



Decolonising the curriculum: Revitalising mathematics education in Post-Schooling South Africa

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ABSTRACT

Decolonising the curriculum has emerged as a critical imperative in South African higher education, particularly within mathematics education, where colonial legacies have historically privileged Western epistemologies while marginalising African knowledge systems. Despite mathematics often being portrayed as neutral and universal, its teaching and content are deeply embedded within specific cultural and historical contexts. This conceptual paper critically examined the extent to which South Africa's post-school mathematics curriculum remains shaped by colonial influences and explored the potential of pre-colonial African mathematical knowledge to inform meaningful curriculum reform. Guided by African-centred epistemologies, indigenous knowledge systems, and post-colonial scholarship, the study employed a qualitative literature-based approach to analyse historical and contemporary scholarship on indigenous African mathematical practices, including counting systems, geometric reasoning, and applied mathematical knowledge embedded in social, architectural, and economic activities. The analysis revealed that contemporary mathematics curricula continue to privilege Eurocentric paradigms while overlooking Africa's rich mathematical heritage, thereby reinforcing epistemic exclusion. The study argued that integrating indigenous mathematical knowledge can contribute to a more inclusive, contextually relevant, and socially responsive curriculum that enhances student engagement and affirms cultural identities. The paper's primary contribution lies in providing a conceptual synthesis that bridges decolonisation theory, indigenous African mathematical knowledge, and critical mathematics education to advance curriculum transformation in post-school mathematics education. By foregrounding epistemic plurality rather than the replacement of existing knowledge systems, the study offers a theoretically grounded framework for reimagining mathematics education and promoting epistemic justice in South African higher education.

Keywords: Decolonisation, Mathematics curriculum, Indigenous knowledge systems, African epistemologies.

INTRODUCTION

The decolonisation of education has become a central discourse in South African higher education, particularly in the aftermath of broader social and political calls for epistemic justice and curriculum transformation. Decolonisation seeks to challenge and dismantle the dominance of Eurocentric knowledge systems that were institutionalised during colonialism and apartheid, while foregrounding

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PUBLICATION HISTORY - Received : 7th February, 2026 | Accepted: 15th July, 2026 | Published: 25th September, 2026.

TO CITE THIS ARTICLE – Mthethwa, Themba Mngomeni, and Alfred Mvunyelwa Msomi. "Decolonising the curriculum: Revitalising mathematics education in Post-Schooling South Africa." *E-Journal of Humanities, Arts and Social Sciences* 7, no.7 (2026): 2154 - 2165
<https://doi.org/10.38159/ehass.20267729>

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indigenous and locally grounded epistemologies. Within this discourse, mathematics education occupies a contested space. Although mathematics is frequently portrayed as a neutral, universal, and culture-free discipline, growing scholarship demonstrates that mathematical knowledge is historically situated and socially constructed, reflecting the values, priorities, and worldviews of the societies in which it develops.¹

In South Africa, the post-school mathematics curriculum remains largely shaped by Western epistemological traditions introduced through colonial education systems. These traditions prioritise European-origin mathematical frameworks, such as Euclidean geometry, algebraic formalism, and abstract reasoning, while marginalising or entirely excluding African mathematical knowledge systems.² As a result, mathematics is often experienced by students as disconnected from their cultural identities and lived realities, reinforcing perceptions that legitimate mathematical knowledge originates exclusively from Western intellectual traditions. This epistemic imbalance not only undermines the recognition of Africa's intellectual heritage but also perpetuates structural inequalities in access, participation, and success in mathematics education.

Historical and archaeological evidence challenges the notion that advanced mathematical thinking is solely a Western achievement. Pre-colonial African societies developed sophisticated mathematical practices embedded in everyday activities such as trade, architecture, agriculture, astronomy, and art. Artifacts such as the Ishango and Lebombo bones provide evidence of early numerical reasoning and arithmetic practices, while African architectural designs and artistic traditions reveal complex geometric and fractal principles.³ Despite this rich heritage, these contributions remain largely absent from mainstream mathematics curricula in South African higher education, resulting in an incomplete and exclusionary representation of mathematical knowledge.

