



Decolonising Health Sciences: Reflections on Innovation, Epistemic Justice, and Advancing Medical Laboratory Education in Africa

Nokukhanya Thembane 

Department of Biomedical Science, Faculty of Applied and Health Science, Mangosuthu University of Technology, Durban, KwaZulu-Natal, Republic of South Africa

Corresponding author, email: thembane@mut.ac.za

Abstract

Medical Laboratory Science (MLS) education in Africa continues to reflect colonial legacies, with curricula and pedagogies largely shaped by Eurocentric frameworks that often overlook local health realities. This paper adopts a reflective, critical-interpretive methodology to explore the persistence of such frameworks and the ways in which they marginalise Indigenous knowledge systems while constraining innovation in health sciences training. Grounded in decolonial theory and the concept of epistemic justice, the analysis draws on interdisciplinary scholarship to investigate the epistemological assumptions rooted in MLS education. The paper argues that meaningful transformation requires dismantling inherited structures that privilege Western epistemologies over African ways of knowing and reimagining the curriculum as a site of both critique and possibility. In line with this objective, the paper proposes context-responsive pathways for reform, including curriculum redesign, inclusive teaching practices, and shifts in policy orientation aimed at promoting more equitable and locally relevant knowledge production. By foregrounding and centering African epistemologies and promoting critical reflexivity, the study positions health sciences institutions as key actors in advancing intellectual diversity and local expertise. This study contributes to ongoing conversations about curriculum transformation, offering a decolonial lens through which to rethink the future of MLS education in Africa.

Keywords: African health education, curriculum innovation, Decolonial Theory, epistemic justice, Indigenous knowledge systems, medical laboratory science education.

Introduction

Reimagining medical laboratory science (MLS) training in South Africa and the broader African context means placing decoloniality, epistemic justice, and transformative education at the core. This paper takes a critical look at the colonial legacies shaping MLS education and offers pathways for transformation grounded in epistemic justice.

The Bachelor of Health Science in Medical Laboratory Science (BHSc: MLS) replaced the National Diploma in Medical Technology to align with the Higher Education Qualifications Sub-Framework (HEQSF). This degree offers a foundation in health diagnostics, pathology, scientific research, and professional ethics, as set out by the Health Professions Council

of South Africa (HPCSA). Beyond the technical training, it aims to be a forward-looking programme that equips graduates to critically engage with new diagnostic technologies and global health issues through an African lens.

South Africa's higher education system faces unique challenges shaped by its political history and the requirement to prepare graduates for an evolving world, including the pressures of decolonisation, the Fourth Industrial Revolution (4IR), and ongoing health crises (Mageza-Mokhethi & Adekanmbi, 2024). With demand for laboratory services expected to grow significantly, strategic workforce planning is essential (Surriga, 2025). Preparing students for the 4IR means closing the gaps between current STEM education and future skills, especially in creativity, innovation, and problem-solving (Magagula &

Awodiji, 2025). Collaboration among government, universities, and industry is essential to ensure graduates meet the demands of a rapidly changing labour market (Kabombo, Chanda, & Ngulube, 2025).

MLS education has moved from colonial-era training toward formal university programmes, reflecting ongoing efforts to update curricula and integrate technology in ways that confront historical inequalities and address today's workforce expectations (Monekosso, 2014). To truly reconfigure MLS education, there is a need to integrate Indigenous ways of knowing and to rethink teaching approaches to provide a platform for participation and critical engagement. A genuinely decolonised curriculum goes beyond simply adding African content; it creates spaces where diverse knowledge systems are recognised and applied to real health challenges. This involves blending community knowledge, oral traditions, and Indigenous healing with biomedical science, and helping students to critically examine the social and historical forces shaping health and illness in African societies.

In practice, this means preparing MLS graduates not just as skilled lab professionals but as ethically grounded, socially aware practitioners who navigate the intersections of science, culture, and community health. Integrating epistemic justice into curriculum design and teaching would help institutions nurture a new generation of health professionals capable of bridging disciplines and contributing to a more equitable healthcare system. Recent scholarship highlights the importance of addressing epistemic injustice to advance equity and social justice in education, for example, partnerships between researchers and practitioners (Penuel & Watkins, 2019). Some researchers call for dismantling Eurocentric knowledge in health professions education to create more inclusive curricula (Paton, Smith, & Wilson, 2020). Some stress shared decision-making and critical reflection to confront epistemic injustice, while others focus on marginalised voices and alternative teaching methods that foster inclusivity (Omodan, 2025).

Critical performativity has emerged as an effective teaching tool for strategically integrating

African healing systems into curricula (Moeta et al., 2019). Methods like the imbizo process encourage the integration of African traditional health knowledge by bringing together multiple stakeholders (Moeta et al., 2019). Also, participatory techniques such as photovoice can ground learning in local community realities (Wang et al, 1998). These approaches can help steer education away from Eurocentric biomedical models toward inclusive, community-focused health sciences. They validate diverse ways of knowing, challenge power imbalances in knowledge production, and equip students with the critical skills essential to respond to local health challenges.

Turning this vision into reality has its challenges. Rigid accreditation systems, limited resources, and resistance from faculty boards steeped in traditional approaches delay progress (Dube, 2025; African Union & European Commission, 2018). Overcoming these obstacles requires intentional strategic leadership and systemic adjustments that go beyond token gestures (Hanson, 2013). Central to this transformation are two critical components: (a) interdisciplinary collaboration and (b) meaningful stakeholder engagement. To this end, partnerships should be created that span academia, industry, and healthcare professionals, including traditional health practitioners, alongside regular and inclusive curriculum review processes.

