


# (Post-) apartheid's legacy of racialised microaggressions in mathematics teacher education

**Author:**Sinobia Kenny<sup>1</sup> **Affiliation:**

<sup>1</sup>Department of Education Policy Studies, Faculty of Education, Stellenbosch University, Stellenbosch, South Africa

**Corresponding author:**

Sinobia Kenny,  
sinobia@aimssec.ac.za

**Dates:**

Received: 07 Nov. 2024

Accepted: 02 Mar. 2025

Published: 23 May 2025

**How to cite this article:**

Kenny, S., 2025, '(Post-) apartheid's legacy of racialised microaggressions in mathematics teacher education', *Transformation in Higher Education* 10(0), a487. <https://doi.org/10.4102/the.v10i0.487>

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Few women living with the label of 'coloured' in South Africa find themselves employed in mathematics higher education. Transformation in mathematics education in South Africa has been slow and riddled with racialised microaggressions for women living with racialised labels. While there is a belief that in democratic South Africa, for racially marginalised women, life opportunities have increased, covert racism continues to be felt as racial microaggressions, starting from family and friends to those in authoritative positions of power in higher education institutions. Drawing on critical race theory and theories of racial microaggressions, five 'coloured' women were interviewed separately using semi-structured questions to better understand their lived experiences of mathematics education. The main finding was that subtleties of not belonging to Science, Technology, Engineering and Mathematics (STEM) education are exercised through access to and advancement in higher education via bursaries, scholarships and awards.

**Contribution:** While students may welcome funding for their undergraduate and postgraduate STEM programmes, such funding also puts pressure on them to prove their worth continuously. Placing pressure on students resonates with expectations of an apartheid past. Furthermore, whether state or private, policymakers and funders need to be mindful of balancing the scale between awarding funding opportunities and students losing their funding if they drop out, achievable through flexible funding models. Rigid funding models may discourage career exploration and restrict options, while flexible models allow students to refine their career goals over time. For teacher education in mathematics, the state could offer flexibility in permitting students to interchange across disciplines of mathematics without penalties.

**Keywords:** lived experiences; 'coloured' women; women of colour; critical race theory; racial microaggressions; teacher education; mathematics education; higher education.

## Introduction

Since the advent of democracy in South Africa, strides have been made to transform the mathematics education landscape. Still, the deeply entrenched legacy of apartheid continues to cast a long shadow over both school and post-school education. This research, conducted within the timeframe of South Africa's democratic era, reaches back into the apartheid period to trace how enduring systemic inequities still shape educational experiences and outcomes today. By examining the influence of apartheid's structural legacy, this study reveals the challenges – and the slow but essential progress – in redefining educational equity in mathematics. For this article, we refer to people of colour as a collective of the race classifications of black African, 'coloured' and Indian. Women living with the label of 'coloured' are the focus of this study.

During apartheid, the South African government's severe race legislations and prohibitions limited access to higher education, particularly for those from historically marginalised groups. This was particularly true for qualified teachers who wanted to advance their careers beyond school education (Kenny & Davids 2022). The apartheid regime's initial racialised education policies in the 1950s ensured that prospective teachers of colour could either qualify for lower primary college teaching qualifications with a Standard 8 school exit certificate or teach in upper primary school if they had a Standard 10 school leaving certificate. They had no chances to teach at secondary schools with college certificates (Chisholm 2019). In contrast, white prospective teachers were required to have a Standard 10 certificate for a primary or secondary school teaching qualification at a college or university, equipping them with greater options to qualify for secondary school teaching roles (Chisholm 2019). This structural and racialised inequality

contributed to a shortage of secondary school teachers in South Africa (Fiske & Ladd 2004). The racially segregated and quota-based university admission policies limited access for students of colour, constraining their career choices and reinforcing educational disparities (Walker 2005). For example, students of colour had to seek permits from the apartheid government to enrol in programmes dedicated to white students, significantly restricting educational opportunities. The government's provision of state bursaries for prospective teachers was a double-edged sword. While it provided access to teacher education, it also controlled these students' career trajectories. The options were to either teach in state schools or financially reimburse the state for the equivalent number of years of obtaining a state bursary (Chisholm 2019).

