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TRANSLANGUAGING IN SOUTH AFRICAN PRIMARY MATHEMATICS EDUCATION: A SEMI-SYSTEMATIC REVIEW OF PEDAGOGICAL OPPORTUNITIES FOR MULTILINGUAL LEARNERS

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Abstract

South African primary mathematics classrooms remain linguistically complex due to the mismatch between learners' home languages and the dominant language of instruction. This mismatch continues to contribute to poor learner participation, conceptual misunderstanding, and low mathematics achievement. This semi-systematic review explores how translanguaging can be harnessed as a pedagogical resource in multilingual South African primary mathematics classrooms. Eight peer-reviewed studies published between 2020 and 2023 were selected following a structured search and screening process using predefined inclusion and exclusion criteria. Studies were retrieved from Google Scholar, Scopus, and ResearchGate and analysed thematically using Braun and Clarke's six-phase framework. Findings reveal that translanguaging enhances classroom communication, supports conceptual meaning-making, strengthens learner participation, and improves mathematical proficiency by allowing learners to draw on their full linguistic repertoires. The review highlights the need for language-responsive pedagogies, teacher professional development, and multilingual classroom policies that promote equitable mathematics learning in South African schools.

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INTRODUCTION

Multilingual learners often face significant challenges in education due to language barriers and cultural difference. Being multilingual means having more than one language in one's linguistic repertoire. Even though South Africa is a multilingual country with a constitution, the language in education policy and other laws recognizing the linguistic diversity of its citizens, monolingual-oriented pedagogies in education continue to be the norm (Charamba, 2021). The default language of instruction is still English or Afrikaans, which happens to be the mother tongue of approximately 19.7% of the country's populace (Statistics, 2017). Analysts, academics, and some educators contend that leaners' underperformance on national and international assessments is mainly due to the misalignment between their mother tongue and the medium of instruction (Ndhlovana & Charamba, 2023; Essien et al., 2023). For instance, the mathematics

examination results released by the National Senior Certificate Examination Report for matriculants in South Africa (grade 12) for the years 2020-2022 on performance at 50% and above is 22.3%, 23.0% and 22.0% respectively (Department of Education, National Certificate School Subject Report, 2022).

It has come to be widely accepted in the literature that an individual's possibility for success in the job market is closely correlated with the level and length of education they get (Pusser, 2023). Therefore, providing the poor with education of a lower calibre disadvantages them in the job market and perpetuates their poverty. This has caused much debate on the education system in South African resulting in a change of curriculum from Bantu education up until the current CAPS (DoE, 2011) curriculum (Charamba, 2021). After the democratic state was established in 1994 and a post-apartheid curriculum was introduced in 1998, there has been a growing demand to comprehend what is taking place in the classroom, especially in light of anecdotal evidence of a chronic breakdown in the teaching and learning culture (Sutrisno, 2023). This affected the vast majority of learners rather than just a small number making it all the more unsettling and there is need for empowering the historically disadvantages multilingual learners in our country.

The South African primary education sector has generated a lot of research and discussion during the past decade and the findings of national and international assessments of learner accomplishment are particularly significant. Trends in International Mathematics and Science (TIMSS), Progress in International Reading Literacy Study (PIRLS), and Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) are three major international comparisons of primary school learners in which South Africa has participated. In all three assessments, South Africa either has the worst overall average score among the low-income nations evaluated by international agencies, or underperforms several other less developed nations, such as Kenya, Swaziland, and Tanzania (Mlachila & Moeletsi, 2019). From the concerning results of these assessments, it is clear that though there is a slight improvement for instance in Mathematics as per the grade 5 TIMSS assessment results of 2011; 2015; and 2019 (353; 376; and 374 points respectively) (Reddy et al., 2016), something still lags in the mathematics teaching and learning making the results stay below the benchmark. The poor foundation of mathematics education in South Africa not only affects the primary sector but is replicated to the matric national results where we only have approximately 30% learners who are proficient in mathematics. Analysis of assessments provides significant insight into South African learners' performance and the underlying causes for that performance and language stands out in all of them.

In the interest of equity for learners who are racially and linguistically underrepresented throughout the realm of mathematics education, there has been a greater emphasis on encouraging disciplinary language and literacy development in addition to content knowledge (Marshall et al., 2023). When adopted blindly, the theory of change that underpins a large portion of the language-focused mathematics education focus views multilingual learners who are racialized as linguistically inadequate and in need of language remediation, rather than recognizing the systemic racial and language barriers that learners must overcome (Rosa & Flores, 2023). The way policy makers, teachers and academics view this particular practice needs to be reconsidered because as Cummins (2019) argues, home language belongs to the learners and should not be viewed as a barrier to learning but rather a useful tool.