Authors such as Bracken, Fredrickson, Fredrickson, & Appleman et al. (2023), Heleta (2016) and Ghimire (2025) point out that current educational models tend to reinforce Eurocentric knowledge hierarchies that privilege certain forms of knowledge and sustain inequalities. To dismantle these legacies, authentic partnerships will need to be built with Indigenous communities, and educators will need to engage in health equity issues. Scholars conclude that transforming MLS education through an epistemic justice lens is not only a moral obligation but a pedagogical necessity (Bracken et al., 2023).

This broader agenda aligns with the White Paper for Post-School Education and Training (2014), which sets out a vision for a fairer, more integrated, and socially responsive

post-school education system in South Africa. The policy emphasises workplace-linked learning, expanded access, and improved quality and relevance to support inclusive development (Malambe, 2016). Within this framework, the MLS programme at universities of technology plays a vital role in advancing health justice.

However, the policy has not yet produced significant benefits for many previously disadvantaged South Africans (Mzangwa, 2019). It lays important groundwork, but its transformative potential is limited by systemic barriers and uneven and unmonitored implementation (Jansen & Sayed, 2001). In addition, focusing on skills development, although crucial, is not sufficient to address the sector's complex challenges (Mboup, Gershy-Damet, Touré Kane, & Bélec, 2014).

Addressing workforce and infrastructure challenges in MLS training

MLS training in Africa faces serious obstacles, including infrastructure shortages, faculty gaps, and difficulties in retaining staff (Mboup et al., 2014). These issues worsen critical staffing shortages in diagnostic and clinical labs, compounded by the closure of training programmes and the low visibility of careers in laboratory medicine (Abidemi, Foloranmi, & Opeyemi, 2024). This problem is not confined to Africa; it is also seen in places like Saudi Arabia (Al-Anezi, 2025). Addressing these challenges demands a comprehensive approach that includes curriculum and accreditation reform, and better integration of technology.

Transdisciplinary education has emerged as a strategic way forward, preparing graduates for the evolving demands of the workforce and contributing to national development priorities (Hamedani, Aslam, Oraibi, Wah, & Hamedani, 2024). This approach aligns with the Sustainable Development Goals (SDGs) and the transformative aims of the 4IR, highlighting innovation and skills development to overcome systemic inequalities and resource scarcity common in many African contexts.

The MLS qualification represents a crucial response to South Africa's shortage of

trained professionals in diagnostic and clinical lab services. It marks a significant shift toward curricula that align with the SDGs and 4IR priorities, including emerging fields that are still taking shape. This alignment is especially important amid a rapidly changing health landscape marked by technological disruption and the growing role of artificial intelligence. However, it is the contention of this author that the MLS curriculum does not go far enough in critiquing the colonial legacy and advancing the contributions of Africa to medical science.

Methods

Figure 1 illustrates how decolonial theory and epistemic justice guide a reflective approach that triangulates curriculum review, policy engagement, based on the author's personal teaching experience to analyse power structures and epistemological hierarchies, leading to context-responsive, justice-oriented curricular innovations.

Although not an empirical study, this paper employs a critical-interpretive approach grounded in decolonial and epistemic justice frameworks. It draws on the author's personal experience, informed by engagement with interdisciplinary literature, policy texts, and curricular discourse, to critically examine the implicit power structures and epistemological hierarchies embedded in Medical Laboratory Sciences (MLS) education in South Africa.

The study adopts a decolonial methodological stance, based on a critical engagement with dominant Western knowledge regimes and informed by African intellectual traditions. Guided by Fricker's concept of epistemic justice (Fricker, 2007), the analysis foregrounds the exclusion of Indigenous Knowledge Systems (IKS) and African epistemologies from formal health sciences education and explores how such exclusions constrain both innovation and relevance. Decolonial theory, advanced by thinkers such as Hoppers (2002), provides a lens through which to view and question dominant Western knowledge regimes and to envision curricular alternatives rooted in African intellectual traditions. This methodological stance allowed the author to

engage reflectively with the normative assumptions underpinning health sciences curricula and to propose context-responsive, justice-oriented innovations.

A reflective critical-interpretive approach was applied through a triangulation of curriculum review, personal teaching experience, and policy analysis. The curriculum review entailed a critical

examination of content and pedagogy, seeking to identify colonial imprints and opportunities for epistemic diversification. Personal teaching experience offered insight into the lived realities and pedagogical challenges in MLS programmes, while policy analysis enabled an assessment of educational and health policy alignment with decolonial and epistemic justice objectives as depicted in Figure 1 and Figure 2.