Post-apartheid, the current government's continuation of race categorisations to redress inequity (Badat & Sayed 2014) meant further division and friction in an already contested and historically separated nation. The democratic government's decision to implement self-categorisations (white, 'coloured', Indian, and black African) further divided people, meaning that apartheid's legacy of division continued to persist.

This research does not aim to single out any particular race or gender group or to minimise the diverse experiences of all women of colour. The focus on women classified as 'coloured' is tied to a broader study that sought to critically examine and disrupt the historical and social label of 'coloured' related to identity and lived experiences. By exploring this group within a larger framework, the author aimed to highlight specific intersections without overshadowing the unique challenges women of colour face.

Race-gendered representation remains problematic for 'coloured' women (Adams et al. 2012; Breetzke and Hedding 2018; Erasmus 2011; Kenny 2020; Kenny & Davids 2024; Le Grange 2019). By 2021, there were 26 public universities in South Africa (Department of Higher Education and Training 2023:9). According to the Statistics on Post-school Education and Training in South Africa 2021 report (Department of Higher Education and Training 2023:28), there were 4755 (13.36%) 'coloured' women permanent staff employed at public HEIs in South Africa out of a total of 35 583 permanently employed women at public HEIs in South Africa. Of the 4755 'coloured' women, 828 (17.41%) were employed in the personnel category of Instruction and Research, 3391 (71.31%) as Administrative Staff and 536 (11.27%) as Services. In the Instruction and Research personnel category, 828 (8.33%) 'coloured' women, out of the 9936 women in the same personnel category, had the lowest percentage of race-gendered representation at public universities.

Research about the misrecognition of 'coloured' women in higher education in South Africa is slim (Kenny & Davids 2024), and even less is known about racialised microaggressions in mathematics higher education spaces.

This study examines the subtle racial microaggressions that 'coloured' women encounter while pursuing careers as mathematics teachers and in mathematics teacher education. The author does not aim to prove the existence of race. Rather, her standpoint is that racism exists and is experienced in various ways, sometimes subtly and in a nuanced way, and at other times felt as overt racism. Through a lens of critical race theory and racial microaggressions, the article sheds light on broader implications for systemic changes, awareness and support structures needed to attract and retain historically marginalised teachers and university educators in mathematics education.

### Positionality of mathematics education

Like all school and college subjects studied during apartheid, mathematics was taught from a prescribed syllabus. Naidoo (2005) notes that the qualifications of lecturers at teacher training colleges did not necessitate actual teaching in schools and meant that lecturers had no experience in the educational context of students' learning. Student teachers in college learned school mathematics, with their focus depending on whether they would teach at upper primary or lower primary schools. Pedagogically, mathematics teaching focused on the procedures of finding correct answers (rote learning) rather than teaching how to understand or apply mathematics (Naidoo 2005).

There have been repeated efforts by the national education department to introduce reforms. In response to challenges and criticisms of an Outcomes-Based Education (OBE) (Chisholm 2012), a Revised National Curriculum Statement (RNCS) was introduced in 2002, which aimed to streamline the curriculum with more explicit guidelines on the requirements of subject content knowledge. Subsequently, there have also been several attempts to improve the mathematics curriculum (Khuzwayo & Mncube 2017). Continuous professional development programmes were introduced to upskill in-service teachers, particularly those from previously disadvantaged racialised backgrounds who had received substandard training under apartheid. These programmes emphasised upgrading teachers' subject knowledge and pedagogical skills and made use of a professional development point system (Kanjee & Sayed 2013). Still, investing in mathematics teacher education has not had the desired outcome of increased learner success rates in mathematics (Centre for Development and Enterprise 2023a).

Research on the reasons for poor performance in mathematics abounds. In the Centre for Development Enterprise's (2023b) latest report, *The silent crisis: What's wrong with our education system*, the centre identifies a legacy of inequality, a lack of quality teaching and commitment among teachers, accountability deficits throughout the system, and a compromised and incompetent bureaucratic education system as significant challenges. The fabric of institutional challenges shows itself more transparently in schools.

For example, gender under-representation in schools (Davids & Waghid 2020) and deeply entrenched silences around racism (Davids & Waghid 2015) can significantly impact the experiences of teachers in schools. The misrecognition of school leaders based on race and gender has also come to the fore (Kriger & Kenny 2024). Race and racism are so deeply entrenched that they continue to influence where parents choose to enrol their children in schools (Jansen 2009; Jansen & Kriger 2020).