The continued marginalisation of indigenous knowledge systems in mathematics education has significant educational and social implications. When students are unable to see their histories, cultures, and ways of knowing reflected in the curriculum, mathematics may appear alien, inaccessible, and irrelevant. Scholars argue that this disconnection contributes to low engagement, diminished confidence, and persistent achievement gaps, particularly among students from historically marginalised communities.⁴ Conversely, a curriculum that acknowledges and integrates indigenous mathematical knowledge has the potential to foster cultural affirmation, intellectual inclusivity, and deeper conceptual understanding.

Against this background, this conceptual paper examines the decolonisation of the mathematics curriculum in South Africa's post-school education sector. It interrogates the enduring influence of colonial epistemologies in contemporary mathematics curricula and explores how indigenous African mathematical knowledge can be meaningfully integrated to promote relevance, inclusivity, and epistemic justice. Rather than rejecting Western mathematics outright, the paper advocates for a pluralistic approach that recognises multiple mathematical traditions and situates mathematics within diverse cultural and historical contexts.

Guided by this purpose, the study is structured around the following research questions:

- (1) What does decolonisation mean in the context of the post-school mathematics curriculum in South Africa?
- (2) In what ways do colonial legacies continue to shape the content and pedagogy of mathematics education?
- (3) What forms of indigenous mathematical knowledge existed in pre-colonial African societies?

¹ Ubiratan D'Ambrosio, "Cultural Framing of Mathematics Teaching and Learning," in *Proceedings of the Fifth International Congress on Mathematical Education* (Adelaide: PME, 1994), 1–10; Catherine A Odora-Hoppers, *Indigenous Knowledge and the Integration of Knowledge Systems: Towards a Philosophy of Articulation* (Claremont: New Africa Books, 2001).

² Malegapuru W. Makgoba, *African Renaissance: The New Struggle* (Cape Town: Tafelberg, 1999); Lesley Le Grange, "Decolonising the University Curriculum," *South African Journal of Higher Education* 30, no. 2 (2016): 1–12.

³ Michael P Closs, "An Ancient African Counting Device," *Scientific American* 255, no. 4 (1986): 86–92; Ron Eglash, *African Fractals: Modern Computing and Indigenous Design* (New Brunswick, NJ: Rutgers University Press, 1999).

⁴ Odora-Hoppers, *Indigenous Knowledge and the Integration of Knowledge Systems: Towards a Philosophy of Articulation*; Paulus Gerdes, *Geometry from Africa: Mathematical and Educational Explorations* (Washington, DC: Mathematical Association of America, 2019).

- (4) How can indigenous African mathematical knowledge be integrated into contemporary mathematics curricula to enhance relevance, inclusivity, and student engagement?

By addressing these questions, the paper contributes to ongoing debates on curriculum transformation and offers insights into how mathematics education can be reimagined as a culturally grounded and socially responsive discipline. The following section reviews existing literature on decolonisation, indigenous knowledge systems, and mathematics education to situate the study within broader scholarly conversations.

LITERATURE REVIEW

Decolonisation, Epistemic Justice, and Curriculum Transformation in Higher Education

The decolonisation of the curriculum has become a central concern in higher education systems across the Global South, particularly in post-colonial societies such as South Africa. At its core, decolonisation is concerned with addressing epistemic injustice—the systematic privileging of Western knowledge systems at the expense of indigenous and locally grounded epistemologies.⁵ Recent scholarship emphasises that decolonisation is not merely symbolic or representational but requires a fundamental restructuring of how knowledge is produced, validated, and transmitted within universities.⁶

Contemporary debates further highlight that curriculum decolonisation involves challenging the assumption that Western epistemologies are universal, neutral, and superior. Instead, knowledge is increasingly understood as historically situated and culturally embedded.⁷ In the South African context, calls for decolonisation gained renewed urgency following student movements such as *#RhodesMustFall* and *#FeesMustFall*, which exposed the persistence of coloniality in university curricula, institutional cultures, and pedagogical practices. These movements foregrounded the need to re-centre African epistemologies and lived experiences within academic knowledge systems.

Despite growing consensus on the importance of decolonisation, scholars note that many curriculum reforms remain superficial, focusing on diversification of reading lists rather than epistemological transformation.⁸ This critique is particularly relevant for disciplines such as mathematics, which are often excluded from decolonisation debates on the assumption that they are culturally neutral.