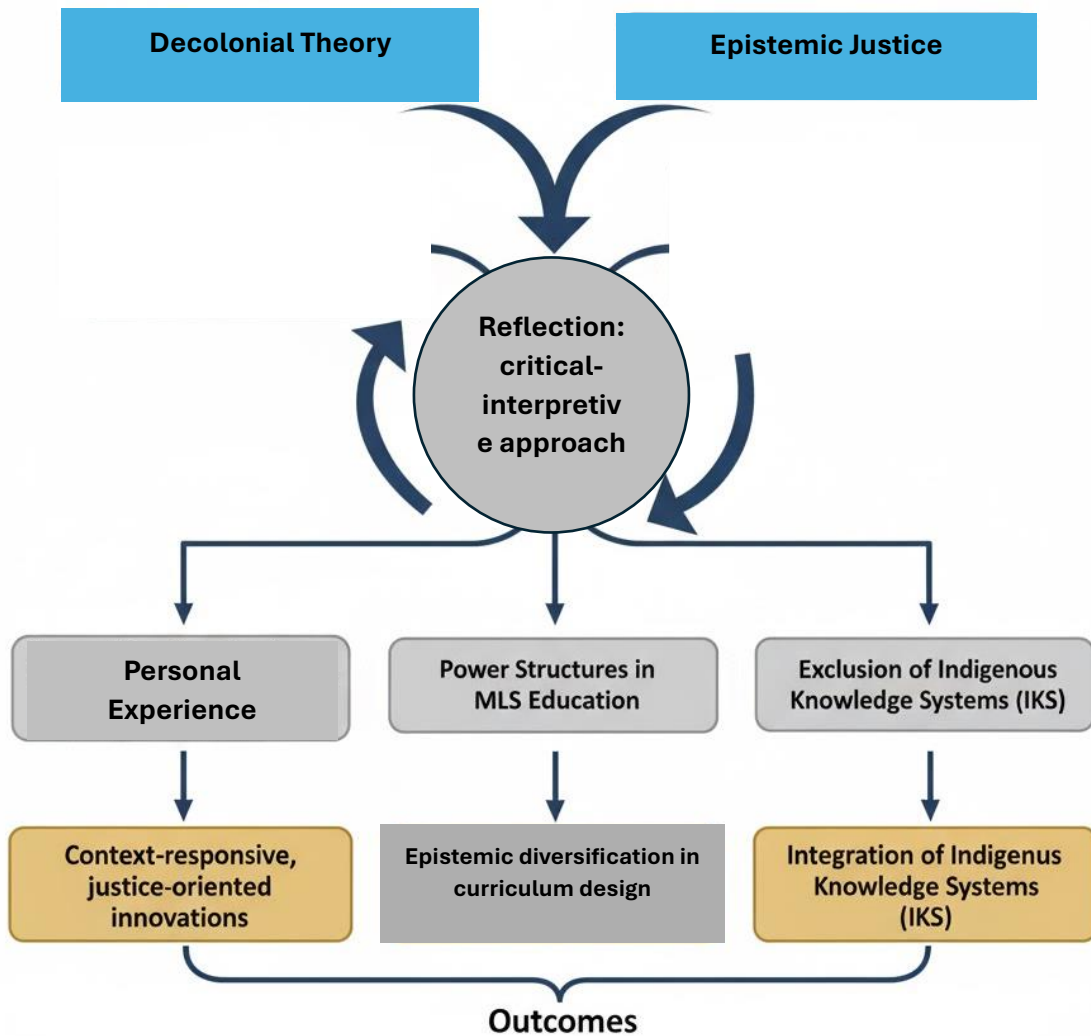


Figure 1: Reflective Critical-Interpretive Methodology and Theoretical Framework for Decolonising MLS Education in South Africa.

Findings and Discussion

While curricular transformation and epistemic justice are foundational to reimagining Medical Laboratory Science (MLS) education, these ideals must be situated within South Africa’s

pressing healthcare realities. Understanding whose knowledge counts is only one side; the other is grappling with health systems strained by workforce shortages, uneven diagnostic infrastructure, and rural-urban disparities. These conditions compromise diagnostic accuracy and

shape what is possible in the MLS curriculum. The curriculum must therefore be intellectually transformative and responsive, preparing graduates to lead in an overstretched and evolving health landscape (Merzel, 2023).

Figure 2 shows the themes that emerged from an examination of the above sources. These themes may be seen as the pillars of a transformed Afrocentric MLS curriculum.



Figure 2: The pillars of the decolonial transformation of MLS education in Africa

The MLS curriculum must address workforce shortages, artificial intelligence (AI) and future-ready graduates, issues to do with equity and justice, global health sovereignty, the need for curriculum innovation, and African epistemologies and IKS. Each of these is discussed below.

Workforce shortages and diagnostic care: Deepening the challenge

The global shortage of clinical laboratory professionals is acute in sub-Saharan Africa, where healthcare systems are under significant strain owing to high disease burdens and systemic underinvestment (WHO, 2020). Ironically, while healthcare professionals are in high demand, about one in three are unemployed, reflecting a disconnect between education systems, labour

markets, and funding models (McKinsey & Company, 2020; WHO, 2020).

In South Africa, this shortage affects treatment accuracy and the integrity of public health surveillance systems (Gordon, Booysen, & Mbonigaba, 2020). Since an estimated 70% of clinical decisions depend on accurate laboratory data, any delay or error in diagnostics can have severe consequences for patient outcomes. Inequality in service provision is a major concern: although 46% of South Africans live in rural areas, only 12% of medical personnel serve these communities (Gordon, Booysen, & Mbonigaba, 2020).

Medical laboratory services face infrastructural deficits and under-accreditation. In 2020, only 668 medical laboratories across the WHO–AFRO region held ISO 15189 accreditation, a small fraction of labs in sub-Saharan Africa (Odhiambo et al., 2023). Electronic information systems continue to be unevenly implemented, with persistent digital infrastructure gaps impacting laboratory quality and data management.