In the teaching and learning of concepts with understanding, recent research has demonstrated and continues to show that eliminating language-induced achievement gaps is of the utmost importance (Prediger, 2022). In educational contexts, translanguaging theory has been helpful in normalizing and creating space for multilingual learners' language practices (García & Kleifgen, 2020; Cummins, 2019). Translanguaging takes place when multilinguals flexibly use their entire linguistic repertoire to analyze information, give it meaning, and communicate it to

others (Cenoz & Gorter, 2022). Translanguaging was coined by Cen Williams who conducted a Welsh-language class observation in the 1980s and found that although teachers spoke to the learners in Welsh, they consistently received responses from them in English (Lewis et al, 2012). This provided essential sustenance for multilingual learners and has since been adopted as a useful pedagogy that enhances learners understanding in different teaching and learning settings. Regardless of the degree of biliteracy of multilingual learners, translanguaging pedagogies reframe education to highlight the languages as strengths (Wei, 2022). Additionally, recent research has demonstrated the potential of translanguaging pedagogies for connecting learners' knowledge and experiences gained outside of the classroom with conceptual mathematical skills they are expected to acquire in class (Tai & Wei, 2020), encouraging group grit (Morale & DiNapoli, 2018), and making it possible for more fair evaluation of mathematical concepts (Gandara & Randall, 2019).

Although translanguaging has increasingly received attention in multilingual education research, limited review-based studies have specifically synthesised evidence on translanguaging practices in South African primary mathematics classrooms. Existing studies often focus on language policy, science education, or isolated classroom interventions rather than providing a consolidated understanding of translanguaging as a pedagogical approach in primary mathematics education. This review contributes to the field by synthesising recent empirical studies on translanguaging in South African primary mathematics classrooms and identifying common pedagogical patterns, opportunities, and challenges associated with multilingual mathematics learning.

Nevertheless, despite the potential of translanguaging pedagogy, little is known about the best ways to assist mathematics teachers and learners in certain South African classrooms where learners speak more than one home language. With even more prominent multilingual learners and dismal performances of our learners, there is a more urgent need to attend to language practices that can enhance mathematical learning and thus contributing towards closing such gaps. To gain the research aims, researchers formulate the following research questions. How is translanguaging implemented in South African primary mathematics classrooms? How does translanguaging support meaning-making and mathematical understanding among multilingual learners? And What pedagogical implications emerge from translanguaging practices in primary mathematics education?

Literature Review

Language and multilingualism in Primary mathematics education

As was already mentioned, throughout the past few decades, research on mathematics education has actively centred on the study of language. According to Tang et at. (2022), mathematical concepts are mostly discussed and communicated using language. However, despite being a part of a natural language like English, mathematics is regarded as a specialized language (Ortiz, 2022). As they study the topic, learners must learn to acquire or appropriate a mathematical register in order to be able to hear, speak, read, and write mathematical symbols and words with understanding. This means that when learners study mathematics, they move from speaking informally to using language that is more mathematically structured and then speaking in academic mathematical language. Knowing mathematics is therefore inextricably linked to knowing its language and goes beyond the oversimplified idea of working with numbers or algebra. Learning mathematics can be challenging, and this is even worse in multilingual classrooms when multiple languages are spoken. Due to rising globalization in recent decades, teachers today more than ever have to deal with learners who utilize a variety of languages and other language practices, many of which are alien to them.

Mathematics has been taught as a dehumanising subject which makes it difficult for learners to make sense of it. In their work on the efficacy of a language-responsive approach to teaching percentages in German, Prediger and Neugebauer (2023) show that language can be a useful tool in the classroom. The multilevel regression analysis conducted through a cluster-randomized field trial with a pre-, post-, and retention-test design with control group in 79 classes randomly assigned to the intervention and control groups shows that the intervention group developed significantly more conceptual understanding of percentages than the control group because they received more contextual explanations and were allowed to explain their ideas in a language they were familiar with. This suggest that one specific goal for mathematics teachers should be to enable their learners a way to utilize the mathematics register for personal use and make of it. We therefore turn to teacher education on how to effectively use language and the teaching and learning of mathematics.

Teacher education on language in mathematics teaching

As illuminated earlier in the introduction to this paper, there are substantive differences in multilingual features of mathematics classrooms across the continent. Recent times have seen a continuous focus on study into multilingual mathematics classrooms as well as advancements in this field. This subject according to Planas and Pimm (2023) is robust, expanding, and even more pervasive today than ever before. Flexible language usage that promotes mathematics learning and teaching continue to receive significant attention (Erath & Prediger, 2021; Essien, 2020). Social perspectives on language have become increasingly popular, and all-or-nothing views on multilingual learners' involvement in mathematics are making way for views on participation through a diversity of languages, mathematics registers, communities, and cultures.

Language diversity is now being refocused on all contexts for mathematics teaching and learning, not just in contexts of poverty, migration, colonialism, ethnic difference, nor as a quality that is specific to the learner. This makes the current research on multilingual mathematics classrooms especially important. Translanguaging is examined by Planas and Källberg (2022) in connection to educational strategies intended to foster identity and mathematical meaning across linguistic boundaries and educational environments. Alhasnawi (2021) discusses pedagogical approaches in university mathematics instruction with an emphasis on translanguaged mathematical discourse. These articles all embrace the idea that language is a dynamic, social practice that may also be creative.