Reframing Mathematics as a Culturally Situated Knowledge System

Traditional views of mathematics as an objective, universal, and culture-free discipline have been increasingly challenged by scholars in critical mathematics education and ethnomathematics. D'Ambrosio's foundational work argues that mathematics is a human activity shaped by cultural, historical, and social contexts, resulting in multiple mathematical systems across societies.⁹ This perspective disrupts the dominance of Western mathematical traditions by recognising alternative ways of mathematical knowing and problem-solving.

Recent studies extend this critique by demonstrating how mathematics curricula often function as sites of epistemic exclusion. Scholars argue that when mathematics is taught solely through Eurocentric frameworks, students from non-Western backgrounds may struggle to see its relevance or legitimacy, reinforcing patterns of alienation and underachievement.¹⁰ In South Africa, mathematics curricula at both school and university levels continue to prioritise abstraction and formalism derived from Western traditions, with little acknowledgement of indigenous mathematical practices.¹¹

Emerging literature emphasises that recognising mathematics as culturally situated does not undermine its intellectual rigour. Rather, it expands the discipline by situating mathematical concepts

⁵ Makgoba, *African Renaissance: The New Struggle*.

⁶ Le Grange, "Decolonising the University Curriculum."

⁷ Raewyn Connell, *The Good University: What Universities Actually Do and Why It Matters* (London: Zed Books, 2019).

⁸ Jonathan D Jansen, *Decolonisation in Universities: The Politics of Knowledge* (Johannesburg: Wits University Press, 2019).

⁹ D'Ambrosio, "Cultural Framing of Mathematics Teaching and Learning."

¹⁰ Morgan Ndlovu, "Re-Imagining Mathematics Education through Decoloniality," *Journal of Education* 64 (2015): 51–70; Margaret Walsh, *Understanding Mathematical Pedagogies* (London: Routledge, 2017).

¹¹ Le Grange, "Decolonising the University Curriculum."

within diverse epistemological traditions, thereby enriching understanding and application. This reframing is critical for advancing decolonisation within mathematics education, particularly at the post-school level where disciplinary boundaries are more rigidly enforced.

Indigenous African Mathematical Knowledge and Its Marginalisation

A substantial body of scholarship documents the existence of sophisticated mathematical knowledge in pre-colonial African societies. Archaeological artefacts such as the Ishango and Lebombo bones provide evidence of early numerical reasoning, arithmetic structuring, and possibly astronomical calculation.¹² Beyond numerical systems, African societies developed advanced spatial and geometric reasoning embedded in architecture, art, and settlement planning. Eglash's work on African fractals demonstrates that recursive geometric principles evident in African village layouts, textiles, and artistic designs align with complex mathematical concepts such as self-similarity and non-linear scaling.¹³ Zaslavsky further illustrates how indigenous counting systems and mathematical games were integral to trade, agriculture, and governance across African societies.¹⁴ These studies collectively challenge Eurocentric historical narratives that position Africa as mathematically deficient or dependent on Western knowledge.

Despite this evidence, indigenous African mathematical knowledge remains largely absent from formal mathematics curricula, particularly in higher education. Scholars argue that this absence reinforces deficit discourses and perpetuates the misconception that legitimate mathematics originates exclusively from Europe.¹⁵ The continued marginalisation of indigenous mathematics thus represents not only a curricular omission but an epistemological exclusion with profound educational consequences.

Decolonising Mathematics Education: Contemporary Approaches and Limitations

Recent scholarship on decolonising mathematics education in South Africa highlights both the promise and the complexity of curriculum transformation. Studies demonstrate that integrating indigenous knowledge into mathematics teaching can enhance student engagement, conceptual understanding, and cultural affirmation.¹⁶ These findings align with culturally relevant pedagogy, which emphasises the importance of connecting academic content to students' cultural identities and lived experiences.¹⁷

However, the literature also identifies significant challenges. One concern is the tendency to romanticise indigenous knowledge or treat it as static and homogenous. Asante cautions that indigenous knowledge systems vary widely across African societies and must be engaged contextually rather than homogenised.¹⁸ Another challenge lies in institutional resistance, where concerns about academic standards and global competitiveness are used to justify the continued dominance of Western mathematical frameworks.¹⁹

Importantly, much of the existing literature focuses on school-level interventions, with limited attention to post-school or university mathematics curricula. Where higher education is addressed, discussions often remain conceptual, offering limited guidance on how indigenous and Western mathematical knowledge systems can coexist without reinforcing epistemic hierarchies.

