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Balancing Growth, Inclusivity, and Technology: Rethinking Student-Centered Learning in South African Higher Education

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Abstract. South African higher education faces persistent challenges related to massification, curriculum decolonization, and digital inequities, particularly in resource-constrained institutions. These factors place significant strain on student support systems, impacting teaching quality and necessitating innovative, adaptive strategies to foster inclusive, student-centered learning.

This study critically examines the intersection of these challenges and explores strategies to enhance student support in higher education. Employing a qualitative research design, the study integrates document analysis with autoethnographic reflections from the author's experiences in academia. Thematic analysis identifies key barriers and interventions for strengthening student-centered learning in the South African context.

Findings indicate that massification has strained student support structures, reducing opportunities for personalized engagement. While curriculum decolonization policies exist, inconsistent implementation—due to faculty training gaps and institutional inertia—limits their impact. Additionally, digital inequalities continue to hinder equitable access to learning resources, exacerbating disparities in student engagement. However, targeted interventions such as blended learning models, structured peer mentorship programs, and flexible assessment strategies offer viable pathways to mitigate these challenges.

The study underscores the need for comprehensive reforms that integrate faculty development, digital infrastructure enhancement, and curriculum transformation. Strengthening student support systems through inclusive and adaptive strategies is critical for ensuring the sustainability and equity of higher education. By addressing structural barriers, this study contributes to ongoing discussions on educational transformation, offering practical insights into improving student success and institutional resilience in South African universities.

Keywords: Student-Centered Learning; Massification; Decolonization; Digital Inequity; Student Support Strategies

1. Introduction

A student-centered teaching and learning space is critically instrumental to the overall quest for students' self-actualization especially as envisioned within the decolonization goal of Higher Education Institutions (HEIs) in South Africa, and Africa at large (Hassan, 2022). Student-centered teaching and learning are characterized by active engagement of learners in the learning process, emphasizing collaboration, problem-solving, and participation in discussions (Arman, 2018). This approach prioritizes individual learner needs, promotes self-motivation, and enhances cognitive, emotional, and physical development through personalized attention and tailored learning experiences. However, the pursuit of student-centered learning in South African higher education is fraught with challenges, particularly as higher education policies in South Africa have been focusing on redressing historical exclusion, decolonizing pedagogies, and increasingly adopting technology. This challenge is significant when viewed through the lenses of social constructivism and decolonization theories.

Social constructivism highlights the importance of collaborative knowledge-building and active student participation (Vygotsky, 1978), while the decolonization theory calls for integrating Indigenous knowledge and culturally relevant teaching methods to address historical marginalization, as seen in South Africa (Heleta, 2016). Meanwhile the three forces—massification (growth), decolonization (inclusivity), and technological innovation—create both opportunities and tensions within higher education, shaping the landscape of teaching and learning in complex and often contradictory ways. For instance, extant literature extensively documents the tensions between widening access and resource constraints (Fouche et al., 2021; Nyagope, 2023; Pillay, 2020).

Essentially, improved access to higher education has not necessarily led to a corresponding enhancement in educational quality, as HEIs continue to grapple with overcrowded classrooms, limited academic support, and inequitable access to digital learning resources (Adonis & Silinda, 2021; Faloye & Ajayi, 2022). As National Development Plan (NDP, 2011) highlighted, "While enrolment and attainment gaps have narrowed across different race groups, the quality of education for the vast majority has remained poor at all levels. The higher education therefore tends to be a low-participation, high-attrition system." This creates a paradox: how can meaningful student-centered learning be achieved when massification overwhelms resources, decolonization requires substantial curricular transformation, and technology integration remains uneven, despite its potential benefits? These intersecting challenges highlight a critical gap in understanding how they collectively shape pedagogical strategies, particularly in fostering learner-centered approaches.

Accordingly, this study seeks to address this gap by exploring how lecturers navigate these challenges and by proposing strategies to enhance student-centered teaching and learning in South African higher education. By engaging contemporary scholarships and reflecting on the author's lived experiences, through the lens of social constructivism and decolonization theories, this research offers an analysis of student support dynamics, and how they can be

optimized to sustain effective student-centered teaching and learning amidst these transformations. The study focuses on recent scholarships, particularly from 2016 onward, to acknowledge this period that brought to light some of the challenges of massification and decolonization. For instance, recent studies suggest that the effects of massification, such as the challenges of large class sizes, are relatively recent, stemming from the #FeesMustFall activism, which resulted in many changes including the introduction of free education for the poor in 2018 (CHE, 2018, p. 11; Mokoena, 2021).

Thus, it is pertinent to understand how lecturers are navigating the various transformations taking place to facilitate a student-centered pedagogy that promotes the necessary engaging and personalized education experience for the student. Accordingly, this study evaluates: (1) the impact of massification on teaching and learning, (2) how decolonization efforts are experienced within this space, and (3) how technology integration can either bridge or exacerbate existing inequalities in South African HEIs. Given the increasing adoption of digital learning, particularly in the post-COVID-19 era, this study also explores digital pedagogy through connectivism (Mafenya, 2022), underscoring the significance of networked learning in the Fourth Industrial Revolution (4IR). It provides insight into relevant trends pre- and post-COVID experiences, given the pandemic's relationship with the general trends in technology integration in SA HEIs. This study aims to advance student success in South Africa by bridging theoretical insights with practical recommendations. As the country navigates the legacy of apartheid, its higher education sector faces crossroads: managing massification, decolonization, and technology integration could either reinforce inequalities or drive social mobility and economic development. This study is structured into the following sections: literature review and theoretical framework, methodology and method, findings and analysis, discussion, conclusion, and recommendations.

