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HOW CAN THE SIMPLIFICATION OF MATH LANGUAGE IN EXAM QUESTIONS EFFECTIVELY ENHANCE THE UNDERSTANDING AND ACADEMIC PERFORMANCE OF ENGLISH LANGUAGE LEARNERS?

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Action Research Overview

This study addresses the challenge of linguistic complexity in math assessments for English Language Learners (ELLs). Complex vocabulary and sentence structures in math exam questions can hinder ELL comprehension and performance (Abedi & Lord, 2001). This problem is significant because it potentially undermines the accurate assessment of ELLs' mathematical abilities, leading to underperformance that doesn't reflect their true capabilities. By investigating the impact of simplified math language on ELL performance, this research aims to identify effective strategies for enhancing ELL understanding and academic achievement in mathematics.

Background of the Problem

The study was conducted at Hartland International School, focusing on Year 8 ELL students. The problem of linguistic complexity in math assessments is ongoing and significant, as it affects ELLs' ability to demonstrate their mathematical knowledge accurately. If not addressed, this issue may continue to create barriers for ELLs in math education, potentially leading to lower academic performance and reduced educational opportunities. By simplifying the language in math exam questions, we aim to benefit ELL students by allowing them to better showcase their mathematical abilities without being hindered by language barriers.

Literature Review

Previous research has highlighted the impact of linguistic complexity on ELL performance in math assessments. Abedi and Lord (2001) found that complex vocabulary and sentence structures are major obstacles for ELLs in understanding and solving math problems. Language simplification strategies, such as using familiar words, short sentences, and active voice, have been shown to enhance ELL understanding (Abedi & Lord, 2001; Robertson, 2011).

Additionally, providing language support through visual aids, manipulatives, and glossaries can support ELL comprehension and achievement (Robertson, 2011). The integration of content and language is crucial, with collaboration between teachers and ELL specialists being essential in simplifying question language while preserving academic rigor (Alt et al., 2014; Robertson, 2011). Providing supplementary language resources and instruction can further support ELL understanding and performance in math assessments (Robertson, 2011).

Methods

This study employs action research to address the problem of linguistic complexity in math assessments for ELLs. Action research is particularly suitable for this context as it allows for direct implementation and evaluation of language simplification strategies in a real classroom setting, promoting immediate benefits for students and enabling iterative improvements based on feedback.

Research Questions:

1. How does the linguistic complexity of math exam questions affect ELL comprehension and performance?
2. What specific language simplification strategies are most effective in enhancing ELL understanding and achievement?
3. How can teachers implement language simplification in math exams while maintaining content rigor?

Methodology

The research involves administering both original and language-simplified versions of math exams to Year 8 ELL students. Think-aloud sessions with ELLs are conducted to gather qualitative data on their thought processes while solving problems. Additionally, quality assurance discussions with the Math department ensure that the simplified assessments maintain content rigor.

Participants

The study focuses on Year 8 ELL students at Hartland International School.

Data Collection

Data was collected through:

1. Administration of original and language-simplified versions of math exams.
2. Think-aloud sessions with ELL students.
3. Quality assurance discussions with the Math department.

Data Analysis

The analysis includes:

1. Quantitative analysis of exam scores (limited due to small sample size and assessment window constraints).
2. Qualitative analysis of think-aloud student feedback and teacher reflections.
3. Comparison of original and simplified exam questions, quality assured by the math department.

Results

While the study is ongoing, preliminary results indicate:

- ELLs performed significantly better on language-simplified math exams.
- Teachers reported increased ELL student confidence with simplified exams.
- Effective simplification strategies were identified and compiled into a comparison chart, which was positively received by the math department.

Discussion and Reflections

The preliminary findings align with previous research on the impact of linguistic complexity on ELL performance (Abedi & Lord, 2001). The results suggest that language simplification can be implemented without compromising math content.

Reflections:

- The simplified exams may benefit not only ELLs but also struggling native English speakers
- Ongoing collaboration with the math department is crucial for implementation
- Some students have requested that tier 3 subject-specific vocabulary not be simplified, as they feel they will have to learn it twice (e.g., probability/chance)

Conclusion

Language simplification in math exams can significantly enhance ELL understanding and academic performance. Teachers and ELL specialists can adopt effective simplification strategies while maintaining content rigor. However, the study has limitations, including a small sample size limited to one year group and a limited time frame to show significant increases in

performance. Future actions include:

- Ongoing collaboration with the math department on termly assessments.
- Support with assessment design.
- Collaboration with other departments using the same model throughout the next academic year.

References

Abedi, J., & Lord, C. (2001). The language factor in mathematics tests. *Applied Measurement in Education, 14*(3), 219-234.

Alt, M., Arizmendi, G. D., & Beal, C. R. (2014). The relationship between mathematics and language: Academic implications for children with specific language impairment and English language learners. *Language, Speech, and Hearing Services in Schools, 45*(3), 220-233.

Robertson, K. (2011). *Math instruction for English language learners*. Colorín Colorado. Retrieved July 17, 2024, from https://www.colorincolorado.org/article/math-instruction-english-language-learners