Theoretical framework: Funds of knowledge (FoK)

According to Moll et al. (2006) curricula should be developed in such a way that learners' FoK are taken into consideration. The FoK approach advocates for the recognition of learner's informal experiences while also examining the way teachers and schools use these FoK to assist individual learners in developing personalized ways of knowing (Gonzalez, 2006). FoK is an approach coined by Gonzalez and it recognizes the potential of the knowledge that results from learners actively engaging in cross-generational learning experiences in the classroom. The concept, as put forth by Gonzalez (2006), contends that teaching mathematics should be connected to learners' lives and that the specifics of effective pedagogy should be connected to local cultures and community contexts. Learners do not enter the mathematics classroom as blank slates or with only their prior schooling, as a result, homes serve as "repositories of knowledge" (Gonzalez, 2006, p. 26). By transferring this knowledge to educational settings, families can help learners bridge the gap between their daily lives and their education.

This theory was selected because it promotes a social approach to education in which learners may bring their own experiences into the mathematics classroom and build upon them in a way that recognizes them as unique persons (Gonzales, 2006). According to Charamba (2020),

a learner's language is one of the social experiences and knowledge bases they bring to class. Thus, this study has used the idea of translanguaging (García, 2009) and the social development viewpoint (Gonzales, 2006) to analyze the mathematics learning of multilinguals in South African classroom.

RESEARCH METHOD

Research Design

This study adopted a qualitative semi-systematic review design to explore how translanguaging can be used to empower multilingual learners in primary mathematics classrooms. A semi-systematic review is appropriate for studies that seek to examine the development of knowledge across diverse research traditions and contexts while identifying patterns, themes, and conceptual understandings from existing literature (Snyder, 2019). Unlike a fully systematic review, which typically focuses on narrowly defined research questions and standardized empirical comparisons, a semi-systematic review allows for broader exploration and interpretive synthesis of studies conducted using different methodologies, educational contexts, and theoretical perspectives. The semi-systematic review design was therefore suitable for this study because the aim was not only to summarize previous findings but also to construct new understanding regarding the pedagogical role of translanguaging in multilingual mathematics classrooms. The review enabled the researchers to examine how translanguaging practices have evolved in recent scholarship and how these practices can support multilingual learners in South African primary mathematics education.

The study reviewed eight peer-reviewed studies published between 2020 and 2023. The selected studies focused on translanguaging, multilingualism, and mathematics teaching and learning in multilingual educational settings. The reviewed studies included different classroom contexts, learner age groups, and educational environments, with particular emphasis on primary school mathematics classrooms. The studies also represented diverse language contexts and research locations, including South Africa and other multilingual educational settings globally. Both qualitative and mixed-method studies were considered in order to obtain a broader understanding of translanguaging practices in mathematics education.

Data Sources and Search Strategy

Since this study was a literature review, the "participants" were not human respondents, but rather peer-reviewed research studies selected for analysis. Data were collected from electronic academic databases and scholarly sources, including Google Scholar, Web of Science, Scopus, ResearchGate, and relevant academic texts. These sources were selected because they provide access to credible and peer-reviewed educational research relevant to translanguaging and mathematics education. A structured search strategy was employed to identify relevant literature published between 2020 and 2023. The search focused on recent studies to ensure that the findings reflected current debates and practices in multilingual mathematics education. The following keywords and search combinations were used: "translanguaging in mathematics education"; "multilingualism in primary mathematics classrooms"; "translanguaging and mathematics learning"; "multilingual learners in mathematics"; and "language practices in mathematics classrooms" Boolean operators such as AND and OR were used to refine the searches and improve the relevance of results.

The inclusion criteria for this review were established to ensure that the selected studies were relevant to the focus of the research. Studies were included if they were published between 2020 and 2023 and appeared in peer-reviewed journal articles. In addition, the studies had to focus on translanguaging or multilingual practices in mathematics education, involve multilingual learners or multilingual classroom contexts, and address teaching and learning in primary or foundational

mathematics education. The exclusion criteria were applied to eliminate studies that did not meet the scope and quality requirements of the review. Studies were excluded if they were not peer-reviewed, focused on subjects unrelated to mathematics education, or were published outside the selected time frame. Studies were also excluded if they did not address translanguaging or multilingual pedagogies, or if they lacked sufficient methodological detail or relevance to the research questions.

The screening process was conducted in several stages. First, articles were identified through keyword searches across the selected databases. Second, duplicate articles were removed. Third, the titles and abstracts of the remaining studies were screened to determine relevance to the study objectives. Finally, the full texts of potentially relevant articles were reviewed carefully against the inclusion and exclusion criteria. Through this process, eight studies were selected for final analysis because they directly addressed translanguaging practices in multilingual mathematics classrooms and provided relevant empirical evidence for the study.

Data Analysis

The selected studies were analyzed using thematic analysis as proposed by Braun and Clarke (2006). Thematic analysis was considered appropriate because it allows researchers to identify, analyze, and interpret recurring patterns and themes across qualitative data. In this study, thematic analysis enabled the researchers to synthesize findings from different studies and identify common trends regarding translanguaging practices in multilingual mathematics education. The analysis followed Braun and Clarke's (2006) six-step framework. First, the researchers familiarized themselves with the data through repeated reading of the selected studies. Second, initial codes were generated from significant findings and concepts related to translanguaging and mathematics learning. Third, the researchers searched for patterns and broader themes across the coded data. Fourth, the identified themes were reviewed and refined to ensure consistency and relevance. Fifth, the final themes were defined and named. Finally, the analytical report was produced by interpreting the findings based on the themes that emerged from the reviewed studies.