2. Literature Review and Theoretical Framework

2.1 Massification in Higher Education.

Massification, the expansion of higher education to accommodate more students, has been observed in higher education institutions globally over the years. This is particularly noticeable in South Africa, where access was historically limited for certain racial groups (Nyagope, 2023). Although generally viewed as beneficial for social and economic progress (Cloete, 2014), massification has its challenges including the straining of resources due to insufficient infrastructure and staff, exacerbated by declining government funding (Fouche et al., 2021). Fouche et al. (2021) note the negative impacts of massification, including the challenges it poses to student-centered learning, as it undermines the opportunity to provide detailed individual feedback. Corroborating, Pillay (2020) also observed challenges such as decreased student engagement and superficial thinking and highlighted issues like insufficient professional development and infrastructure limitations for lecturers. Pillay also underscores the importance of understanding learning theories, like social constructivism, to enhance teaching in large classes. Adopting student-centered

learning promotes an inclusive educational environment. Strategies such as group work help instructors manage larger student cohorts effectively. Engelbrecht and Harding (2017) note that these strategies address massification challenges, by improving student participation and reducing anonymity. This is consistent with the ideals of social constructivism advocated by Pillay (2020), which emphasizes the social nature of learning.

2.2 Decolonization

Decolonization is a concept with varied and contested meanings (de Oliveira Andreotti et al., 2015, p. 22), but at its core, it involves challenging Eurocentric structures, disrupting power hierarchies, and promoting cultural relevance in knowledge construction (Hassan, 2022). Thus, decolonization is portrayed as a political and anti-colonial struggle against exploitation and oppression. In the context of education, it is an advocacy for a transformative re-evaluation of educational practices to address historical legacies and promote inclusivity. Decolonization involves challenging and transforming colonial legacies in curriculum, pedagogy, and institutional practices, to promote diverse perspectives, Indigenous knowledge systems, and inclusive learning environments (Heleta, 2016; Luckett, 2023).

In higher education, decolonization focuses on epistemological aspects, such as foregrounding Indigenous and non-Western knowledge and their holders, including both teachers and students (Hassan, 2022; Heleta, 2016). This approach challenges the exclusive status of Western knowledge traditions and opens possibilities for Indigenous knowledge systems that were marginalized under colonialism. For instance, language policies, particularly the use of English as the medium of instruction, are highlighted as impacting inclusivity, with a call for mother-tongue education, which has emerged as one of the demands for the decolonization of HE in South Africa. In this regard, Hassan (2022) proposes Ubuntu-centered educational initiatives to reshape and reimagine development and decolonization, advocating for a curriculum overhaul based on Ubuntu principles. The author underscores the significance of cultural capital, language policies, and student-centered teaching approaches in promoting decolonization and inclusivity within the educational system (Hassan, 2022).

2.3 Technology Integration

Education technology (edtech) has become prevalent in supporting personalized learning and meeting the evolving demands of a growing student population (Moll et al., 2022). Technology has played a pivotal role in shaping student-centered learning, with institutions implementing e-learning platforms, hybrid learning models, and digital resource hubs to enhance accessibility (Nyagope, 2023). Considering the challenges of massification in higher education, Pillay (2020) suggests strategies such as leveraging technology and subdividing classes into smaller groups. This viewpoint aligns with findings from prior research (cited in Pillay, 2020).

While well-resourced universities have been successful in integrating these technologies, underfunded institutions continue to grapple with infrastructure limitations and digital literacy challenges (Dlamini, 2023; Faloye & Ajayi, 2022).

As Turner (2023, p. 580) observed "When universities shut down during Covid-19 and #FeesMustFall, access as a key indicator of inequality in higher education shifted from formal admission, funding, and system navigation to access to connectivity and digital literacy." For instance, in their exploration of the challenges faced by undergraduate students at the University of Venda during the Covid-19 pandemic Sadiki et al. (2023), revealed significant barriers to effective e-learning participation. The authors highlighted access issues, including limited digital skills, financial constraints, and poor internet connectivity, which restricted students' ability to engage with electronic learning platforms (E-LPs). Additionally, home environments characterized by domestic responsibilities and overcrowded living conditions further disrupted study time and focus. The study also identified limited interaction with lecturers, resulting in reduced academic support and engagement. Similarly, the Council on Higher Education (CHE, 2018) confirms that issues with infrastructure, policy development, and practitioner understanding, limit the potential of technology for educational change. These observations align closely with the author's experiences as an educator at a historically disadvantaged institution in South Africa.

Hence, this study examines the complexities of fostering an inclusive, equitable, and effective educational environment. The exploration aims to develop nuanced strategies that balance scalability, cultural relevance, and technological advancement while addressing systemic inequities. By doing so, to deepen the understanding of the tensions and opportunities in transforming higher education in South Africa.