The author argues that racial biases and the consequences of racism persist throughout the education system, manifesting in interpersonal racial microaggressions. Although slightly outdated, Solóranzo, Allen and Carroll (2002) reported that students at the University of California, Berkeley felt racial microaggressions in mathematics and science. For example, some students felt that there were only certain groups who were good at mathematics; they felt ignored and overlooked in the classroom by the teacher while some reported a classroom environment that was unsupportive and discouraging. Closer to home, a study at Stellenbosch University found that women of colour from minority groups felt undervalued and disrespected (Daniels & Damon 2011). As Le Roux (2016) suggests, mathematics and mathematics education disregard their roles in perpetuating South Africa's historical legacies of racism in higher education.

### Critical race theory and racial microaggressions

Critical Race Theory (CRT) affirms that racism is not merely an individual prejudice but a systemic issue embedded in laws, policies and institutions. This perspective helps explain why racial disparities persist in areas such as higher education, even within institutions that implement affirmative action (Delgado & Stefancic 2017). For example, in U.S., Bernal and Villalpando's (2002:176) study of higher education lecturing staff shows Eurocentric dominant epistemologies in the academy. They critique how white supremacy – defined as a system that promotes white dominance and marginalises non-white contributions – normalises Eurocentric paradigms, leading to what they describe as an *apartheid of knowledge*. This separation of knowledge contributions devalues the epistemologies of people of colour, giving the impression that their perspectives either do not exist or do not matter. Solóranzo et al. (2002:24) posit three ways that an apartheid of knowledge can play itself out: (1) one group believes itself to be superior, (2) the group that believes itself to be superior has the power to carry out the racist behavior and (3) racism affects multiple racial and/or ethnic groups. Solorzano and Yosso's (2001:3) definition of CRT in teacher education is helpful because it turns attention to the intersections of power that subordinate particular groups:

[4] framework that can be used to theorise and examine how race and racism impact the structures, processes and discourses within a teacher [higher] education context. [... It also] theorises

and examines that place where racism intersects with other forms of subordination, such as sexism and classism.' (Yosso 2001: 3)

Critical Race Theory in higher education is less commonly heard of in South Africa (Adonis & Silinda 2021), which implies that the voices and experiences of those often excluded or silenced in higher education are not documented with a starting point that racism exists in their respective institutions. Research that avoids this starting point tends to want to disprove that racism exists, which is not helpful to people who live with racism. Critical Race Theory offers a more nuanced understanding of lived experiences, as Kenny and Davids (2022, 2024) point out, where racism has been internalised and normalised. This article deconstructs racism as acts of racial microaggressions in mathematics education as experienced during apartheid and post-apartheid South Africa (1975–2015).

Racial microaggressions are subtle spoken and unspoken insults based on racialised and other intersectional stereotypes that target non-white racialised groups and can seriously impact the lives of those who experience it (Solóranzo et al. 2002:17). Solóranzo et al. (2002:16) argue that knowing what constitutes racial microaggressions gives a better understanding of how the experiences of racism affect educational experiences. The authors draw on the seminal work of Chester Pierce, who defines racial microaggressions as 'subtle, stunning, often automatic and non-verbal exchanges which are "put downs" of Blacks [people of colour] by offenders'. The offensive 'put downs' are not visibly apparent but equally damaging as overt racism. Solóranzo, Ceja and Yosso (2000:60) describe microaggressions as 'subtle insults (verbal, non-verbal and/or visual) directed toward people of colour often automatically or unconsciously'. These unconscious microaggressions can go unnoticed as they are often normalised in society and, at other times, camouflaged in meaningless actions and false/no recognition. Yep and Lesure (2019) share examples of racial microaggressions as verbal ('You speak English so well', suggesting that speaking English is unexpected of the person), non-verbal (clutching a purse when a person of colour passes by, implying fear based on their appearance) and environmental (under-representation in decision-making organisations demonstrating messages of non-importance).

