full potential. This phenomenon raises questions about why students do not engage more deeply with mathematical concepts and how educators can better support their academic growth.

Background of the Problem

In our mathematics classrooms, some ELL students complete assignments adequately but show little curiosity for mathematical exploration beyond minimum requirements. These students often possess strong quantitative reasoning abilities, as evidenced by their performance on CAT4 data. However, their classroom engagement remains minimal.

The initial action research study involving 29 Year 7 and 8 students revealed evidence of an engagement gap. Whilst 66% of students demonstrate growth mindset beliefs that practice leads to improvement and 45% express genuine curiosity about understanding mathematical reasoning, only 31% actively seek challenging problems when given the choice. This progression from belief to curiosity to action reveals substantial untapped potential amongst capable but disengaged learners.

Analysis comparing CAT4 Quantitative scores with classroom performance confirmed the presence of capable but disengaged learners within the focus group. Some ELL students demonstrated high quantitative reasoning abilities that were not reflected in their classroom engagement or assignment quality. Mathematical anxiety significantly impacts performance, with 48% of students experiencing nervousness during assessments and 41% worrying about making mistakes during mathematical tasks. These anxiety levels represent substantial barriers to mathematical risk-taking and deeper engagement. Without targeted interventions, capable ELL students might miss critical mathematical growth opportunities that limit their academic potential.

Literature Review

This action research study drew upon three key sources that provided both theoretical understanding and practical strategies for supporting English Language Learners in mathematics education. Each source contributed essential insights that shaped my approach to identifying and addressing student disengagement.

Understanding Student Mindsets

Dweck's (2008) and Boaler's (2022) research provided the foundation for understanding why capable ELL students may disengage from mathematical learning. Their work demonstrates that students who believe their mathematical ability is fixed are more likely to avoid challenges. This insight directly explained the "coasting" behaviour I observed in the classroom.

Dweck's work guided the survey design and the growth mindset interventions, particularly her emphasis on reframing mistakes as learning opportunities. The finding that 66% of students held growth mindset beliefs but only 31% actively sought challenges validated her assertion that beliefs alone are insufficient without supportive structures. This research shaped my classroom language and feedback approaches. I implemented Dweck's concept of "yet" and process-focused praise to shift student beliefs about their mathematical capabilities through paired discussion.

Creating Inclusive Mathematical Experiences
Boaler's (2022) "Mathish: Finding Creativity, Diversity, and Meaning in Mathematics" provided crucial insights into mathematical creativity and inclusive practice. Her research on multiple solution pathways and mathematical discourse directly informed the intervention design. Boaler emphasises that visual mathematics and diverse mathematical perspectives create more engaging learning experiences. Her work shows that open-ended mathematical tasks increase engagement across diverse student populations, these findings on mathematical discourse proved particularly valuable. Her research demonstrates that when students explain their thinking, languages can become assets rather than deficits. This insight guided the development of mathematical guided questions that scaffolded students' multilingual and monolingual communication whilst building their confidence.

Implementing Research-Based Strategies
The YouCubed (n.d.) website resources provided practical information and strategies for implementing research-based approaches in real classroom settings. YouCubed's growth mindset activities were used to design specific interventions for building mathematical resilience amongst ELL students. Their resources on mathematical discourse and collaborative problem-solving provided templates that were adapted for the classroom context.

Together, these three sources created a comprehensive framework addressing emotional, pedagogical and practical dimensions of supporting ELL students in mathematics. Dweck's research helped me understand why disengagement occurs. Boaler's work showed how mathematical instruction could be more inclusive. YouCubed provided the practical implementation tools.

Results

The nature of action research enables continuous refinement of strategies based on observed outcomes. This makes it particularly well-suited to investigate complex, context-specific challenges faced by all students, including multilingual students in mathematics education.

The primary research objectives guiding this study were:
- How can we identify capable but disengaged students in mathematics?
- What interventions effectively promote deeper mathematical engagement?
- How can we ensure ELLs access challenging mathematics beyond language barriers?

Methodology
This collaborative action research study used multiple cycles of data collection, intervention implementation, and refinement with a mathematics department colleague to address student disengagement and improve strategies.
Based on initial findings, ongoing targeted interventions were implemented

with a focus group of 15 Year 8 students. These included growth mindset exercises to build mathematical resilience and strategies to support mathematical approaches, including explicit vocabulary instruction with visual support for mathematics terminology. The concept that mathematics problems can have multiple solution paths was introduced to engage 'coasting' students by providing appropriate challenge levels and opportunities to share in mathematics conversations. This complemented mathematical discourse strategies developed to help students articulate their thinking in pair work, whilst scaffolded problem-solving approaches supported ELL students in accessing challenging mathematics content without reducing cognitive demand.