2.4 Theoretical Framework and Application

The analysis draws on the social constructivism and decolonization theories to examine student-centered learning in South African higher education. On the one hand, social constructivism emphasizes collaborative knowledge construction and the active role of students in meaning-making (Vygotsky, 1978). This aligns with learner-centered approaches that promote active engagement and co-creation (Arman, 2018; Du Plessis, 2020). In the context of massification, it offers insights into fostering meaningful interactions despite resource constraints (Pillay, 2020). Zimba et al. (2021) observe the core principles of social constructivism, including the importance of student agency in the learning process, and how it fosters a more engaging and personalized educational experience.

On the other hand, the decolonization theory challenges Eurocentric knowledge systems, advocating for the inclusion of Indigenous perspectives to counter apartheid-era marginalizations. This framework critiques traditional curricula and teaching methods, promoting culturally relevant education that empowers students (Chasi & Rodny-Gumede, 2019; Hassan, 2022). However, the implementation of decolonization efforts is often hindered by structural barriers, such as large class sizes and insufficient faculty training, which limit the ability to create inclusive and participatory learning environments (Hardman, 2024). The impact is also notable in the ongoing digitalization, with potential ramifications for a student-centered pedagogy (Turner, 2023).

This integration of both frameworks in this study provides a theoretical foundation for understanding how these antecedent variables influence the consequent variables—student engagement, inclusivity, and learning outcomes. For instance, Massification negatively impacts student engagement by limiting personalized feedback and interaction, undermining the collaborative learning central to social constructivism (Maringe & Sing, 2014; Mulryan-Kyne, 2010). Decolonization enhances inclusivity by integrating Indigenous knowledge and culturally relevant pedagogies, yet structural barriers, such as large class sizes and faculty resistance, constrain its effectiveness (Heleta, 2016; Luckett, 2023). The integration of education technologies (Edtech) offers adaptive and personalized learning opportunities, but its potential is curtailed by the digital divide, particularly for historically disadvantaged students (Ng'ambi et al., 2016; Oyedemi, 2021). Thus, massification, decolonization, and technological integration shape student engagement in complex ways, presenting both challenges and opportunities for transformative learning.

The interplay of these forces underscores the need for a balanced approach that mitigates structural constraints while leveraging technology to foster inclusive, student-centered learning, as supported by both social constructivism and decolonization theories (Hassan, 2022; Mcinziba, 2020; Moloi & Salawu, 2022). While existing research often examines these issues in isolation, this study explores their combined impact on student-centered learning, offering a holistic framework for understanding and addressing systemic inequities. By leveraging social constructivism and decolonization, this study advocates for equitable access to digital resources, fostering inclusive and culturally responsive learning environments.

3. Methodology and Method

This study adopts a qualitative research design that is grounded in an interpretivist paradigm, recognizing the subjective and context-dependent nature of educational realities (Jacobs, 2023). Hence, a focused literature review is used to engage with the academic literature on student-centered pedagogy, massification, decolonization, and technological integration in higher education, especially in South Africa, within an autoethnographic framework. Defined as "a form of self-narrative that places the self within a social context" (Reed-Danahay, 1997, p. 9, as cited in Butz & Besio, 2009) autoethnography enables a rigorous self-reflection. Such reflexivity allows for a critical engagement with the structural and institutional dimensions of higher education while drawing from personal pedagogical encounters as an educator. This approach enables a critical and reflexive examination of the author's lived experiences as an educator within a resource-constrained higher education setting (Adams et al., 2017; Butz & Besio, 2009). In this regard, the researcher is both an observer and a participant, engaging in identity work that is simultaneously introspective and outward-facing (DeNora, 2000, cited in Butz & Besio, 2009).

3.1 Data Collection

This study draws on literature analysis as its primary data source, alongside an "insider research typology" of autoethnographic reflection. Sources, including academic literature, policy documents, and institutional reports are used to

establish the theoretical and empirical foundations. Among these are academic publications such as journal articles, book chapters, thesis, and reports from the Department of Higher Education and Training (DHET) and the Council on Higher Education (CHE), covering discussions on massification, decolonization, and digital transformation from 2016–2024, particularly post-#FeesMustFall and the COVID-19 pandemic. Search terms included variations of "massification," "decolonization," "technology integration," "student-centered learning," and "South African higher education." Sources were selected based on relevance and credibility in addressing systemic challenges and interventions. The focused timeframe (2016–2024) is driven by my interest in scholarly discussions on decolonization emerging from the #FeesMustFall movement (2015–2016) while also capturing shifts in technology integration before and after the COVID-19 pandemic in South African HEIs. Furthermore, the author's experiences serve as both a source of insider knowledge as well as a critical lens for interpreting literature and identifying practical strategies for overcoming institutional constraints. An autoethnographic narrative helps researchers to "scrutinize, publicize, and reflexively rework their self-understandings as a way to shape understandings of and in the wider world" (Butz & Besio, 2009, p. 1661).

3.2 Data Analysis

A thematic analysis is utilized in identifying and interpreting recurring patterns and insights across the collected data (Creswell & Poth, 2016). The analysis follows an inductive approach, allowing themes to emerge from literature, policy reviews, and reflective narratives. Findings are triangulated through cross-referencing personal experience with established research and policy discussions to enhance the credibility of the study. However, the study acknowledges the subjectivity of interpretive analysis and the selective nature of the literature review. While the author's experiences provide valuable context, it remains a singular perspective. This study is primarily document-based and reflective, so ethical concerns are minimal. Nonetheless, the author is committed to academic integrity and transparency in presenting experiences and interpretations of data.