Codes were developed inductively from the reviewed studies based on recurring ideas, teaching strategies, learner experiences, and pedagogical implications related to translanguaging. Similar codes were grouped together to form broader themes and sub-themes. During the analysis, particular attention was given to identifying both successful and challenging aspects of translanguaging practices in multilingual mathematics classrooms. To ensure trustworthiness and credibility, the researchers maintained consistency in the coding and screening procedures and repeatedly revisited the selected studies to verify interpretations and thematic categorizations. The use of clearly defined inclusion criteria, systematic screening procedures, and established thematic analysis guidelines further strengthened the reliability of the findings. The themes that emerged from the analysis are presented in the following section.

RESEARCH FINDINGS AND DISCUSSION

Findings

The findings of this semi-systematic review suggest that translanguaging plays a significant pedagogical role in multilingual mathematics classrooms. Across the eight reviewed studies as presented in Table 1 below, the literature consistently indicates that translanguaging supports learner participation, mathematical communication, conceptual understanding, and mathematical proficiency. The findings respond directly to the research questions by demonstrating how translanguaging is implemented in multilingual classrooms, how it supports the teaching and learning of mathematics, and what pedagogical implications it has for multilingual mathematics education.

Table 1
Overview of Studies Included in the Review

Author(s)	Year	Context	Methodology	Key Findings	Contribution
Graven & Robertson	2020	Grade 4 mathematics classrooms	Qualitative case study	Home language improved meaning-making	Positioned translanguaging as epistemic access
Robertson & Graven	2020	South African Grade 4 mathematics classrooms	Qualitative classroom study	Explanatory talk in multiple languages supported understanding and learner participation	Highlighted the importance of learners' full linguistic repertoires
Poo	2021	Grade 3 mathematics classrooms	Classroom observation	Learners used Sepedi and English flexibly to explain mathematical ideas and representations	Demonstrated how translanguaging enhances conceptual learning
Poo & Venkat	2021	Multilingual mathematics classrooms	Comparative classroom study	Translanguaging promoted conceptual understanding more effectively than direct translation	Showed translanguaging as a resource for mathematical proficiency
Bezuidenhout	2022	South African multilingual learners	Quantitative/ educational study	Learners with limited exposure to mathematical vocabulary experienced challenges in mathematics learning	Highlighted the importance of language and vocabulary development in supporting mathematical understanding.
Mostert & Roberts	2022	Early grade mathematics texts in English and isiXhosa	Qualitative text analysis	Examined how mathematical comparison language is expressed across English and isiXhosa mathematics texts	linguistic diversity in mathematical expression and the importance of multilingual approaches in mathematics learning
Schoeman et al.	2023	South African FP classrooms	Qualitative	Translanguaging enhanced participation and communication	Demonstrated scaffolding role of home languages
Coetzer et al.	2023	Grade 1 teachers	Interviews and observations	Teacher awareness of linguistic repertoires is essential	Highlighted pedagogical implications

Rather than claiming that translanguaging guarantees effective learning in all contexts, the reviewed literature suggests that translanguaging creates opportunities for learners to access mathematical meaning through their full linguistic repertoires. Three major themes emerged from the analysis: (1) translanguaging enhances mathematical communication, (2) translanguaging functions as an epistemic tool for meaning-making, and (3) translanguaging supports mathematical proficiency in multilingual classrooms.

Translanguaging enhances Mathematical communication

One of the most consistent findings across the reviewed studies is that translanguaging enhances communication and learner participation in mathematics classrooms. Mathematics researchers widely acknowledge that communication is central to the development of mathematical understanding (Genc & Erbas, 2019; Ndhlovana & Charamba, 2023; Prediger, 2019). The reviewed literature suggests that allowing learners to move flexibly between languages enables them to explain mathematical reasoning, ask questions, and engage more confidently in classroom discussions. For example, Schoeman et al. (2023) found that translanguaging improved learner engagement and communication in foundation phase mathematics classrooms in South

Africa. Learners were encouraged to respond to mathematical story sums using languages other than English, which enabled them to draw on familiar number concepts and vocabulary from their home languages. Teachers observed that learners used their linguistic resources as scaffolding mechanisms that supported calculations, explanations, and clarification of misconceptions.

Similarly, Poo (2021) demonstrated how teachers in English-medium classrooms used both Sepedi and English during mathematics instruction. Learners were able to participate actively by expressing ideas in their home languages while simultaneously engaging with mathematical representations. The study suggests that translanguaging often occurs naturally in multilingual classrooms and can support conceptual engagement with minimal disruption to instruction. The reviewed studies further indicate that translanguaging is particularly valuable for learners from linguistically and socioeconomically marginalized backgrounds. Bezuidenhout (2022) argues that many multilingual learners struggle with mathematics because they are not sufficiently exposed to mathematical vocabulary in languages they fully understand. Translanguaging therefore provides learners with opportunities to negotiate meaning and communicate mathematical ideas more effectively. Overall, the findings suggest that translanguaging enhances classroom interaction by creating inclusive learning spaces where learners can participate meaningfully using their full linguistic repertoires.