¹² Closs, "An Ancient African Counting Device."

¹³ Eglash, *African Fractals: Modern Computing and Indigenous Design*.

¹⁴ Claudia Zaslavsky, *Africa Counts: Number and Pattern in African Culture* (Boston: Prindle: Weber & Schmidt, 1973).

¹⁵ Molefi Kete Asante, *Afrocentricity: The Theory of Social Change* (Chicago: African American Images, 2003); Connell, *The Good University: What Universities Actually Do and Why It Matters*.

¹⁶ R Govender and T. Soni, "Re-Imagining Mathematics Education in Post-Apartheid South Africa," *African Journal of Research in Mathematics, Science and Technology Education* 24, no. 2 (2020): 210–21; Thabiso Mthembu, "Indigenous Knowledge Systems and Mathematics Teaching in South Africa," *Pythagoras* 40, no. 1 (2019); Morgan Ndlovu, "Decoloniality and Mathematics Education: Rethinking Knowledge and Pedagogy," *Educational Research for Social Change* 10, no.1(2021):1–15.

¹⁷ Gloria Ladson-Billings, "Toward a Theory of Culturally Relevant Pedagogy," *American Educational Research Journal* 32, no. 3 (1995): 465–491.

¹⁸ Asante, *Afrocentricity: The Theory of Social Change*.

¹⁹ Jansen, *Decolonisation in Universities: The Politics of Knowledge*.

Identifying the Research Gap and Contribution of the Present Study

While there is growing scholarship advocating for the decolonisation of mathematics education, a clear gap remains in conceptual analyses that specifically address post-school mathematics curricula in South Africa. Existing studies tend to either focus on broader curriculum decolonisation without disciplinary specificity or examine mathematics education without fully engaging with epistemological questions of coloniality and knowledge validation.

Furthermore, there is limited scholarship that systematically synthesises indigenous African mathematical knowledge with critical mathematics education and post-colonial theory to inform curriculum transformation at the university level. As a result, educators and curriculum designers lack coherent conceptual frameworks to guide meaningful decolonisation beyond tokenistic inclusion.

This study addresses this gap by offering a conceptual synthesis that critically examines colonial legacies in post-school mathematics education while foregrounding indigenous African mathematical knowledge as a legitimate and enriching component of the curriculum. By situating mathematics within African-centred epistemologies and advocating for epistemic plurality rather than replacement, the study contributes to a more nuanced and theoretically grounded understanding of curriculum decolonisation. In doing so, it provides a foundation for future empirical research, curriculum development, and policy interventions aimed at achieving epistemic justice in higher education mathematics.

While the preceding discussion demonstrates that indigenous African societies possessed rich and sophisticated mathematical knowledge, this body of scholarship is often presented in fragmented ways across disciplines. To synthesise key insights from the literature and highlight their relevance to contemporary mathematics curricula, **Table 1** maps selected indigenous mathematical practices onto corresponding mathematical concepts and potential curriculum applications.

Table 1: Indigenous Mathematical Knowledge and Curriculum Relevance

Indigenous Practice	Mathematical Concept	Curriculum Relevance
African counting systems	Number bases, arithmetic structures	Foundations of number theory
Fractal village designs	Self-similarity, recursion	Geometry and non-linear systems
Indigenous architecture	Measurement, symmetry	Spatial reasoning and design
Trade and agriculture	Ratios, estimation, optimisation	Applied mathematics

This synthesis provides a conceptual foundation for the methodological approach adopted in this study, which draws on these bodies of literature to interrogate colonial legacies and explore possibilities for curriculum transformation in post-school mathematics education.

METHODOLOGY

Research Design

This study adopted a qualitative conceptual research design, which was appropriate for interrogating theoretical, philosophical, and curriculum-based questions related to the decolonisation of mathematics education.²⁰ Conceptual research was employed because it facilitates the clarification of key constructs, the synthesis of existing scholarship, and the development of integrative theoretical frameworks rather than the generation of empirical data.²¹

²⁰ Yosef Jabareen, "Building a Conceptual Framework: Philosophy, Definitions, and Procedure," *International Journal of Qualitative Methods* 8, no. 4 (December 1, 2009): 49–62, <https://doi.org/10.1177/160940690900800406>; Sharon M Ravitch and Matthew Riggan, *Reason & Rigor: How Conceptual Frameworks Guide Research*, 2nd ed (Thousand Oaks, CA: Sage, 2017).