4. Finding and Analysis

The following have been identified in the complex interplay between decolonization massification and technology integration in HEIs, and the implications for student-centered teaching and learning in South Africa.

4.1 Growth and Inclusivity

Although increasing access to education has been a priority for the government since the end of apartheid, the rising demand for decolonization among students particularly reinforced the surge in enrollment. This was especially noticeable following the #FeesMustFall activism in 2015/16, which led to the introduction of free education for the poor and resulted in a significant increase in enrollment in 2018. A DHET report shows that "Enrolment of first-time entering students at public HEIs increased by 3.1 percent (5 157) over the 13 years between 2009-2021. (See figure 1 below). This is in keeping with the NDP's Vision 2030 to increase enrolments in both public and private higher education institutions to 1,620,000, up from 950,000 in 2010 (NDP, 2011, p. 17).

Similarly, the data on the Gross Enrollment Ratio (GER), which represents the percentage of all eligible children enrolled in higher education, indicates a steady increase from 18.86 percent in 2015 to 27.1 percent in 2022. The pace of massification accelerated significantly between 2017 and 2020, rising from 21.4 percent to 25.13 percent. However, post-2020 growth stabilized, likely due to pandemic-related disruptions, with only a marginal increase from 25.36 percent in 2021 to 27.17 percent in 2022. Besides, despite these gains, the GER in South Africa remains significantly lower than the global average of 55.47 percent in 2022. Figure 2 below illustrates the Gross National Enrollment in Post-Secondary Education and Training (PSET) between 2015 and 2021, alongside first-time first-year enrollment in public higher education institutions. With an average growth rate of 1.4 percent between 2014 and 2021—or 2.3 percent when private universities are included (DHET, 2024, p. 28)—enrollment expansion remains insufficient to meet the National Development Plan (NDP) 2030 targets(DHET, 2024, p. 28).

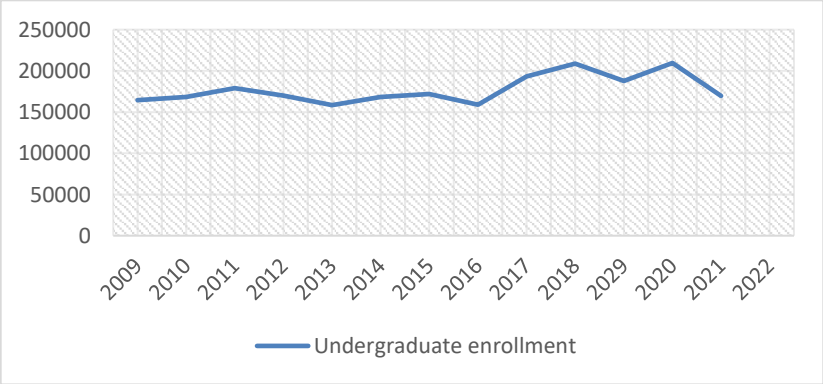


Figure 1: Number of first-time undergraduate students enrolled in public HEIs (2009 – 2021)

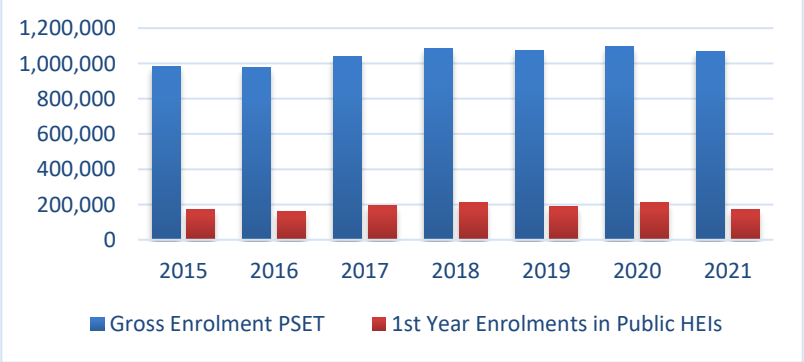


Figure 2: First-year Enrollment in Public HEIs and Gross Enrolment (PSET) 2015-2021 Data source: (DHET, 2021b, p. 120; 2024)

This increase in access stems from various factors including policy shifts, increased funding, and structural expansions. For instance, in terms of funding, The "38.6% increase in bursary and loan recipients between 2011 and 2017, from 332 187 to 460 341" is illustrative (DHET, 2021a, p. 28). This effort sought to address the inequalities of the apartheid era, and diversify student demographics, especially raising the participation of the black population which

has been historically disadvantaged. As Akala (2023, p. np) has observed, "the most significant goal after the 1994 transformation of a highly racialized system was to aspire to an inclusive higher education and guarantee the right to higher education". The annual average enrollment growth rate of 3.2% among Black South Africans from 2014 to 2021, compared to a decline of –0.3% for Coloured students, –4.5% for Indian/Asian students, and –5.8% for White students, highlights significant progress in expanding access to higher education for historically disadvantaged populations (DHET, 2024, p. 26).