Translanguaging is an epistemic tool in mathematics classroom

Translanguaging as an Epistemic Tool in Mathematics Classrooms

A second major finding emerging from the review is that translanguaging functions as an epistemic tool that supports meaning-making and conceptual understanding in mathematics. The reviewed studies consistently suggest that learners develop deeper understanding when they are allowed to use their home languages alongside the language of instruction. Graven and Robertson (2020), for instance, found that learners in Grade 4 mathematics classrooms were better able to make sense of mathematical concepts when they could discuss ideas in their home languages. Drawing on theories of additive bilingualism and second-language learning, the study highlighted the importance of allowing multilingual learners to access mathematical knowledge through familiar linguistic resources. Similarly, Robertson and Graven (2020) argue that explanatory talk in multiple languages enables learners to experiment with different understandings and perspectives. In multilingual mathematics classrooms where English is often the language of instruction, translanguaging, as concurred by Prediger (2019) allows learners to bridge gaps between everyday language and formal mathematical discourse. The reviewed studies therefore suggest that translanguaging supports epistemic access by enabling learners to construct mathematical meaning through multiple linguistic pathways.

Schoeman et al. (2023) further found that translanguaging had an epistemological function in helping learners understand mathematical concepts through familiar number names and linguistic structures. Learners were able to use stronger languages to support learning in weaker languages, thereby strengthening comprehension and participation. The findings also emphasize the importance of teacher awareness of learners' linguistic repertoires. Coetzer et al. (2023) argue that teachers' understanding of learners' language practices is essential for effective mathematics instruction in multilingual settings. Their study suggests that translanguaging pedagogies can assist learners in negotiating the linguistic demands of mathematics while simultaneously developing mathematical understanding.

Translanguaging as a Resource for improved Mathematical Proficiency

The final theme emerging from the review is that translanguaging supports the development of mathematical proficiency. Across the reviewed studies, multilingualism is increasingly viewed as a resource rather than a barrier in mathematics education (Coetzer et al., 2023; Mostert &

Roberts, 2020). Mostert and Roberts (2020) conceptualised language as a resource for meaning-making that enables learners to participate actively and construct new mathematical knowledge. The reviewed studies suggest that when learners are permitted to use multiple languages flexibly, they are better able to reason mathematically, solve problems, and articulate their understanding. Poo and Venkat (2021), for example, compared translanguaging and direct translation practices in mathematics classrooms and found that learners demonstrated stronger conceptual understanding when they engaged fluidly with multiple languages. Rather than simply translating words, learners used their full linguistic repertoires to solve problems, justify reasoning, and communicate mathematical ideas clearly.

The literature further suggests that translanguaging promotes conceptual understanding rather than rote memorization. Askew and Venkat (2019) describe mathematical proficiency as the ability to understand concepts deeply, reason logically, and generate new knowledge. In this regard, translanguaging creates opportunities for learners to connect mathematical ideas with familiar linguistic and cultural experiences, thereby strengthening comprehension and critical thinking. Poo (2021) additionally observed that teachers who moved flexibly between languages and mathematical representations created richer opportunities for learner understanding. Such language practices supported meaning-making by helping learners interpret mathematical concepts within familiar linguistic contexts.

Discussion

This study explored the role of translanguaging in multilingual South African primary mathematics classrooms through a semi-systematic review of recent literature. The findings suggest that translanguaging is not merely a communication strategy but a pedagogical and epistemic resource that enables multilingual learners to access mathematical meaning through their full linguistic repertoires (Erath et al., 2021). The reviewed studies collectively indicate that when learners are allowed to move flexibly between languages, they are better able to communicate mathematical ideas, engage in classroom discourse, and develop conceptual understanding. These findings reinforce the growing body of multilingual mathematics education research that positions language as central to mathematical meaning-making rather than as a neutral medium of instruction.

The findings further highlight the persistent linguistic challenges that many South African learners encounter, particularly during the transition from home language instruction in the Foundation Phase to English as the language of learning and teaching in Grade 4 (McLachlan & Essien, 2022). The reviewed studies suggest that this abrupt linguistic transition often limits learners' participation and understanding, leading many learners to rely on memorization rather than conceptual reasoning. In this regard, translanguaging emerges as a pedagogical response to the mismatch between learners' linguistic realities and monolingual classroom practices. The findings therefore support previous studies which argue that multilingual learners benefit when their home languages are recognized as cognitive and academic resources rather than barriers to learning (Prediger & Neugebauer, 2023; Robertson & Graven, 2020).

The review also extends previous research on multilingual mathematics education by demonstrating that translanguaging supports epistemic access in mathematics classrooms. Learners who are permitted to use their home languages alongside English are better able to negotiate mathematical meanings, explain reasoning, and engage critically with mathematical concepts (Askew & Venkat, 2019). This finding aligns with heteroglossic perspectives of language, which view multilingualism as dynamic and interconnected rather than as separate and competing language systems. The reviewed studies therefore challenge monolingual approaches

to mathematics teaching that prioritize English-only instruction and marginalize learners' linguistic repertoires.