The retention of skilled laboratory scientists is a growing concern. In Namibia, 64% of recent graduates intend to emigrate, with only 7% willing to work in rural areas (Noden et al., 2015). Similar patterns exist in South Africa, where professionals are overworked, under-resourced, and constrained by outdated infrastructure and limited access to emerging technologies (Davids, Zemlin, & Kruger, 2024).

Policy responses include return-of-service agreements incentivising work in under-resourced areas and international support for laboratories, especially during COVID-19. However, systemic reform is slow, with workforce development hampered by low investment in laboratory systems, leadership, and infrastructure.

The Bachelor of Health Science in Medical Laboratory Science (BHSc: MLS) programme addresses these challenges by equipping students with technical proficiency and ethical sensitivity. Students rotate through clinical chemistry, histology, virology, microbiology, and

cytopathology under academic and industry mentorship (Thembane, 2022).

Innovation, strategic AI, and future-ready graduates

As health diagnostics evolves, South African Medical Laboratory Science (MLS) graduates must move beyond being passive users of imported technologies and become innovators shaping diagnostic futures relevant to Africa (Maruta, 2025). Globally and increasingly in Africa, medical education curricula are being reshaped to incorporate AI and data ethics, preparing students for a fast-changing digital landscape (Tshibangu & Thembane, 2025). A future-ready MLS graduate requires not only clinical competencies but also data science literacy, critical thinking, and technological agility (Shachak, Monkman, Lesselroth, Lee, & Alcocer Alkureishi, 2024).

Several African initiatives have integrated digital tools and AI into health science education. The “Kwame for Science” AI assistant in West Africa supports science learning through AI-powered dialogue, illustrating the potential of large language models in African classrooms (Boateng et al., 2024). In South Africa, platforms like STEMulator provide curriculum-aligned digital STEM content via USB drives to under-resourced schools, demonstrating innovative, context-sensitive digital learning (Gundersen, 2024). Although not specific to MLS, these efforts show that technology-enhanced learning is becoming the norm in educational settings.

However, AI integration raises ethical concerns demanding attention: data privacy, consent, and algorithmic bias are critical issues, especially as AI systems rely on data from the Global North. Without contextualisation, these systems risk reinforcing diagnostic inequalities or misclassifying diseases in African populations (Grancia, 2025). For example, Tanzania’s attempts to integrate AI into electronic health records exposed issues around patient autonomy and lack of community consultation (Mahamadou, Ochasi, & Altman, 2024). MLS programmes should thus include training in data governance, ethical AI use, and regulatory literacy. While South Africa’s POPIA offers a legal foundation, health- and AI-

specific ethical guidelines are still developing (Sihlahla, Donnelly, Townsend, & Thaldar, 2025).

To be future-ready, MLS graduates must combine technical skills with the ability to collaborate across disciplines, adapt to rapid change, and engage in lifelong learning. Curricula should permit flexibility, creativity, and systems thinking, enabling graduates to critically assess the systems of which they are a part and help redesign the tools they use to suit African health challenges.

Examples of MLS professionals leading innovation include Zambia's AI-supported ultrasound tools improving maternal care (Della Ripa, Santos, & Walker, 2025) and African startups like Nigeria's 54gene and Rwanda's Zipline, which combine innovative diagnostic and logistics solutions. These highlight how MLS graduates can translate science into scalable, context-appropriate solutions.

True innovation requires confronting Eurocentric biomedical dominance and asking: 'Whose knowledge counts?' The recognition of marginalised Indigenous knowledge calls for integrating Indigenous Knowledge Systems and culturally rooted epistemologies into MLS curricula as foundational, not tokenistic.

The promise of African epistemologies and Indigenous Knowledge Systems

While the current Medical Laboratory Science (MLS) curriculum is grounded in Eurocentric biomedical models, there is growing recognition of the importance of integrating African epistemologies and Indigenous Knowledge Systems (IKS) into health sciences education. African epistemologies are rooted in holistic, relational, and community-centred worldviews that emphasise interconnectedness among people, nature, and the spiritual realm (Adeate & Sewchurran, 2023). Unlike the reductionist approach of Western biomedical science, these systems view health as a balance involving physical, social, and spiritual well-being (Datta & Starlight, 2024). This relational understanding is particularly relevant in South Africa's pluralistic health landscape, where biomedical and traditional practices coexist and

complement each other (Peltzer & Mngqundaniso, 2008).

Entrenching African epistemologies and IKS into MLS curricula requires profound transformation of curricular logic, pedagogy, and assessment frameworks (Smith, 2020). Foregrounding IKS challenges the dominance of Western scientific knowledge as the sole legitimate source of expertise and affirms the value in other scientific worldviews (Van der Merwe, Serekoane, & Du Plooy, 2024).

Examples of IKS relevant to health include medicinal plants for diagnostics and therapy. This includes traditional healing rituals addressing psychosocial and spiritual illnesses, and community-based health surveillance supporting disease prevention. Integrating IKS in MLS education might include case studies comparing traditional and laboratory methods, and community partnerships with healers for experiential learning (Peltzer & Mngqundaniso, 2008).

Tensions arise from differing epistemologies, methods, and concerns about intellectual property (Smith, 2020). Addressing these requires respectful dialogue in which Indigenous knowledge is engaged with critically and collaboratively (Datta & Starlight, 2024). Health sciences education can go a long way by recognising diverse sources of knowledge and integrating African epistemologies and IKS into its curricula.