Wilkins-Yel, Hyman and Zounlome (2018) provide insight into microaggressions in their nationwide study of 176 participants in Science, Technology, Engineering and Mathematics (STEM) higher education in America. Four themes came to the fore of microaggressions experienced: (1) delegitimisation of one's skills and expertise, (2) implicit and explicit messages communicating their lack of belonging in STEM, (3) instances where both their voice and physical presence were ignored, (4) gendered and racialised encounters, resonating with Bernal and Villalpando's (2002) apartheid of knowledge. Wilkins-Yel et al. (2018) found that

women of colour often spend their time and energy merely surviving in STEM fields rather than actively engaging in STEM work. Kohli and Solórzano (2012:459) provide examples of how Eurocentric teachers' inability to pronounce students' names can be seen as acts of racial microaggressions. Kohli and Solórzano (2012) propose that all teachers should: (1) recognise Eurocentric bias, (2) identify and expand their cultural limits and (3) have an awareness that they have the power to influence a student's sense of self and worldview.

## Research methods and design

The research paradigm is interpretivism (Babbie & Mouton 2001). It seeks to make sense of the lived experiences of 'coloured' women, as they journey into mathematics education, starting in teacher education in South Africa. The main objective is to identify how racism is felt in mathematics education in post-apartheid and the effects thereof. The participants in this study were part of a more extensive study that explored the lived experiences and identities of 'coloured' women as professional mathematics educators. This study examines the experiences of a specific group of women with whom the author shares lived experiences. She does not claim to speak for other racialised groups, as she has not lived their realities. Instead, she makes sense of lived experiences through a postcolonial feminist lens – the voices of women, as they lived it, is a theory about them (Al-wazedi 2020), emphasising the importance of self-representation rather than speaking on behalf of others. Broader findings and discussions have been reported by Kenny and Davids (2022, 2024).

Potential participants were invited via email to explain the purpose and context of the study. The criteria did not require them to identify as 'coloured' but rather to acknowledge that they had been socially classified under this label. Five participants, each a practising professional mathematics educator in higher education, gave written consent to be interviewed individually using semi-structured questions. The data for this article were collected from the transcriptions of face-to-face interviews about their lived experiences of teacher education, followed by their career development in mathematics education in higher education spaces. The sensitivity of the research meant that anonymity was essential. The names of the five participants were replaced with pseudonyms.

The findings were categorised under two headings. The first heading considered racialised microaggressions in teacher education. In this regard, inductive thematic analysis created codes that were then grouped as subthemes. The subthemes identified were access and advancement, cultural and linguistic challenges, racial stereotyping and social stratification, and recognition and expectations. The second heading focused on the effects of racialised microaggressions in mathematics education. Codes were grouped inductively into subthemes, namely, validation and recognition in professional spaces, marginalisation and exclusion in academic

and professional spaces, and racialised curriculum and role development. The subthemes were merged into themes. The merged themes are as follows and discussed in the 'Results and discussion' section: access and advancement, cultural and linguistic challenges, lack of validation and recognition in professional spaces, and marginalisation and exclusion in academic and professional contexts. These four themes align with CRT's assertion that racism is a systemic issue embedded in policies and institutional norms that impacts everyday life, whether it be one's personal or professional life.

## Ethical considerations

Ethical clearance to conduct this study was obtained from the Stellenbosch University Research Ethics Committee in 2019 (No. REC-2019-8455).

## Results and discussion

The research findings highlight political and socioeconomic inequities as pivotal to racial microaggressions in the South African educational landscape. While there are sufficient reasons to believe that inequalities have historically been closely linked to the effects of race categorisations in South Africa, previous research findings have not revealed how racial microaggressions play themselves out interpersonally on the educational landscape. Four themes are discussed next.

### Access and advancement

Belinda received bursaries from multiple sources to fund her undergraduate mathematics studies. While, on the surface, more than one bursary may sound beneficial, the need to secure financial support from various sources indicates the financial precarity often faced by students from historically marginalised communities. Belinda had good school grades and career dreams outside of teacher education. The apartheid state did not offer bursaries outside of teaching, so she needed to find alternate funding for her tertiary education. The pressure to constantly prove one's worthiness for financial aid from the private sector can be seen as a racialised microaggression, where 'coloured' women must demonstrate their value to continue receiving bursary payments in ways that may not be required of their more economically privileged peers. The need to constantly prove one's worth to justify the bursary can lead to heightened anxiety and feelings of inadequacy. This pressure can affect their academic performance and overall mental well-being, leading to an environment where the focus shifts from learning to validation. This speaks to the subtleties of not belonging in STEM based on bursaries.