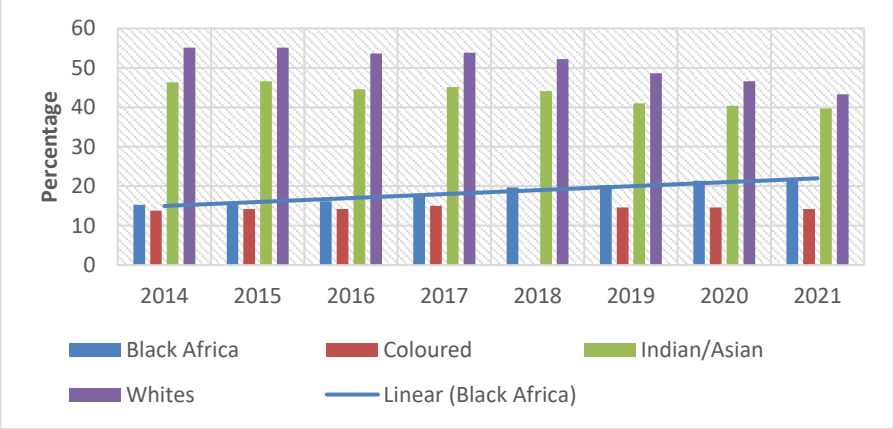


Figure 3: Public universities: Total enrolments and GER by race, 2010–2021
Data source: (DHET, 2024, p. 26)

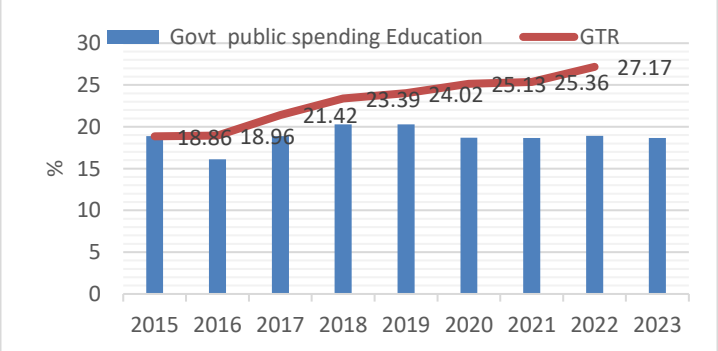


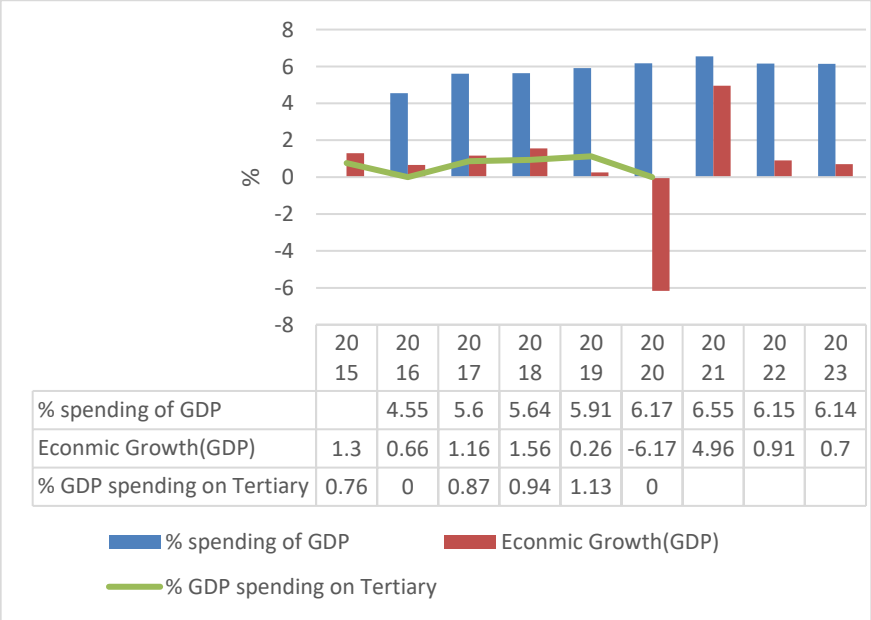
Figure 4: Government spending on Education, Gross Tertiary Enrolment.
Data source: (DHET, 2024).

Figure 4 indicates that education is a priority, with spending exceeding UNESCO benchmarks (15-20% of government expenditure). South Africa outspends most BRICS countries in education as a percentage of both government spending and GDP, trailing only Brazil in the latter. The rise in the GER is not commensurate with government spending on education overall (see Figure 4). Besides, spending per GDP on higher education has remained relatively low, hovering around below 1 percent as shown in Figure 5. DHET (2021b) also noted a decline in the total number of permanent staff members in public HEIs by 1.4 percent (884 staff members) from 2020 to 2021, dropping from 64,551 to 65,435. Of this, only 31.2% (or 20 414) are instruction and research staff, thus impacting the teacher-to-student ratio necessary for quality education. This

suggests that work overload continues to intensify, adversely affecting the teacher-student ratio.

4.1.1 Macro-Economic underpinning

The reality is not divorced from South Africa's overall macroeconomic and political realities over the years that implicate the quality of education. The rise in GER, while addressing historical political issues, is confronted with resource constraints. For instance, as Figure 5 indicates the economic indicators remain unfavorable for implementing the post-apartheid agenda for reducing racial inequality, especially through higher education deemed as a pathway to social mobility (NDP, 2011). Economic growth has been volatile, with a sharp decline to -6.75% in 2020, likely due to the COVID-19 pandemic. Recovery is seen in subsequent years, but growth rates remain modest. The modest economic growth rates challenge both quality and sustainability, which calls for efficient allocation and utilization of resources to achieve sustainable expansion in higher education.