Equity, access, and representational justice

The Bachelor of Health Science in Medical Laboratory Science (BHSc: MLS) programme currently faces inequities in access and representation that mirror broader systemic patterns in medical science education. Key obstacles include limited laboratory space, scarce work-integrated learning (WIL) placements, and the under-preparedness of students from resource-constrained schools (Thembane, 2022; Maruta, 2025). In one university of technology, only 40 students are admitted per cohort, with demand far exceeding supply (Thembane, 2022). Investment in academic development and inclusive

pedagogical support is essential to address these gaps (Katznelson & Gerke, 2021).

Beyond access, representational justice is paramount. Socio-economic disparities and apartheid-era legacies continue to affect student preparedness and retention (Sihlahla, Donnelly, Townsend, & Thaldar, 2025). To address the disparities, financial aid such as the National Student Financial Aid Scheme (NSFAS) in South Africa, is vital, as are mentorship, academic support, and inclusive teaching strategies.

Institutional culture and leadership shape inclusive environments. Universities that embrace social justice demonstrate higher retention and success among underrepresented groups than those that continue to marginalise under-resourced students. Therefore, incorporating representational justice into curricula and support services is key to producing graduates who reflect South Africa's diversity.

Curriculum as a lever of innovative policy

Viewing the curriculum as a strategic lever of innovation in policy empowers universities to go beyond traditional goals of work-readiness and positions them as key actors in national social and economic development. In South Africa, the MLS curriculum aligns closely with national health policies, such as the National Health Insurance (NHI) framework, and the country's commitment to the United Nations Sustainable Development Goals (SDGs), particularly SDG 3 (Good health and well-being) and SDG 9 (Industry, innovation, and infrastructure) (Maruta, 2025). The inclusion of these priorities into programme outcomes helps to ensure that MLS supports the broader economic transformation agenda.

Industry partnerships are also key to keeping curricula responsive to real-world demands and technological advances. Universities of technology need to actively engage in collaboration with public and private laboratories as well as health departments to ensure that the MLS curriculum reflects positive trends in AI use, molecular diagnostics, and digital health tools (Sjöo & Hellström, 2019). These partnerships enable joint research projects, enhancing students'

technical competencies and exposing them to current industry challenges. For example, digital health startups have helped introduce modules on data management ethics and AI applications in diagnostics, cultivating a forward-looking graduate profile (Grancia, 2025).

Beyond technical skills, the MLS curriculum should cultivate critical thinking and leadership. Assessment strategies should reinforce the values of innovation and epistemic justice, while problem-based learning should engage students in complex, real-world cases.

At the same time, care must be taken not over instrumentalise higher education. Reducing academic programmes solely to tools for policy implementation risks undermining intellectual autonomy and critical enquiry. In all these endeavours, it is essential that a balance is maintained between responsiveness to policy imperatives and academic freedom. Such a balance will help to ensure that innovation is not merely reactive but also forward thinking, nurturing graduates capable of independent thought.

A global wake-up call and the need for medical sovereignty

The COVID-19 pandemic exposed deep global health inequalities, highlighting the weaponisation of science and the monopolisation of medical innovations by the Global North (Chung, 2024). The pandemic also disrupted medical research and education, with fields such as Medical Laboratory Science facing drastic funding cuts (Thembane, 2022). Anti-science policies and reduced governmental support further hindered local expertise and infrastructure development, underscoring the vulnerability of African health systems and the urgent need for resilience and self-sufficiency in health sciences education.

Global geopolitics and science diplomacy heavily influence African health research and education. Funding and collaborations often favour institutions in high-income countries, marginalising African researchers to data collection roles rather than positions of intellectual leadership (Ingenhoff et al., 2025). To address

these inequities, African MLS education should focus on strategic investment in homegrown capacity and equitable partnerships based on shared leadership, co-creation, technology transfer, and locally relevant innovation.

The pandemic also offered a vision for African leadership in health innovation. Africa holds tremendous potential to innovate in contextually relevant ways, develop indigenous diagnostics, apply AI to local epidemiology, and commercialise local research. These are just some of the ways in which MLS programmes could drive systemic improvements in health outcomes. Africa needs MLS graduates who are innovators, leaders, and advocates for health justice, and who challenge the dependency on external actors. MLS professionals could play a pivotal role in decolonising global health by bridging biomedical science with African epistemologies, promoting a just and pluralistic health landscape.

Conclusion

As South Africa and the broader African continent grapple with persistent health inequalities and underrepresentation in global innovation landscapes, the urgency of curriculum transformation in Medical Laboratory Science cannot be overstated. This paper has argued that redesigning MLS education must go beyond technical upgrades or policy compliance; it requires a radical reorientation toward justice, relevance, and intellectual sovereignty.

Central to this transformation is epistemic justice – the recognition that whose knowledge counts shapes not only what is taught but also how graduates understand their roles in society. Incorporating African epistemologies and Indigenous Knowledge Systems should not be a matter of cultural tokenism; what is required is a rebuilding of curricula on intellectual foundations rooted in the lived experiences, health practices, and scientific traditions of African communities. Such an approach would cultivate graduates who are not only clinically and technologically proficient but also ethically grounded and socially responsive.

Innovation in MLS education must likewise be inclusive and decolonial. African MLS

programmes should equip students to question the intellectual assumptions of an entirely Western view of medicine, and to value local innovation, diagnostics, and health solutions. They should have a global view of their role in society balanced by a sense of their responsibilities to their local and regional contexts. This would include integrating AI into their work, advocating and participating in equitable global partnerships, and engaging in research that foregrounds the African medical tradition. The ideal MLS practitioner would be a scientist fluent in both laboratory practice and the languages of community, equity, and transformation.