One recommendation is for private companies to include mentorship and support for their bursary recipients so that the offer includes continuous personal and academic development. By personal development, the author refers to supporting students with the effects of historical traumas of exclusion, whereas academic development

refers to interventions for grade improvement and sustainability. Personal and academic support could be part of a funding package where all students qualify with the option to opt out, not the opposite, which is to choose to opt into the package offer. In this way, there is no need for a student to seek help. Help is part of the offer. In addition, whether in the public or private sector, funders must carefully navigate the balance between providing funding opportunities and ensuring that the students do not lose their financial support with rigid funding models. Rigid funding frameworks can stifle creativity and limit students' career choices. As a recommendation, funding could be made available for STEM education fields of study rather than subject-specific ones, creating greater flexibility within and across disciplines. Being creative about how funding is allocated may be key to reducing the *apartheid of knowledge* as coined by Bernal and Villalpando (2002:176).

Sara won an award for mathematics in her second year of college, which provided 'much needed financial support' for her studies. While this recognition might seem optimistic, the fact that such awards were necessary to support her studies suggests underlying financial inequities. As was the case for Belinda, students from marginalised backgrounds often rely on scholarships, bursaries, or prizes to continue their education, which can have the effects of a double-edged sword. While the award is a form of recognition for any student, it also highlights the systemic economic disparities that necessitate such support. Additionally, the financial aid she received was tied to her performance in mathematics, a subject she eventually dropped. It reflects the limited scope of academic awards and recognition available to students like Sara, particularly when their interests diverge from areas like mathematics deemed valuable by the institution. Although Sara was recognised for her achievements in mathematics, it raises the question of whose interests such recognition truly serves. To Sara, the award seemed to be 'less about valuing [her] efforts and more about the institution upholding the subject's status'. Her reasoning was once she dropped mathematics, the recognition disappeared along with it. Universities need to be mindful of their awarding systems and the way students come to understand their meanings. Awards are based on past performance, while meanings linger into one's future.

Sara dropped her studies in mathematics because she found inspiration in science, allowing her to engage and explore her curiosity fully. The fact that she had to drop mathematics to focus on science suggests a need to make difficult choices in an environment that may only partially support or encourage a broader exploration of interests. The experience indicates that marginalised students can be pigeonholed into specific academic fields of study, limiting their opportunities to explore and develop diverse skills and interests. The subtle pressure to remain in particular subjects or excel in areas like mathematics, which are often associated with higher academic prestige (or financial

support), can be a form of racialised microaggression. This pressure can create an environment where students need to conform to certain expectations to succeed and prove their worth rather than being free to explore their genuine interests in science. Therefore, racial microaggressions can play itself out when one is allowed to study in a field (traditionally for 'white' men), like mathematics, but then becomes a questionable decision if they change their mind to pursue a different career. In other words, once the decision is made to study mathematics, she is frowned upon if she chooses to change her mind. The point is that given an opportunity, if she later changes her mind, there is little or no further assistance provided to her. This experience may reinforce existing feelings of inferiority, which contribute to the broader issue of imposter syndrome. Policymakers and universities need to reconsider the natural human behaviour of seeking change, viewing it as not only as a personal phenomenon but also as an integral part of one's career experience.

### Cultural and linguistic challenges

Eva completed her post-schooling at a college run by 'white' religious devotees with strict religious practices. The expectation to participate in religious activities could be understood as a form of cultural assimilation despite personal beliefs. It could be interpreted as a racial microaggression, where the college imposed a dominant culture on students from alternate backgrounds. The college enforced a strict dress code, requiring students to wear a uniform that was monitored for modesty:

'[W]e literally had to go and stand in front of a writing board, take a piece of chalk, put our hand up and touch its highest point. If the dress was too short, you literally had to take out that hem, or you had to buy a new uniform, which was deducted from your bursary.' (Eva)