²¹ Themba M. Mthethwa and Alfred M. Msomi, "Barriers and Enablers to Implementing Hyflex Pedagogy in Higher Education Institutions: A Focus on Mathematics Education," 2025, 264–82, https://doi.org/10.2991/978-2-38476-521-8_17.

The study sought to critically examine how colonial epistemologies continue to shape mathematics education in South Africa and to explore the potential contribution of indigenous African mathematical knowledge to curriculum transformation.

The study was guided by an African-centred and post-colonial methodological orientation. Post-colonial theory provided a framework for examining how colonial power relations have continued to influence knowledge production and curriculum design.²² In addition, critical mathematics education and ethnomathematics provided analytical lenses for understanding mathematics as a culturally situated practice rather than a universal and value-neutral discipline.²³

Data Sources and Literature Selection

The study relied exclusively on secondary sources, including peer-reviewed journal articles, scholarly books, policy documents, and historical and archaeological studies relevant to mathematics education, indigenous knowledge systems, and curriculum transformation. The literature was identified through purposive searches of academic databases and scholarly repositories, including Google Scholar, Scopus, ERIC, and university library databases. Search terms included combinations of keywords such as *decolonisation*, *mathematics education*, *curriculum transformation*, *indigenous knowledge systems*, *ethnomathematics*, *African epistemologies*, and *higher education*.

A purposive sampling strategy was employed to select sources that were directly relevant to the study's research questions and conceptual focus.²⁴ Priority was given to seminal and highly cited works in the fields of decolonisation, curriculum studies, ethnomathematics, indigenous knowledge systems, and African-centred scholarship, as well as recent studies that addressed contemporary debates on epistemic justice and curriculum reform.

Sources were included if they:

1. Examined decolonisation, curriculum transformation, or epistemic justice in higher education;
2. Addressed mathematics education from critical, cultural, or ethnomathematical perspectives;
3. Documented indigenous African mathematical knowledge and practices; or
4. Contributed theoretical insights relevant to African-centred and post-colonial scholarship.

Sources were excluded if they focused solely on technical mathematical content without engaging educational, cultural, or epistemological dimensions, or if they lacked direct relevance to the study's conceptual objectives. This selection process ensured both conceptual depth and alignment with the study's analytical focus.²⁵

To enhance transparency, the selected literature was organised into three interrelated thematic domains: (1) decolonisation and curriculum transformation, (2) indigenous African mathematical knowledge, and (3) critical mathematics education and culturally relevant pedagogy. These domains reflected the major scholarly conversations informing the study and provided a framework for subsequent analysis.

Analytical Strategy

The study employed a thematic critical literature analysis to synthesise insights across diverse bodies of scholarship.²⁶ The analysis extended beyond thematic grouping by incorporating an iterative process of reading, coding, comparison, interpretation, and conceptual synthesis.

Initially, the selected sources were read repeatedly to identify recurring concepts, arguments, and perspectives related to curriculum decolonisation, indigenous mathematical knowledge, epistemic justice, and mathematics education. Key ideas were then coded and grouped according to their relevance

²² Frantz Fanon, *The Wretched of the Earth* (New York: Grove Press, 1961).

²³ D'Ambrosio, "Cultural Framing of Mathematics Teaching and Learning."

²⁴ Hannah Snyder, "Literature Review as a Research Methodology: An Overview and Guidelines," *Journal of Business Research* 104 (November 2019): 333–39, <https://doi.org/10.1016/j.jbusres.2019.07.039>.

²⁵ Snyder, "Literature Review as a Research Methodology," 336.

²⁶ Virginia Braun and Victoria Clarke, "Using Thematic Analysis in Psychology," *Qualitative Research in Psychology* 3, no. 2 (2006): 77–101; Lorelli S. Nowell et al., "Thematic Analysis," *International Journal of Qualitative Methods* 16, no. 1 (December 1, 2017), <https://doi.org/10.1177/1609406917733847>.

to the study's research questions. Through continuous comparison across sources, patterns, contradictions, and gaps in the literature were identified.