An important implication emerging from this review concerns teacher education and professional development. The findings suggest that many teachers continue to work within monolingual instructional traditions despite teaching in linguistically diverse classrooms. This indicates a need for teacher education programmes to prepare teachers for multilingual pedagogies that incorporate translanguaging practices into mathematics teaching. Teachers require support in designing language-responsive lessons, facilitating multilingual classroom discourse, and using learners' home languages strategically to scaffold conceptual understanding. The findings additionally suggest that teachers do not necessarily need to be fluent in all learners' home languages in order to implement translanguaging pedagogies effectively. Rather, teachers need to create classroom environments where learners can collaboratively draw on their linguistic resources during mathematical meaning-making.

The findings also have implications for curriculum development and language policy in South Africa. Current classroom practices are often shaped by policies and assessment structures that privilege English as the dominant language of learning and teaching. However, the reviewed studies suggest that rigid monolingual practices may contribute to inequitable learning opportunities for multilingual learners. The study therefore supports calls for more flexible and inclusive language policies that recognize multilingualism as a resource in mathematics education. Curriculum developers and policymakers may need to reconsider how multilingual pedagogies can be integrated into mathematics curricula, teacher guidelines, and classroom assessment practices.

Furthermore, the findings emphasize the importance of classroom discourse in mathematical learning. Translanguaging enables learners to participate actively in discussions, articulate reasoning, and construct understanding collaboratively. In this regard, the review supports sociocultural perspectives of learning, which view knowledge construction as socially mediated through interaction and dialogue. The reviewed studies suggest that meaningful mathematics learning occurs when learners can engage with concepts in linguistically familiar and cognitively accessible ways. While the reviewed literature demonstrates promising outcomes associated with translanguaging, the findings should not be interpreted as conclusive proof that translanguaging alone guarantees improved mathematics achievement in all contexts. Rather, the review indicates that translanguaging creates opportunities for enhanced participation, conceptual understanding, and meaning-making when implemented within supportive classroom environments. Factors such as teacher preparedness, classroom context, learner diversity, and institutional language policies continue to shape the effectiveness of translanguaging practices.

This study also points to several areas requiring further research. Future studies should include empirical classroom-based investigations examining how translanguaging is enacted in different mathematics classrooms across South Africa. Longitudinal studies are needed to explore the long-term impact of translanguaging on mathematical achievement and learner confidence. Additionally, research focusing on teacher professional development would provide valuable insights into how teachers can be prepared to implement multilingual pedagogies effectively. Comparative studies across rural and urban schools, as well as across different linguistic communities, may further deepen understanding of translanguaging practices in mathematics education. This study contributes to the growing scholarship on multilingual mathematics education by synthesizing recent literature on translanguaging in South African primary mathematics classrooms. The review highlights translanguaging as a valuable pedagogical, communicative, and epistemic resource that can support multilingual learners' access to mathematical knowledge. In doing so, the study contributes to ongoing debates about language,

equity, and inclusion in mathematics education and underscores the need for language-responsive pedagogies in multilingual learning environments.

CONCLUSION

This semi-systematic review explored the role of translanguaging in multilingual South African primary mathematics classrooms. The study aimed to examine how translanguaging is implemented in mathematics teaching and learning, as well as its pedagogical implications for multilingual learners. The reviewed literature suggests that translanguaging enhances mathematical communication, supports conceptual understanding, and promotes learner participation by allowing learners to draw on their full linguistic repertoires during mathematical meaning-making. The findings contribute to the growing body of multilingual mathematics education research by highlighting translanguaging as a valuable pedagogical and epistemic resource in linguistically diverse classrooms. The study further emphasizes the importance of language-responsive teaching practices that recognize learners' home languages as assets rather than barriers to learning. These findings have practical implications for teacher education, curriculum development, and classroom practice in South Africa, particularly in supporting more inclusive and equitable mathematics instruction.

LIMITATIONS OF THE REVIEW

This review was limited to eight studies published between 2020 and 2023, which limits the generalizability of the findings. Future research should therefore include more empirical classroom-based studies, longitudinal investigations, and teacher professional development research to further examine the impact of translanguaging on mathematics teaching and learning in multilingual contexts. Overall, the study highlights the importance of embracing learners' linguistic resources in mathematics classrooms and contributes to ongoing discussions on equity, inclusion, and meaningful learning in multilingual education.

DECLARATION OF AI USE

The authors used ChatGPT (OpenAI) in a limited capacity during the revision process for language editing, grammar checking, and improving sentence clarity. All analyses, interpretations, findings, and conclusions were developed independently by the authors. The authors take full responsibility for the content of this manuscript.

REFERENCES

Alhasnawi, S. (2021). Teachers' beliefs and practices with respect to translanguaging university mathematics in Iraq. *Linguistics and Education, 63*, 100930. https://doi.org/10.1016/j.linged.2021.100930

Askew, M., & Venkat, H. (2019). Mathematical subject knowledge for teaching primary school mathematics: Evidence and models for professional development. In *International handbook of mathematics teacher education: Volume 1* (pp. 15–41). Brill Sense.