While cultural challenges may appear tangential to microaggressions, her lived experiences cannot be denied in relation to where she studied mathematics teacher education. The enforcement of such strict gender norms may reflect an underlying attempt to impose a specific image of respectability of mathematics educators. It is also framed within the context of being taught how to be 'ladylike' and 'proper', implying an attempt to civilise or refine the students. The college subtly conveyed that the students' natural cultural expressions were not appropriate or acceptable. Eva's experiences highlight how (mathematics) teacher education cannot be understood in silo. Within teacher education learning spaces, some behaviours make some women feel less than others, which impacts their experiences of teacher education. Furthermore, the underlying message that the students need to be shaped or corrected to fit into a certain societal role reinforces racial and gender stereotypes about what it means to be respectable and who holds the decision-making power to be respectable. Cultural roles in enforcing conformity to certain behaviours in college (and university) can create tension for students whose cultural values

conflict with a dominant campus culture. This expectation to conform can result in feelings of isolation and alienation, particularly for students from minority backgrounds. Eva's home language was not English. This creates additional challenges, as she did not only need to master the academic content but also navigate the cultural expectations tied to language proficiency. This process of assimilation into a culture in which students may not identify can further marginalise them, creating a sense of displacement and cultural erasure:

'I did the BSc in the shortest time ... three years ... What was daunting for me was that I was from an Afrikaans school and an English university, which was totally 180 degrees. I had to adapt. I had to. You don't have a choice.' (Belinda)

The implicit expectation for students to assimilate into a (culture and) language that may not be their own can be a form of microaggression, where students from non-dominant cultural backgrounds are expected to conform to the norms of the dominant group without acknowledging or accommodating their own cultural identities. Culture and language remain contentious issues in education and need to be researched further.

Sara's enrolment at a college to pursue a teacher's diploma was initiated by her father, reflecting a lack of agency in choosing her academic path:

'[My father] said he had spoken to the rector, and I have been accepted at [the college]. I ... cried for weeks on end. My father was not the one you argued with. He was very strict ... very, very, very, very strict. The strictest of the strict. You didn't mess with my dad [giggles]. I came home every afternoon with my dad and I cried because I wasn't sure if I was at the right place. And, then I started making friends at college.' (Sara)

While this may not directly point to racialised microaggressions, it underscores a broader context where students from marginalised backgrounds often have limited choices and are steered into specific career paths due to societal expectations or economic pressures. Sara's motivation to stay at the college came from her friends' encouragement rather than her passion or choice, conforming to societal expectations. Furthermore, the example showcases that loved ones also exercise racialised microaggressions. Her friends, who have internalised the belief that they know what is best for 'coloured' women, tell her, 'That's what "coloured" people do. They become teachers'. This statement disregards Sara's hopes and dreams and reinforces cultural and racialised stereotypes. Although work has been undertaken to better understand post-school racialised and gendered inequities, further deliberation is needed regarding their intersections with cultural expectations from friends and family and initiated by governmental public engagement strategies in STEM. STEM cannot operate in isolation; both the proponents of STEM and those it serves need a deeper understanding of human context – STEM needs to fit into human experience and not vice versa.

## Lack of validation and recognition in professional spaces

Despite Caylie's significant contributions and experience, she was never classified as a lecturer in higher education at the university; instead, she was categorised as a specialist. Firstly, Caylie's categorisation as a specialist brings to the fore the inconsistencies in job titles across universities. For example, teacher trainers are called specialists, facilitators or lecturers depending on their higher education institution. Secondly, the categorisation diminishes her role and contributions, indicating that she is not fully valued like her peers in traditional academic roles. The fact that she, alongside other colleagues, taught both in-service and pre-service mathematics teachers but was not recognised as a lecturer at her university of employment suggests a devaluation of their work, potentially influenced by historical and systemic biases. After returning from a training session, Caylie noted that a lecturer questioned how she acquired her new knowledge. It implies an underlying assumption that her success or knowledge is surprising or not fully deserved by colleagues in the same field teaching pre-service teachers. Through an interpretive lens, colleagues may be employed in the same field of education, but messages of difference created systemically at an institutional level create preconceptions of an order of knowledge. Even though Caylie pursued further studies in the same field of mathematics education, having less status than her pre-service teacher training counterparts meant scepticism about her qualifications and abilities:

'We are an anomaly. We are the only people with that classification in the university. At any other university, we would be lecturers. We work with both ... in-service and pre-service teachers. But when we work on the PGCEs, we are ... mainly ... sort of ... co-opted because their lecturers are on sabbatical or otherwise engaged.' (Caylie)

Using different titles for similar roles in mathematics (teacher) education signals a lack of standardisation and creates vagueness in role expectations. Titles within faculties of education and across universities need to be addressed and standardised nationally, whether mathematics (teacher) education occurs at colleges, universities, or non-government institutions affiliated with universities. Uniformity is further required regarding what constitutes administrative and lecturer roles, as there is a disconnect between the roles of pre-service and in-service mathematics teacher trainers across higher education institutions. This becomes more evident when non-government service providers conduct teacher training on behalf of universities.