	2015	2016	2017	2018	2019	2020	2021	2022	2023
% spending of GDP		4.55	5.6	5.64	5.91	6.17	6.55	6.15	6.14
Econmic Growth(GDP)	1.3	0.66	1.16	1.56	0.26	-6.17	4.96	0.91	0.7
% GDP spending on Tertiary	0.76	0	0.87	0.94	1.13	0			

Figure 5: Percentage spending on Education, HE and GDP growth rate. Data sources: (DHET, World Bank)

This economic reality directly affects resource allocation, exacerbating the challenges of massification and significantly influencing student engagement. For instance, the resultant large class sizes and the imbalance in the teacher-student ratio impede meaningful student participation.

4.1.2 Large Classes and Student Engagement

Despite the gains in access, the literature highlights the adverse effects of massification on student engagement, the depth of learning, and the feasibility of personalized feedback mechanisms. In a student-centered and decolonized educational framework, large class sizes undermine effective teaching and learning by fostering anonymity, reducing student motivation, and limiting

opportunities for interactive and personalized learning experiences (Mulryan-Kyne, 2010).

Also, inadequate resources, including insufficient support materials and poor infrastructure, limit educators' ability to facilitate interactive and collaborative learning experiences (CHE, 2010, 2019). Constructivist learning environments thrive on active engagement, collaboration, and dialogue, yet large classes often rely on lecture-centered teaching, limiting students' ability to share diverse perspectives and engage in meaningful discussions (Mulryan-Kyne, 2010; Nyagope, 2023). In such contexts, classroom management difficulties, including distractions such as late arrivals, side conversations, and digital device usage, further weaken the student-centered approach, making it harder for academics to cultivate an inclusive and participatory learning space (Matoti & Lenong, 2018). Large classes restrict personalized instruction, making it difficult for students to engage in peer discussions and scaffold their understanding through social interactions. This limitation reinforces passive learning and reliance on memorization rather than critical thinking (Maringe & Sing, 2014).

The legacy of apartheid-era inequalities has left many students from marginalized communities underprepared for university-level learning. Little wonder, significant disparities in throughput rates persist, with dropout rates among Black South African students remaining disproportionately high compared to their counterparts (Otu & Mkhize, 2018). It is important to clarify that in academic literature, the term "Black" is often used broadly to encompass individuals of African, African American, Afro-Caribbean, or Afro-Latin descent (Browdy & Milu, 2022). I will limit the scope of the term "Black" in this context to individuals of African descent. This distinction is particularly relevant to my teaching experience, which has primarily involved Black African students at Durban University of Technology (DUT).

Furthermore, the diverse backgrounds of students further complicate engagement, as many are first-generation university attendees who often lack the academic preparedness to navigate higher education effectively (Mulryan-Kyne, 2010). Moreover, the lack of consensus on an optimum class size exacerbates these issues, as increasing student numbers diminish opportunities for interaction, thereby threatening the development of essential skills and competence (Biggs, 1999; Cuseo, 2007; Hornsby & Osman, 2014). Hence, the literature emphasizes the need to address overcrowding and its impact on learner-centered teaching approaches.

Assessment and feedback, crucial for student-centered and constructivist learning, are particularly challenging in large classes. As Pika (2024, p. 126) observed, the principle of a student-centered approach “values transparency of learning outcomes and assessment practices and the overall relevance to the development of the student. Hence, providing timely, formative feedback that helps students reflect and improve their learning becomes nearly impossible when academics must assess large numbers of students (Moodley, 2015). While peer assessment has been proposed as a partial solution to enhance engagement

(Msiza, Zondi, & Couch, 2020), the absence of direct, personalized feedback negatively impacts student retention and overall success (Maringe & Sing, 2014).

4.1.3 Small Group Learning as a Response to Massification

Tutorials and small group learning have been implemented to counteract the negative effects of massification, as these allow for more focused interaction, enhanced participation, and personalized academic support. For instance, tutorials at institutions like the University of Johannesburg, the University of the Free State, and Cape Peninsula University of Technology aim to tackle academic challenges and improve student outcomes (Hassan, 2022). However, small group tutorials are also challenged by massification in South Africa HEI for various reasons, including diminishing funds, and the quality of tutorials. Besides, Ohei (2019) underscores the need for well-structured tutorials to manage the growing student influx given that poorly arranged tutorials compromise academic standards.

4.2 Curriculum Transformation

Decolonization calls for pedagogical approaches that validate Indigenous ways of knowing, integrating African epistemologies, and fostering learning environments that accommodate students' linguistic and cultural diversities. In a country as socially, culturally, and linguistically diverse as South Africa, the 'social and cultural backgrounds and positionalities' that students bring to the classroom are considered valuable (Fouche et al., 2021).

Meanwhile, Vandeyar (2020, p. 783) argues that the "Achilles' heels" in the decolonization effort are the academics themselves, and merely changing the curriculum without addressing the role of academics will not lead to meaningful educational change. In this regard, Hardman (2024) observed decolonization in education faces significant challenges, beginning with resistance to change from those invested in traditional systems of knowledge. The author suggests that any attempt to alter established epistemologies tends to be perceived as epistemic violence, leading to pushbacks from institutions and educators who view these changes as undermining academic rigor.