Bezuidenhout, H. S. (2022). Associations between early numeracy and mathematics-specific vocabulary. *South African Journal of Childhood Education, 12*(1). https://doi.org/10.4102/sajce.v12i1.1191

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Cenoz, J., & Gorter, D. (2022). Pedagogical translanguaging and its application to language classes. *RELC Journal, 53*(2), 342–354. https://doi.org/10.1177/00336882221082751

Charamba, E. (2020). Translanguaging: Developing scientific scholarship in a multilingual classroom. *Journal of Multilingual and Multicultural Development, 41*(8), 655–672. https://doi.org/10.1080/01434632.2019.1625907

Charamba, E. (2021). Learning and language: Towards a reconceptualization of their mutual interdependences in a multilingual science class. *Journal of Multilingual and Multicultural Development, 42*(6), 503–521. https://doi.org/10.1080/01434632.2019.1707837

Charamba, E. (2023). Translanguaging as bona fide practice in a multilingual South African science classroom. *International Review of Education, 69*(1), 31–50. https://doi.org/10.1007/s11159-023-09990-0

Chirinda, B., Kitchen, R., Castellón, L. B., & Matute, K. (2023). Teaching mathematics in post-apartheid South Africa: The perspectives of teachers of black students. *Research in Mathematics Education, 25*(1), 105–123. https://doi.org/10.1080/14794802.2021.2024086

Coetzer, T., Livingston, C., & Barnard, E. (2023). Eleven Grade 1 teachers' understandings of mathematical language in a South African context. *Reading & Writing, 14*(1), 2079–8245. https://doi.org/10.4102/rw.v14i1.409

Cummins, J. (2019). The emergence of translanguaging pedagogy: A dialogue between theory and practice. *Journal of Multilingual Education Research, 9*, 19–36.

Department of Basic Education. (2011). *Curriculum and assessment policy statement: Grades 4–6: Mathematics*. Government Printer.

Department of Basic Education. (2022). *National Senior Certificate school subject report*. DBE.

Erath, K., Ingram, J., Moschkovich, J., & Prediger, S. (2021). Designing and enacting instruction that enhances language for mathematics learning: A review of the state of development and research. *ZDM–Mathematics Education, 53*, 245–262.

Erath, K., & Prediger, S. (2021). Quality dimensions for activation and participation in language-responsive mathematics classrooms. In *Classroom research on mathematics and language: Seeing learners and teachers differently*. Routledge.

Essien, A. A. (2020). Norms of practices and pre-service teacher education for multilingual mathematics classrooms in South Africa. In *Multilingual education yearbook 2020: Teacher education and multilingual contexts* (pp. 169–191).

Essien, A. A., Sapire, I., & Taylor, N. (2023). *Landscape analysis of the role of language in early grades mathematics teaching and learning in South Africa*.

Gandara, F., & Randall, J. (2019). Assessing mathematics proficiency of multilingual students: The case for translanguaging in the Democratic Republic of the Congo. *Comparative Education Review, 63*(1), 58–78.

García, O. (2009). Emergent bilinguals and TESOL: What's in a name? *TESOL Quarterly, 43*(2), 322–326.

García, O., & Kleifgen, J. A. (2020). Translanguaging and literacies. *Reading Research Quarterly, 55*(4), 553–571.

Genc, M., & Erbas, A. K. (2019). Secondary mathematics teachers' conceptions of mathematical literacy. *International Journal of Education in Mathematics, Science and Technology, 7*(3), 222–237.

González, N. (2006). Beyond culture: The hybridity of funds of knowledge. In *Funds of knowledge* (pp. 29–46). Routledge.

Graven, M., & Robertson, S. A. (2020). A mathematics teacher's response to a dilemma: "I'm supposed to teach them in English but they don't understand." *South African Journal of Childhood Education, 10*(1), 1–11.

Grosjean, F. (2010). Bilingualism, biculturalism, and deafness. *International Journal of Bilingual Education and Bilingualism, 13*(2), 133–145.

Hattingh, A., McKinney, C., Msimanga, A., Probyn, M., & Tyler, R. (2022). Translanguaging in science education in South African classrooms: Challenging constraining ideologies for science teacher education. In *Translanguaging in science education* (pp. 231–256). Springer International Publishing.

Hoadley, U. (2012). What do we know about teaching and learning in South African primary schools? *Education as Change, 16*(2), 187–202.

Lewis, G., Jones, B., & Baker, C. (2012). Translanguaging: Origins and development from school to street and beyond. *Educational Research and Evaluation, 18*(7), 641–654.

Makonye, J. P. (2019). The effect of translanguaging in teaching the Grade 6 topics of perimeter and area in rural schools. *Southern African Linguistics and Applied Language Studies, 37*(3), 221–231.

Marshall, S. A., McClain, J. B., & McBride, A. (2023). Reframing translanguaging practices to shift mathematics teachers' language ideologies. *International Journal of Qualitative Studies in Education*, 1–14.

McLachlan, K., & Essien, A. A. (2022). Language and multilingualism in the teaching and learning of mathematics in South Africa: A review of literature in *Pythagoras* from 1994 to 2021. *Pythagoras, 43*(1), 1–11.

Mlachila, M. M., & Moeletsi, T. (2019). *Struggling to make the grade: A review of the causes and consequences of the weak outcomes of South Africa's education system*.

Moll, L., Amanti, C., Neff, D., & González, N. (2006). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. In *Funds of knowledge* (pp. 71–87). Routledge.