Achieving this vision demands bold leadership from medical educators, curriculum designers, policymakers, and funding institutions. What might health sciences education look like if it emerged from African soil, literally and epistemologically? How might diagnostics evolve if community-based ways of knowing were placed on an equal footing with Western biomedical models? What mentorship, assessment, and engagement systems would allow students from historically underrepresented backgrounds not only to access the profession but to reimagine and lead it?

This study takes the view that the era for incremental change has passed. Moving from reaction to reinvention, the MLS curriculum should be anchored in an African worldview and designed to cultivate MLS graduates who shape the future of healthcare across the continent. In designing and teaching such a curriculum, we can advance a vision of health sciences education that is just, inclusive, and self-determined; one that heals, empowers and transforms.

Limitations

This paper is based on existing research and personal analysis rather than original data, which means some nuances or recent changes might not be fully represented. The focus on mainly South Africa, while illustrative, may not capture the full diversity of experiences across Africa. In addition, the complexities around integrating technology and Indigenous Knowledge Systems are evolving, and ongoing dialogue is warranted. Despite these constraints, it is hoped

that this reflection has provoked thought and will inspire further conversation on these critical issues.

Ethics statement

This reflective paper does not involve human participants and therefore did not require ethical clearance. It adheres to ethical standards by engaging respectfully with Indigenous and African knowledge systems, upholding cultural sensitivity, and promoting epistemic justice. AI tools were used to assist with language editing and the generation of images. However, all critical thinking, analysis, argumentation, and final content decisions are my own. I take full responsibility for the originality, accuracy, and academic integrity of this work. All sources are appropriately cited, and care has been taken to avoid misrepresentation or cultural appropriation.

Disclosures

Author contributions: Conceptualisation, writing, and reviewing of the manuscript: NT. The author has read and agreed to the current version of the manuscript.

Conflicts of interest: The author declares no conflict of interest.

Acknowledgements

The author would like to thank the Mangosuthu University of Technology and the Teaching and Learning and Development Centre writing retreat, known as ‘Shut Up and Write’. These writing sessions providing the dedicated space and support that made this paper possible. Furthermore, the author acknowledges Jane Mqamelo for her editing assistance.

ORCID: <https://orcid.org/0000-0001-9146-3809>

Thembane N: <https://orcid.org/0000-0001-9146-3809>

References

Abidemi, M. M., Foloranmi, O. M., & Opeyemi, M. M. (2024). A review on the trend of Medical Laboratory Scientists training in Africa. *Sokoto Journal of Medical Laboratory Science*, 9(2), 36–44. <https://doi.org/10.4314/sokjmls.v9i2.5>

Adeate, T., & Sewchurran, A. (2023). African epistemologies and the decolonial curriculum. *Acta Academica*, 55(1), 1–19. https://hdl.handle.net/10520/ejc-academ_v55_n1_a1

African Union & European Commission. (2018). *Joint report on higher education and research collaboration in Africa*. Brussels, Belgium.

Al-Anezi F. M. (2025). Challenges of Healthcare Systems in Saudi Arabia to Delivering Vision 2030: An Empirical Study From Healthcare Workers Perspectives. *Journal of healthcare leadership*, 17, 173–187. <https://doi.org/10.2147/JHL.S516159>

Boateng, G., John, S., Boateng, S., Badu, P., Agyeman-Budu, P., & Kumbol, V. (2024). Real-world deployment and evaluation of Kwame for Science, an AI teaching assistant for science education in West Africa. In A. M. Olney, I. A. Chounta, Z. Liu, O. C. Santos, & I. I. Bittencourt (Eds.), *Artificial intelligence in education (AIED 2024)* (Lecture Notes in Computer Science, Vol. 14830). Springer. https://doi.org/10.1007/978-3-031-64299-9_9

Bracken, R. C., Fredrickson, M. E., Fredrickson, L. A., & Appleman, M. (2023). Generational situatedness: Challenging generational stereotypes in health professions education. *Medical teacher*, 45(4), 380–387. <https://doi.org/10.1080/0142159X.2022.2135428>

Chung, R. (2024). Covid-19 and global structural health inequality. In J. Browne & M. McKeown (Eds.), *What is structural injustice?* (Online ed.). Oxford Academic. <https://doi.org/10.1093/oso/9780198892878.003.0009>

Datta, R., & Starlight, T. (2024). Building a meaningful bridge between Indigenous and Western worldviews: Through decolonial conversation. *International*