Furthermore, the structure of the curriculum itself poses a barrier, as its content-heavy nature prioritizes standardized testing over deep student understanding, creating a contradiction between assessment-driven education and the goals of decolonial pedagogy (Hardman, 2024). The decolonization quest further challenges this structure, as the dominant Eurocentric pedagogical models often fail to integrate Indigenous knowledge systems, collaborative learning rooted in African communalism, and critical reflexivity that could make learning more relevant to students' lived realities (Hassan, 2022).

The challenge of decolonizing assessment practices is further compounded by traditional Eurocentric evaluation methods that often fail to capture the diverse ways African students engage with knowledge. As Hardman (2024) argues without culturally relevant and individualized feedback, students struggle to self-regulate their learning, distancing them from the core principles of social constructivism, student-centered pedagogy, and decolonial education. Further

complicating the process are persistent disparities in resources and training between wealthy and poor students, which reinforce systemic inequalities.

Consequently, many students feel disconnected from their learning environment, reducing attendance, increasing dropout rates, and creating unequal learning opportunities (Luckett, 2023; Oyedemi, 2021). Poor engagement weakens academic performance, motivation, and the ability to construct and apply knowledge collaboratively.

4.2.1 Intersection with Massification

The persistence of large classes due to financial and political incentives limits the ability to decolonize education in meaningful ways, as massified teaching models reinforce hierarchical, authoritative learning environments rather than fostering democratic, participatory, and contextually relevant knowledge production (Wood & Tanner, 2012). Decolonization efforts call for alternative teaching strategies, such as using Indigenous knowledge systems, African storytelling, and collective learning methods to make education more inclusive and responsive to students' realities. However, the review suggests large classes often hinder such decolonial efforts, as one-size-fits-all teaching approaches fail to recognize students' varied historical and socio-economic contexts (Mokoena, 2021; Nyagope, 2023).

These challenges have broader systemic implications, particularly in South Africa, where weak tertiary-level preparation, resulting from poor-quality secondary education, perpetuates a cycle of underperformance (CHE, 2019). Ultimately, inadequate educational preparation continues to hinder the social mobility of South Africans, particularly those from impoverished backgrounds shaped by apartheid legacies, thereby obstructing broader economic transformation

4.3 Edtech to the rescue?

Over the past two decades, technology-enhanced learning in South Africa has undergone significant changes, reflecting global advancements while addressing local realities (Ng'ambi et al., 2016). In their review, Ng'ambi et al. (2016) trace the journey of digitalization, particularly pre-COVID, dividing it into four distinct phases. The first phase (1996-2000) focused on experimenting with new media technologies such as texts, images, sounds, and videos to enhance learning and teaching. However, concerns about the digital divide hindered equitable access to these technologies. The second phase (2001-2005) saw a shift towards leveraging the internet, mobile technologies, and wireless connectivity for active learning and collaborative knowledge production. This phase involved the further development and consolidation of ICT infrastructure and policies to ensure equitable access.

As technology integration became more strategic, the years 2006-2010 were marked by the institutional incorporation of ICT, with research emphasizing pedagogical agendas and leveraging ICT-mediated practices for teaching, learning, and professional development. Finally, from 2011-2016, there was a surge in mobile learning and social media use, prompting questions about the

role of higher education institutions in a digitally connected world where students are adept at using digital devices and accessing content online. Throughout these phases, the focus remained on overcoming disparities in access, integrating technology strategically, and leveraging ICT for enhanced pedagogy and scholarship in a rapidly digitizing world.

4.3.1 Reinforcement under COVID-19

Since the above study, there has been a notable surge in the utilization of ICT, significantly accentuated by the onset of the COVID-19 pandemic. The pandemic prompted South African universities to make substantial investments in ICT infrastructure and support for both students and faculty (Nkoala & Matsilele, 2023). The was an acceleration in the use of existing technologies, procurement of new tools, and provisioning of ongoing training for staff to enhance their competency in a technology-driven environment (Mokoena, 2021; Moloi & Salawu, 2022). As a diagnostic study by Moloi and Salawu (2022) on the institutionalization of technology in higher education reveals, Universities deployed fifty-seven different technologies to facilitate teaching and learning activities. Among the common ones are Learning Management Systems (LMS), Microsoft Package, Google, WhatsApp, Camtasia, smartboard, Lightboard, Virtual Reality (VR)/Augmented Reality (AR), Artificial Intelligence, Simulation Laboratories, High Fidelity Rooms, and Facebook. Technology integration enabled the institutions to maintain the academic calendar and ensure the continuity of classes, even under lockdown conditions.

The positive impact has been notable. Moloi and Salawu (2022) observed that engaging students through online learning led to increased participation in assessments and reduced sick leave applications. In this regard, this integration has played a pivotal role in addressing the challenges associated with massification, as it has facilitated broader access to educational resources and opportunities (Dlamini, 2023). Bolstered by the passion of the digital native modern generation, the integration of various educational technologies has also been crucial in facilitating a student-centered pedagogy (Mcinziba, 2020). For instance, social media tools have provided platforms for collaborative learning, knowledge creation management, personalized content, and interactive and autonomous learning experiences (Mcinziba, 2020). These tools enable students to engage actively, participate creatively, and build a sense of community, ultimately enhancing educational opportunities and student engagement. While traditional institutional learning management systems may struggle to incorporate social media features, emerging learning platforms like Edmodo are becoming increasingly popular in both higher education institutions and schools in South Africa (Ng'ambi et al., 2016).