Morales, H., & DiNapoli, J. (2018). Latinx bilingual students' perseverance on a mathematical task: A rehumanizing perspective. *Journal of Research in Mathematics Education, 7*(3), 226–250.

Morgan, C., Planas, N., & Schütte, M. (2021). Developing a perspective on multiplicity in the study of language in mathematics classrooms. In *Classroom research on mathematics and language: Seeing learners and teachers differently* (pp. 3–21).

Mostert, I., & Roberts, N. (2022). Diversity of mathematical expression: The language of comparison in English and isiXhosa early grade mathematics texts. *Research in Mathematics Education, 24*(1), 3–23.

Ndhlovana, S. N., & Charamba, E. (2023). The efficacy of translanguaging in selected South African mathematics and science intermediate phase classrooms. *JOLLT Journal of Languages and Language Teaching, 11*(3), 373–389. https://doi.org/10.33394/jollt.v11i3.7904

Ortiz, N. A. (2022). Let our rejoicing rise without bound: A focus on Black language and mathematics learning. *International Journal of Qualitative Studies in Education*, 1–13.

Planas, N. (2021). Challenges and opportunities from translingual research on multilingual mathematics classrooms. In *Mathematics education and language* (pp. 1–18). https://doi.org/10.1007/978-3-030-72009-4_1

Planas, N., & Pimm, D. (2023). Mathematics education research on language and on communication including some distinctions: Where are we now? *ZDM–Mathematics Education, 56*(1), 127–139. https://doi.org/10.1007/s11858-023-01497-0

Poo, M. (2021). Patterned differences in Grade 3 mathematics teachers' working with representations across two language contexts: Implications for learning opportunities. *African Journal of Research in Mathematics, Science and Technology Education, 25*(3), 225–235. https://hdl.handle.net/10520/ejc-saarmste_v25_i3_a225

Poo, M., & Venkat, H. (2021). Approaches that leverage home language in multilingual classrooms. In *Mathematics education and language* (pp. 39–55). https://doi.org/10.1007/978-3-030-72009-4_3

Prediger, S. (2019). Theorizing in design research: Methodological reflections on developing and connecting theory elements for language-responsive mathematics classrooms. *Avances de Investigación en Educación Matemática, 15*, 5–27.

Prediger, S. (2022). Enhancing language for developing conceptual understanding: A research journey connecting different research approaches. In *Twelfth Congress of the European Society for Research in Mathematics Education (CERME12)*.

Prediger, S., & Neugebauer, P. (2023). Can students with different language backgrounds profit equally from a language-responsive instructional approach for percentages? Differential effectiveness in a field trial. *Mathematical Thinking and Learning, 25*(1), 2–22. https://doi.org/10.1080/10986065.2021.1919817

Pusser, B. (2023). Of a mind to labor: Reconceptualizing student work and higher education. In *Understanding the working college student: New research and its implications for policy and practice* (pp. 134–154). Routledge. https://doi.org/10.4324/9781003448495-10

Reddy, V., Isdale, K., Juan, A., Visser, M., Winnaar, L., & Arends, F. (2016). *TIMSS 2015: Highlights of mathematics achievement of Grade 5 South African learners*. Department of Basic Education/Human Sciences Research Council.

Robertson, S. A., & Graven, M. (2019). Language as an including or excluding factor in mathematics teaching and learning. *Mathematics Education Research Journal, 32*(1), 77–101. https://doi.org/10.1007/s13394-019-00302-0

Rosa, J., & Flores, N. (2023). Rethinking language barriers and social justice from a raciolinguistic perspective. *Daedalus, 152*(3), 99–114. https://doi.org/10.1162/daed_a_02020

Schoeman, J. C., Geertsema, S., le Roux, M., & Pottas, L. (2025). The effect of pedagogical translanguaging on foundation phase classrooms in a South African private school. *Journal of Language, Identity & Education, 24*(3), 627–644. https://doi.org/10.1080/15348458.2023.2165494

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research, 104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Statistics South Africa. (2017). *Census 2017 census in brief*. Statistics South Africa.

Sutrisno, D. B. (2023). Multilingualism and translanguaging: A review of translanguaging practices in the linguistically diverse Indonesian EFL classrooms. *JOLLT Journal of Languages and Language Teaching, 11*(3), 547–554. https://doi.org/10.33394/jollt.v11i3.8265

Tai, K. W. H., & Wei, L. (2020). Bringing the outside in: Connecting students' out-of-school knowledge and experience through translanguaging in Hong Kong English medium instruction mathematics classes. *System, 95*, 102364. https://doi.org/10.1016/j.system.2020.102364

Tang, K. S., Lin, S. W., & Kaur, B. (2022). Mapping and extending the theoretical perspectives of reading in science and mathematics education research. *International Journal of Science and Mathematics Education, 20*(1), 1–15. https://doi.org/10.1007/s10763-022-10322-1

Wei, L. (2022). Translanguaging as method. *Research Methods in Applied Linguistics, 1*(3), 100026. https://doi.org/10.1016/j.rmal.2022.100026

Williams, J., & Ryan, J. (2020). On the compatibility of dialogism and dialectics: The case of mathematics education and professional development. *Mind, Culture, and Activity, 27*(1), 70–85. https://doi.org/10.1080/10749039.2019.1686026