- Journal of Qualitative Methods*, 23. <https://doi.org/10.1177/16094069241235564>
- Davids, A., Zemlin, A. E., & Kruger, E. C. (2024). Challenges with communication of critical laboratory results in a resource-limited setting in South Africa. *African Journal of Laboratory Medicine*, 13(1), a2457. <https://doi.org/10.4102/ajlm.v13i1.2457>
- Della Ripa, S., Santos, N., & Walker, D. (2025). AI enabled obstetric point of care ultrasound as an emerging technology in low- and middle-income countries: Provider and health system perspectives. *BMC Pregnancy and Childbirth*, 25, 729. <https://doi.org/10.1186/s12884-025-07796-6>
- Dube, K. (2024). Challenges and opportunities facing higher education in South Africa. In K. Dube (Ed.), *Redefining education and development* (pp. 15–32). Springer. https://doi.org/10.1007/978-3-031-69954-2_2
- Fricker, M. (2007). *Epistemic injustice: Power and the ethics of knowing*. Oxford university press. [Epistemic Injustice: Power and the Ethics of Knowing](https://doi.org/10.1017/9780199203828)
- Ghimire A. (2025). Rewriting the byline: toward epistemic justice in global health authorship. *Frontiers in public health*, 13, 1621979. <https://doi.org/10.3389/fpubh.2025.1621979>
- Gordon, T., Booyesen, F., & Mbonigaba, J. (2020). Socio-economic inequalities in the multiple dimensions of access to healthcare: The case of South Africa. *BMC Public Health*, 20, 289. <https://doi.org/10.1186/s12889-020-8368-7>
- Grancia, M. K. (2025). Decolonizing AI ethics in Africa's healthcare: An ethical perspective. *AI and Ethics*, 5, 3129–3142. <https://doi.org/10.1007/s43681-024-00650-z>
- Gundersen, R. (2024). Explore STEM with STEMulator: A gift to the nation's youth. *Quest*, 20(3), 34–35. <https://doi.org/10.10520/ejc-quest-v20-n3-a12>
- Hamedani, S. S., Aslam, S., Oraibi, B. A. M., Wah, Y. B., & Hamedani, S. S. (2024). Transitioning towards tomorrow's workforce: Education 5.0 in the landscape of Society 5.0—A systematic literature review. *Education Sciences*, 14(10), 1041. <https://doi.org/10.3390/educsci14101041>
- Hanson, A. (2013). Institutional leadership and systemic reform in higher education. *Journal of Educational Change*, 14(3), 245–260.
- Heleta, N. (2016). Decolonisation of higher education: Dismantling epistemic violence. *South African Journal of Science*, 112(5/6), 1–7.
- Hoppers, C. A. O. (Ed.). (2002). *Indigenous knowledge and the integration of knowledge systems: Towards a philosophy of articulation*. Claremont, South Africa: New Africa Books.
- Ingenhoff, R., Sarker, M., Hanson, K., Rashid, S. F., De Allegri, M., Storer Jones, F., Cook-Deegan, M., Anton, N., Sewankambo, N. K., & GLOHRA Steering Committee. (2025). Stronger together: Advancing equity in global health research partnerships. *BMJ Global Health*, 10, e019601. <https://doi.org/10.1136/bmjgh-2025-019601>
- Kabombo, K., Chanda, T. C., & Ngulube, L. (2025). The role of government in promoting academia-industry collaboration and partnership for national development. Zenodo. <https://doi.org/10.5281/zenodo.15328414>
- Katznelson, G., & Gerke, S. (2021). The need for health AI ethics in medical school education. *Advances in Health Sciences*

- Education*, 26, 1447–1458.
<https://doi.org/10.1007/s10459-021-10040-3>
- Magagula, M. M., & Awodiji, O. A. (2024). The implications of the Fourth Industrial Revolution on technical and vocational education and training in South Africa. *Social Sciences & Humanities Open*, 10, 100896.
<https://doi.org/10.1016/j.ssaho.2024.100896>
- Mageza-Mokhethi, M., & Adekanmbi, F. P. (2024). Employability within South African businesses in the 4IR era: The impacts of abilities, self-efficacy, and work-integrated learning effectiveness. *Problems and Perspectives in Management*, 22(4), 600–610.
[https://doi.org/10.21511/ppm.22\(4\).2024.45](https://doi.org/10.21511/ppm.22(4).2024.45)
- Mahamadou, A. J. D., Ochasi, A., & Altman, R. B. (2024). Data ethics in the era of healthcare artificial intelligence in Africa: An Ubuntu philosophy perspective. *arXiv preprint arXiv:2406.10121*.
<https://doi.org/10.48550/arXiv.2406.10121>
- Malambe, L. (2016). *Exploring skills development within the interface of public and private sectors*. (Thesis). University of Cape Town, Faculty of Commerce, Graduate School of Development Policy and Practice. Retrieved from <http://hdl.handle.net/11427/20981>
- Maringe, N., & Osman, R. (2016). Skills development in South African education policy. *Journal of Education and Work*, 29(4), 405–420. DOI:[10.20853/30-5-616](https://doi.org/10.20853/30-5-616)
- Maruta, T. (2025). The role of artificial intelligence in diagnostics: A new frontier for laboratory medicine in Africa. *African Journal of Laboratory Medicine*, 14(1), 2952.
<https://doi.org/10.4102/ajlm.v14i1.2952>
- Mboup, S., Gershy-Damet, G. M., Touré Kane, C., & Bélec, L. (2014). Les défis de la formation dans les laboratoires médicaux en Afrique [The challenges of training in medical laboratories in Africa]. *Médecine Tropicale*, 74(5), 449–454.
<https://doi.org/10.1684/mst.2014.0349>
- McKinsey & Company. (2020). *Overcoming sub-Saharan Africa's health workforce paradox*. Retrieved from <https://www.mckinsey.com/industries/social-sector/our-insights/overcoming-sub-saharan-africas-health-workforce-paradox>
- Merzel, C. R. (2023). *Pedagogy for transformative teaching and learning*. *Pedagogy in Health Promotion*, 9(4), 231–233.
<https://doi.org/10.1177/23733799231208392>
- Moeta, M., Mogale, R. S., Mgozeli, S. E., Moagi, M. M., & Pema-Bhana, V. (2019). Integrating African traditional health knowledge and practices into health sciences curricula in higher education: An Imbizo Approach. *International Journal of African Renaissance Studies-Multi-, Inter-and Transdisciplinarity*, 14(1), 67–82.
<https://doi.org/10.1080/18186874.2019.1635505>
- Monekosso, G. L. (2014). A brief history of medical education in Sub-Saharan Africa. *Academic Medicine*, 89(8 Suppl), S11–S15.
<https://doi.org/10.1097/ACM.0000000000000355>
- Mothibe, M. E., & Sibanda, M. (2019). African traditional medicine: South African perspective. In C. Mordeniz (Ed.), *Traditional and complementary medicine*. London: IntechOpen.
<https://doi.org/10.5772/intechopen.83790>
- Mzangwa, S. T. (2019). The effects of higher education policy on transformation in