During Ashanti's third year of study at a college, she found herself above the level of her mathematics class peers, so much so that when the mathematics lecturer was absent, the lecturer asked Ashanti to take over teaching the class:

'We even had our maths [lecturer], who was absent for a week. And she didn't get someone in her place to teach us. She asked

me. And ... we had fellow students who [needed help in maths]. And, they would often ask me. We even had weekends. They arranged weekends at their different houses for me to come and help them. And, that's where I became aware that students understand each other better because they understood me better than they did the lecturer.' (Ashanti)

While this situation might initially seem as empowering as peer-assisted learning, it also hints at the possibility that Ashanti's capabilities were exploited when needed at a pinch. Because she was asked to step in in the absence of an alternative, her competence was not fully recognised or valued in a formal teaching role. If she had been a lecturer, she would likely have received compensation for her efforts. Ashanti's peers relied on her to understand mathematics concepts. Although she shared that she did not ask for or receive compensation, at the same time, the institution (represented by a lecturer) also did not recognise her potential as perhaps a tutor or mentor, which could reflect a microaggression. Although it is possible that the institution may not have had a system of tutors or mentors, there was neither a monetary nor formal recognition of her efforts. In other words, Ashanti's abilities were appreciated by her peers but not formally acknowledged, nurtured or compensated by the educational institution. These subtleties or racial microaggressions might not be immediately recognised as causes for concern. However, for students who have inherited a legacy of marginalisation, a lecturer at the institution benefits from their time, energy, and commitment.

### Marginalisation and exclusion in academic and professional spaces

Caylie was compelled to reskill herself in mathematics to remain in the teaching profession due to the threat of retrenchment in her original subjects of English and History. Her threatening situation reflects the systemic pressures faced by teachers, who have to adapt continually to maintain their positions:

'They said that there are too many English and History teachers, and that they were going to send you to some unknown area to go and work. I decided to reskill myself. So, I registered with [a distance learning university] and studied for three years ... maths, which wasn't easy. Imagine studying varsity maths on my own ... distance learning. We had two days ... two separate days of face-to-face lectures. But on the whole, you taught yourself.' (Caylie)

The underlying implication is that certain subjects, and by extension, certain teachers, are more vulnerable to these pressures. The education system exercises its control over which school subjects hold dominance, ignoring the implications of change. It did not stop Caylie, but having just started a family, it came at a considerable emotional and financial cost to her. Other teachers may have felt trapped or discouraged from exploring alternate career paths, stifling their personal growth and creativity. Career flexibility is vital for anyone wanting to keep up with

education systems that change their foci. It serves as a form of gatekeeping. Introducing personal and career counselling services that offer financial support and emphasise transferable skills demonstrates the universities' and funders' awareness of the intersections of personal life and career changes. Support grants staff the permission to embrace and celebrate interdisciplinary learning and adaptability.

Eva began her career as a teacher. She recalls being reminded of the correct terminology in mathematics (denominator and numerator) by a student. Although this is not a microaggression, it serves as a powerful metaphor. It underscores how the teacher's sense of competence was challenged by students and, by extension, the expectations of the education system. Eva's later realisation that she had been mistaken, coupled with her laughter, suggests a complex internalisation of self-doubt, potentially exacerbated by the racialised context in which she was educated. Eva continues, 'And that was also a life-changing experience for me. Something about it bothered me, and that afternoon, I went to study my books'. One interpretation is her fear of reinforcing societal stereotypes surrounding 'coloured' women, rather than merely rectifying a human error. For teachers from disadvantaged backgrounds, this can intensify feelings of imposter syndrome, where they feel they do not belong or are not as capable as their peers, potentially lingering throughout their lives.

While later employed at university, Eva was sent overseas as part of a diverse group of South Africans studying mathematics. Eva noticed that students abroad could not place her racially with questions like, 'How can you be South African?', and did not seem interested in her story compared to those students who identified as black South Africans. Unable to place her racially and to be less interested in her story as a person of colour reflects the complexities of racial microaggressions and how society reifies biological racism through her lighter skin tone. It reflects identity invalidation as a mathematics student, and their lack of understanding or interest in her experiences. Subsequently, she did not see herself as someone who could aspire to higher positions, such as a university lecturer, despite her significant contributions and experience.