Particular attention was paid to how different scholars conceptualised knowledge, mathematical legitimacy, cultural relevance, and curriculum transformation. The analysis further examined areas of convergence and divergence within the literature to uncover dominant narratives, epistemic silences, and opportunities for curriculum reform. In line with interpretive qualitative research, emphasis was placed on meaning-making, reflexivity, and theoretical integration rather than simple description of existing studies.

The identified themes were subsequently synthesised into broader analytical categories, including coloniality and Eurocentrism in mathematics education, indigenous African mathematical knowledge systems, epistemic exclusion, culturally relevant pedagogy, and epistemic plurality. This process enabled the development of an integrated conceptual framework for understanding how indigenous knowledge systems can contribute to the decolonisation of post-school mathematics curricula in South Africa.

Rigour and Trustworthiness

Conceptual rigour was enhanced through engagement with authoritative and widely cited scholarship across the fields of decolonisation, curriculum studies, indigenous knowledge systems, and mathematics education. Credibility was strengthened through the transparent articulation of the literature selection process and analytical procedures, as well as through sustained engagement with seminal and contemporary sources.²⁷

Dependability was supported by maintaining coherence between the research questions, theoretical framework, literature selection criteria, and analytical approach. Reflexivity was maintained by explicitly acknowledging the epistemological orientation of the study and critically examining assumptions embedded within dominant mathematical discourses. Although the study did not involve empirical validation, its trustworthiness rested on the logical consistency of its arguments, the depth of theoretical engagement, and the transparency of its analytical process.²⁸

Ethical Considerations

As the study relied solely on published and publicly accessible sources, it did not involve human participants and therefore did not require formal ethical clearance. Nevertheless, ethical scholarship was maintained through accurate representation of sources, appropriate citation practices, and respectful engagement with indigenous knowledge systems and African intellectual traditions.

DISCUSSION

This discussion critically engages with the central aim of the study: to examine how the decolonisation of the mathematics curriculum in South Africa's post-school education sector can be advanced through the meaningful integration of indigenous African mathematical knowledge. Drawing on the reviewed literature and the African-centred, post-colonial methodological orientation adopted, the discussion interrogates the persistence of colonial epistemologies in mathematics education, the consequences of epistemic exclusion, and the transformative possibilities of curriculum reform grounded in epistemic plurality and social justice.

Colonial Legacies and the Persistence of Eurocentrism in Mathematics Education

The analysis affirms that colonial legacies continue to exert a powerful influence on the structure, content, and pedagogical assumptions underpinning mathematics education in South African higher education. Despite national policy commitments to transformation and curriculum reform, mathematics curricula remain predominantly aligned with Western epistemological traditions that present mathematical knowledge as universal, culturally neutral, and value-free.²⁹ This framing obscures the

²⁷ Snyder, "Literature Review as a Research Methodology," 336.

²⁸ Nowell et al., "Thematic Analysis."

²⁹ Le Grange, "Decolonising the University Curriculum"; Jansen, *Decolonisation in Universities: The Politics of Knowledge*.

historical and cultural conditions under which mathematical knowledge has been produced and legitimised, while simultaneously marginalising non-Western mathematical traditions.

The persistence of Eurocentrism reflects deeper institutional and epistemological constraints within universities, where academic legitimacy and disciplinary rigour are frequently measured against Western standards of abstraction, formalism, and universality.³⁰ Within this paradigm, indigenous African mathematical knowledge is often positioned as anecdotal, informal, or pedagogically illustrative rather than as theoretically robust and intellectually generative. As post-colonial scholars argue, coloniality operates not only through the exclusion of knowledges but also through the criteria used to determine what counts as valid knowledge in the first place.³¹

Consequently, decolonising mathematics education cannot be reduced to the superficial inclusion of indigenous examples or contextualised applications. Rather, it requires a fundamental epistemological reorientation that challenges inherited hierarchies of knowledge and recognises African intellectual traditions as constitutive, rather than supplementary, to mathematical knowledge production.