- post-apartheid South Africa. *Cogent Education*, 6(1).
<https://doi.org/10.1080/2331186X.2019.1592737>
- Noden, B. H., Nowaseb, V., de Waal-Miller, C., & Van der Colf, B. E. (2015). Profile, perceptions and future expectations of medical laboratory scientists in Namibia. *African Journal of Laboratory Medicine*, 4(1), 1-7.
<https://hdl.handle.net/10520/EJC175916>
- Odhiambo, C. O., van der Puije, B., Maina, M., Mekonen, T., Diallo, S., Datema, T., Loembe, M. M., Kebede, Y., Ndlovu, N., & Ondo, P. (2023). Examining 7 years of implementing quality management systems in medical laboratories in sub-Saharan Africa. *Tropical Medicine & International Health*, 28(2), 126–135.
<https://doi.org/10.1111/tmi.13839>
- Omodan, B. I. (2025). The roles of epistemology and decoloniality in addressing power dynamics in university education. *Globalisation, Societies and Education*, 23(5), 1226–1240.
<https://doi.org/10.1080/14767724.2024.2335661>
- Paton, M., Naidu, T., Wyatt, T. R., Oni, O., Lorello, G. R., Najeeb, U., Feilchenfeld, Z., Waterman, S. J., Whitehead, C. R., & Kuper, A. (2020). Dismantling the master's house: New ways of knowing for equity and social justice in health professions education. *Advances in Health Sciences Education*, 25(5), 1107–1126. <https://doi.org/10.1007/s10459-020-10006-x>
- Penuel, W. R., & Watkins, D. A. (2019). Assessment to promote equity and epistemic justice: A use-case of a research-practice partnership in science education. *The ANNALS of the American Academy of Political and Social Science*, 683(1), 201-216.
<https://doi.org/10.1177/0002716219843>
- Petzer, K., & Mngqundaniso, N. (2008). Patients consulting traditional health practitioners in the context of HIV/AIDS in urban areas in KwaZulu-Natal, South Africa. *African Journal of Traditional, Complementary and Alternative Medicines*, 5(4), 370–379.
<https://doi.org/10.4314/ajtcam.v5i4.31292>
- Shachak, G., Monkman, H., Lesselroth, B., Lee, W. W., & Alcocer Alkureishi, M. L. (2024). Technological literacy as a framework for health professions education in the digital era. In A. M. Olney, I. A. Chounta, Z. Liu, O. C. Santos, & I. I. Bittencourt (Eds.), *Digital health and informatics innovations for sustainable health care systems* (Vol. 14830, pp. 1500–1504). Springer.
<https://doi.org/10.3233/SHTI240699>
- Sihlahla, I., Donnelly, D.-L., Townsend, B., & Thaldar, D. (2025). Legal and ethical principles governing the use of artificial intelligence in radiology services in South Africa. *Developing World Bioethics*, 25(1), 35–45.
<https://doi.org/10.1111/dewb.12436>
- Sjöo, K., & Hellström, T. (2019). University-industry collaboration: A literature review and synthesis. *Industry & Higher Education*, 33(4), 275–285.
<https://doi.org/10.1177/0950422219829697>
- Smith, L. T. (2020). *Decolonizing methodologies: Research and indigenous peoples* (3rd ed.). London: Zed Books Ltd.
<https://doi.org/10.1080/9781000163421>
<https://www.bloomsbury.com/9781000163421>
- Surriga, J. J. A. (2025). *Medical Laboratory Technologist Labor Market and Industry Initiatives to Address Labor Shortages*. Walden University.
- Thembane, N. (2022). Work-integrated learning in medical laboratory science and medical technology during COVID-19. *Scholarship of Teaching and Learning in*

the South, 6(3), 162–174.

<https://doi.org/10.36615/sotls.v6i3.261>

Van der Merwe, A., Serekoane, M., & Du Plooy, S. (2024). Situating pluralism in biomedical healthcare practices: Lessons from the ethnomedical approach.

Scholarship of Teaching and Learning in the South, 8(2), 49–65.

<https://doi.org/10.36615/sotls.v8i2.397>

Wang, C. C., Yi, W. K., Tao, Z. W., & Carovano, K. (1998). Photovoice as a participatory health promotion strategy. *Health promotion international*, 13(1), 75-86.
<https://doi.org/10.1093/heapro/13.1.75>

World Health Organization. (2020). *Health workforce*. Retrieved from <https://www.who.int/health-topics/health-workforce>