Participants

The initial study focused on 29 Year 7 and Year 8 students representing diverse language backgrounds. Once the programme was designed, we focused on 15 students with diverse challenges and barriers. This included both multilingual and first language English speakers. This diverse sample allowed for comparative analysis and ensured that interventions were designed to benefit all students.

Data Collection

Data collection employed multiple methods to capture comprehensive insights into student experiences. A Mathematics Attitude Survey was completed by all 29 participants to gauge baseline attitudes and beliefs about mathematics learning. CAT4 Quantitative scores were analysed alongside internal assessments to identify any discrepancies between cognitive ability and classroom performance. Student voice was captured through reflective pair work and structured questioning. This provided qualitative insights into student perspectives and experiences. Ongoing classroom observations monitored confidence levels and engagement patterns throughout the intervention period.

Data Analysis

The survey data was analysed to identify patterns in student attitudes, beliefs, and behaviours related to mathematical engagement. CAT4 scores were compared with classroom performance data to identify students demonstrating high cognitive ability but low classroom engagement. Qualitative data from student voice activities were examined to understand barriers to engagement from the student perspective. Classroom observation data was used to track changes in engagement patterns throughout the intervention period.

Results

This collaborative action research study used data collection, intervention implementation, and refinement with a mathematics department colleague, revealing that while 55% of students feel confident in problem-solving and 66% believe practice improves ability, significant gaps exist with only 31% choosing challenging problems and 48% experiencing mathematics anxiety, indicating substantial opportunities for targeted engagement interventions.

The analysis of CAT4 scores compared to classroom performance revealed that some ELL students demonstrated high quantitative reasoning abilities that were not reflected in their classroom engagement or assignment quality. This confirmed the presence of capable but disengaged learners within the group.

Mathematical anxiety was identified as a significant barrier, with substantial numbers of students reporting nervousness and worry about mathematical tasks. This data indicates specific areas where targeted interventions could enhance both confidence and deeper mathematical engagement.

Discussion and Reflections

The results reveal that student disengagement stems from multiple interconnected factors rather than simply lacking ability or motivation. The examination of 'coasting' ELL students revealed that disengagement resulted from mathematical anxiety, language barriers, and insufficient challenge opportunities. This understanding fundamentally transformed my practice from addressing disengagement as a single issue to implementing layered interventions targeting emotional, linguistic, and cognitive barriers simultaneously.

Key insights emerged from this research that have broader implications for how to support multilingual students in classrooms. The growth mindset potential finding shows that most students believe they can improve but do not actively seek challenge. This suggests that belief alone is insufficient without supportive structures. A significant confidence gap exists between students' belief in their ability and their willingness to take mathematical risks. An engagement paradox was identified where students value understanding concepts but often avoid deeper exploration due to various barriers. Language barriers create additional challenges specifically for English Language Learners, with mathematics terminology presenting ongoing difficulties.
As the English language teacher supporting the mathematics classroom in this collaborative research, this study transformed my understanding of how language barriers intersect with subject-specific learning challenges. I learnt that surface-level performance rarely reveals the full picture of student capability, and this insight extends far beyond mathematics to all curriculum areas. The findings demonstrate students may appear to be coping adequately in classrooms whilst operating well below their potential due to the complex interplay of language demands, subject-specific terminology, and confidence barriers.

Most importantly, effective support must investigate the intersection of academic, emotional, and cultural factors. Students may appear disengaged whilst facing multiple barriers that, when systematically addressed, can unlock significant potential for deeper learning. The multi-method approach, including student voice, provides a transferable framework that colleagues can apply across all subjects to uncover diverse reasons behind ELL disengagement.

Conclusion

This action research study demonstrates that addressing student disengagement in mathematics requires a multifaceted approach. Although my original focus was on multilingual students, the findings suggest that capable students possess untapped mathematical potential that can be unlocked through targeted, evidence-based interventions.

Key actionable findings include the need for systematic identification of capable but disengaged students using multiple data sources. There is also a need for the implementation of challenge-providing activities and provision of specific language supports that do not diminish mathematical rigour. The research also highlights the critical importance of student voice in understanding concepts and addressing barriers to engagement.

Future research could investigate the long-term impact of these interventions on student mathematical achievement and subject pathway choices. These findings could also have implications for further study, particularly in exploring how similar approaches might be applied across different subjects.

References

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