South Africa's history is deeply marked by racialised patterns of inclusion and exclusion, a legacy that continues to shape contemporary experiences of mobility and belonging. In this context, a student of colour sent abroad encountered a profound sense of otherness, highlighting the complexities that arise when individuals from historically marginalised communities navigate spaces shaped by colonial histories.

Governments must exercise careful consideration when selecting destinations for international study programmes, particularly when sending students to countries that played a direct role in South Africa's colonial past. The remnants of

these historical injustices may still manifest in ways that alienate or disadvantage visiting students, exacerbating feelings of isolation and exclusion.

For more inclusive and transformative exchanges, such visitations could be designed to include structured dialogues on the lived experiences of historical trauma. Joint sessions between South African students and their hosts would encourage a shared reckoning with the past, cultivating deeper awareness and mutual sensitivity. By acknowledging these histories, such engagements have the potential to move beyond mere academic or professional development, creating meaningful cross-cultural understanding that is attuned to the complexities of race, identity and historical responsibility.

## Conclusion

Racial (and gendered) microaggressions are so deeply entrenched in South Africa's educational landscape, with apartheid's legacies lingering on 30 years in its democracy. The main objective of this research was to identify how racism is felt in mathematics education into post-apartheid and the effects thereof. The findings of this research highlight political and socioeconomic powers at play and exercised through the day-to-day experiences. The author's intention was to bring to the fore the consequences of a marginalised group living with 'put downs'.

The findings were on par with the four themes of racial microaggressions reported in the study of Wilkins-Yel et al. (2018), namely: (1) delegitimisation of one's skills and expertise (lack of validation and recognition in professional spaces), (2) implicit and explicit messages communicating their lack of belonging in STEM (cultural and linguistic challenges), (3) instances where both their voice and physical presence were ignored (marginalisation and exclusion in academic and professional spaces), (4) gendered and racialised encounters (exemplified across the four themes). In some ways, this was expected, considering the wide range of each theme. Findings also revealed a fifth theme that emerged, which the author proposes as subtleties of not belonging to STEM based on bursary, scholarship, awards and granting further opportunities (access and advancement). This is perhaps the most important consideration for education policymakers who want to increase the intake of mathematics and mathematics education students (privately and state-funded) via remuneration. The expectations placed upon a mathematics student may explain why some students feel lost or why they are not recruited in the first place. This is due to their ongoing struggles to prove their worthiness in STEM, even in the face of funding.

As far as policymakers and funders are concerned, an overarching recommendation is to create flexible funding models that: (1) encompass personal and academic benefits for mathematics students, (2) are across STEM fields (not for specific subjects in STEM) to accommodate students who want to change careers within STEM fields, (3) permit students to change from STEM careers to other fields of study with counselling and not hold students 'hostage' to their

career choices, (4) include opportunities for structured dialogues on historical trauma in international STEM student-exchange programmes that cultivate awareness and mutual sensitivity.

Furthermore, universities should reconsider their recognition of achievement awards. The current trend focuses on awarding performance in mathematics, rather than acknowledging students' non-numerical efforts in striving for achievement. Students often question their own capabilities, yet the underlying cause remains unclear. This study illustrates that understanding how South Africa's history influences students' experiences as they navigate their personal and academic lives is essential. Allowing students to figure it out on their own is not a viable solution. A form of socially responsible education is required across STEM disciplines, but this is currently lacking and necessitates further discussion.

## Acknowledgements

The author would like to acknowledge the support and encouragement received from her PhD supervisor, Prof. Nuraan Davids. This article is partially based on the author's thesis entitled 'Exploring the lived experiences and identities of 'coloured' women as professional mathematics educators in higher education' towards the degree of Doctor of Philosophy (PhD) in the Department of Education Policy Studies, Stellenbosch University, South Africa on 7 August 2020 with supervisor Nuraan Davids. It is available here: <https://scholar.sun.ac.za/items/fb7272f2-e30d-4f60-bbf6-086a6f06c236>.

## Competing interests

The author declares that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## Author's contribution

S.K. is the sole author of this research article.

## Funding information

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## Data availability

The author confirms that the data supporting the findings of this study are available within the article and its references.

## Disclaimer

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