Reconceptualising Mathematics through Indigenous Knowledge Systems

The discussion foregrounds the need to reconceptualise mathematics as a culturally embedded human activity rather than a detached and ahistorical abstraction. Extensive scholarship in ethnomathematics and indigenous knowledge studies demonstrates that African societies developed sophisticated mathematical reasoning long before colonial intervention, embedded in practices such as counting systems, spatial organisation, architectural design, trade, agriculture, and artistic production.

Recognising these practices challenges enduring deficit narratives that portray African societies as passive recipients of mathematical knowledge or as lacking scientific sophistication.³² Instead, indigenous African mathematics illustrates that mathematical reasoning emerges in response to specific social, environmental, and cultural needs. From this perspective, mathematics is neither singular nor static but plural, dynamic, and contextually grounded.

Importantly, integrating indigenous knowledge into the mathematics curriculum does not entail the rejection of Western mathematics. Rather, it promotes epistemic plurality, where multiple mathematical traditions coexist without hierarchy.³³ Such a pluralistic curriculum enables students to understand mathematics as an evolving body of knowledge shaped by diverse human experiences. This reconceptualisation has the potential to deepen conceptual understanding, foster critical reflection on knowledge production, and disrupt assumptions about the universality and neutrality of dominant mathematical paradigms.

Educational Implications of a Decolonised Mathematics Curriculum

One of the most significant implications of decolonising the mathematics curriculum lies in its potential to enhance student engagement, inclusivity, and epistemic belonging. Research in culturally relevant pedagogy consistently demonstrates that students are more likely to engage meaningfully with academic content when it resonates with their cultural identities and lived experiences.³⁴ In the South African post-school context, where many students come from historically marginalised communities, the continued exclusion of indigenous knowledge can contribute to alienation, low confidence, and disengagement from mathematics.³⁵

A decolonised mathematics curriculum that incorporates culturally grounded examples such as indigenous measurement systems, African architectural geometries, or mathematical patterns in art and design can bridge the divide between abstract mathematical concepts and students' everyday realities.

³⁰ Connell, *The Good University: What Universities Actually Do and Why It Matters*.

³¹ Achille Joseph Mbembe, "Decolonizing the University: New Directions," *Arts and Humanities in Higher Education* 15, no. 1 (2016): 29–45.

³² Connell, *The Good University*,

³³ Walshaw, *Understanding Mathematical Pedagogies*

³⁴ Ndlovu, "Re-imagining Mathematics Education through Decoloniality,"

³⁵ Govender and Soni, "Re-imagining Mathematics Education,"

This contextualisation not only affirms students' identities but also supports deeper conceptual understanding by situating mathematical ideas within meaningful social practices.³⁶

Moreover, such an approach aligns closely with the principles of culturally relevant pedagogy, which emphasises academic success, cultural competence, and the development of critical consciousness as interconnected educational goals.³⁷ In this way, decolonising mathematics education has the potential to transform both what is taught and how students come to see themselves as legitimate mathematical knowers.

Tensions and Challenges in Curriculum Transformation

While the transformative potential of decolonising mathematics education is evident, the discussion also acknowledges significant tensions and challenges. One persistent concern relates to balancing the integration of indigenous knowledge with the demands of global academic standards and disciplinary coherence. Mathematics operates within internationally recognised frameworks, and fears persist that incorporating indigenous knowledge may compromise academic rigour or global competitiveness. However, such concerns often reflect narrow, Western-centric definitions of rigour rather than substantive pedagogical limitations.³⁸

Another challenge concerns the diversity and contextual specificity of indigenous knowledge systems across South Africa. Indigenous mathematical practices are not homogeneous; they vary across regions, cultures, and historical contexts.³⁹ This diversity complicates efforts to design a standardised curriculum and underscores the need for flexible, context-sensitive approaches that allow for regional adaptation while maintaining conceptual coherence. Rather than imposing a singular model of indigenous mathematics, curriculum reform should embrace plurality and local relevance. Institutional resistance also remains a significant barrier to meaningful transformation. Decolonising the curriculum requires more than content revision; it necessitates changes in educator training, assessment practices, and institutional culture.⁴⁰ Without sustained professional development and institutional support, attempts to integrate indigenous perspectives risk becoming superficial or tokenistic, thereby undermining the goals of epistemic justice and curriculum transformation.

Toward Transformative and Epistemically Just Mathematics Education

Ultimately, this discussion underscores that decolonising mathematics education is an ethical, political, and epistemological project aimed at advancing epistemic justice. By recognising African contributions to mathematical knowledge, higher education institutions can challenge historical misrepresentations and disrupt entrenched hierarchies of knowledge and power.⁴¹ Such transformation has implications beyond mathematics education, contributing to broader debates about identity, knowledge production, and social justice in post-colonial societies.

This study argues that a decolonised mathematics curriculum can serve as a catalyst for reimagining higher education in South Africa as an inclusive and socially responsive space that values intellectual diversity and critical engagement. While conceptual in nature, the discussion provides a robust foundation for future empirical research, curriculum innovation, and policy development aimed at operationalising decolonisation in sustainable and meaningful ways. In doing so, it affirms the possibility of a mathematics education that honours Africa's intellectual heritage while equipping students to navigate both local and global mathematical challenges.

³⁶ Mike Mosimege and Ahmed Ismael, "Indigenous Knowledge Systems and Curriculum Transformation in Mathematics Education," *Perspectives in Education* 39, no. 2 (2021): 23–38.

³⁷ Ladson-Billings, "Toward a Theory of Culturally Relevant Pedagogy,"

³⁸ Margaret Walshaw, "Equity, Culture, and Power in Mathematics Education," *ZDM Mathematics Education* 54, no.3(2022):401–14.

³⁹ Asante, *Afrocentricity: The Theory of Social Change*.

⁴⁰ Savo Heleta, "Decolonisation of Higher Education: Dilemmas and Contradictions," *South African Journal of Higher Education* 30 (5): (2016): 1–12.

⁴¹ Odora-Hoppers, *Indigenous Knowledge and the Integration of Knowledge Systems: Towards a Philosophy of Articulation*.

CONCLUSION

This conceptual paper set out to examine the decolonisation of the post-school mathematics curriculum in South Africa by interrogating colonial legacies, foregrounding indigenous African mathematical knowledge, and exploring pathways for curriculum transformation. Guided by four interrelated research questions, the study contributes to ongoing debates on epistemic justice and curriculum reform within higher education.

Firstly, the paper clarified what decolonisation means in the context of mathematics education by conceptualising it as an epistemological process rather than a purely curricular adjustment. Decolonisation was shown to involve challenging the assumed universality and neutrality of Western mathematics, recognising mathematics as culturally situated, and validating African epistemologies as legitimate sources of mathematical knowledge. This reconceptualisation responds directly to the first research question and establishes a foundation for understanding mathematics as a pluralistic discipline.

Secondly, the study demonstrated that colonial legacies continue to shape mathematics curricula in South African higher education through the dominance of Eurocentric content, pedagogies, and standards of academic legitimacy. The analysis revealed that indigenous knowledge systems remain marginalised, reinforcing epistemic hierarchies that privilege Western mathematical traditions. This finding addresses the second research question by illustrating how coloniality persists not only in curriculum content but also in the criteria used to define valid mathematical knowledge.

Thirdly, the paper engaged with historical and scholarly evidence to highlight the existence of sophisticated indigenous African mathematical knowledge prior to colonial disruption. Examples such as indigenous counting systems, fractal geometry in architecture and art, and applied mathematical reasoning in trade and agriculture demonstrate that African societies have long contributed to mathematical knowledge production. Addressing the third research question, the study challenges deficit narratives and repositions Africa as an active contributor to global mathematical heritage.

Finally, the paper explored how indigenous African mathematical knowledge can be integrated into contemporary mathematics curricula to enhance relevance, inclusivity, and student engagement. It argued for a pluralistic and context-sensitive approach that allows indigenous and Western mathematical traditions to coexist without hierarchy. This integration, supported by culturally relevant pedagogy and educator development, addresses the fourth research question and offers a pathway toward more meaningful and socially responsive mathematics education.

In conclusion, decolonising the mathematics curriculum in South Africa holds significant educational and social potential. By recognising multiple mathematical knowledge systems, higher education institutions can foster greater student engagement, affirm cultural identities, and promote epistemic justice. While this study is conceptual in nature, it provides a robust theoretical foundation for future empirical research, policy development, and curriculum innovation. Ultimately, the decolonisation of mathematics education represents a transformative opportunity to reimagine higher education as an inclusive space that honours Africa's intellectual heritage while preparing students for participation in an interconnected global society.

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