4.3.2 The 4IR and Education

The Fourth Industrial Revolution (4IR) also shapes the complex interplay between massification, decolonization, and the pursuit of student-centered learning, both within South Africa and across the African continent. Characterized by the convergence of digital, physical, and biological technologies, the 4IR serves as a transformative force, reshaping global education systems, societal structures, and economic landscapes. Its potential to

enhance access, engagement, and inclusivity in higher education underscores the need for strategic integration that aligns with localized educational priorities and decolonization efforts (Arek-Bawa & Reddy, 2023; Fox & Signé, 2022). Its potential to address systemic challenges such as poverty, inequality, and low human capital makes it highly significant for South Africa's development and, by extension, the broader education sector. In this regard, recent government initiative especially the presidential commission aimed at leveraging the 4IR for capacity development and industrialization in South Africa. This commission is tasked with formulating technology-responsive policies and legislation to address the skills gap in the workforce, emphasizing the need for universities to align their curricula and training programs with the skills 4IR-relevant skills.

The initiative reflects a commitment to improving education and equipping the youth with the necessary skills to meet the demands of a changing economy, intending to increase employment capacity from 16.1 million in 2016 to 20.7 million by 2030 (Moloi & Salawu, 2022). Accordingly, Dlamini (2023) and Fox & Signé (2022) argue that the 4IR presents transformative opportunities to enhance education quality, improve teaching and learning outcomes, and introduce dynamic technology-driven learning methods. By leveraging these advancements, Africa has the potential to bypass conventional educational constraints and adopt innovative, future-ready approaches that foster greater accessibility, inclusivity, and efficiency in education (Dlamini, 2023).

4.3.3 Challenges of Digitalization

The prevailing 'digital divide' in Africa—marked by limited access to the necessary infrastructure and connectivity for digital learning—poses a significant threat to the successful integration of 4IR technologies in education. Despite a decrease in the cost of digital devices over recent years, the affordability of these devices remains a major challenge for Africa's large, impoverished population, including South Africa. Relative to the rest of the world, a high population of sub-Saharan Africa still struggles with access to reliable internet services. As the figure below illustrates, South Africa's internet penetration, which has grown steadily from 54 percent in 2016 to 74.7 percent in 2022, suggests a relatively mature digital infrastructure compared to the broader Sub-Saharan African region, where penetration remains significantly lower at 36.7 percent in 2023. Although above global averages (67.4 percent in 2023), South Africa still lags behind OECD nations, where penetration has nearly reached saturation levels at 89.81 percent.

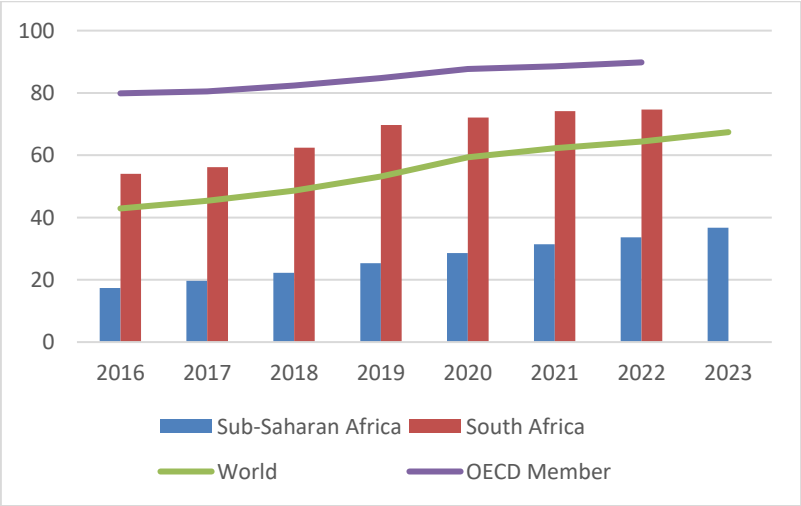


Figure 3: Individuals using the Internet (percent of the population)
Data source: UNESCO, World Bank

Furthermore, South Africa faces a complex challenge of enhancing the quality, affordability, and inclusivity of its ICT ecosystem. While global trends indicate increasing efforts to bridge digital inequalities, South Africa must navigate its position as a middle-income country that still faces economic disparities, which affect ICT adoption rates. Limited ICT infrastructure, especially in rural areas, further restricts access to digital devices and high-speed internet, hampering the development of digital literacy and STEM (Science, Technology, Engineering, and Mathematics) skills. Additionally, a shortage of trained educators remains a critical challenge, as inadequate professional development opportunities hinder the successful integration of the 4IR technologies into teaching practices (Arek-Bawa & Reddy, 2023).

Furthermore, Lubinga et al. (2023) reveal that many HEIs have not effectively utilized technologies like big data analytics, AR/VR, and innovative lecture halls, indicating a lack of successful implementation and a limited focus on digitization over digitalization. While the former which is more concerned with converting physical materials (e.g., books, lecture notes) into digital formats, is foundational, it is the latter that drives meaningful pedagogical change. Pika (2024) observed that many academics lack the necessary knowledge and competencies to effectively integrate technology into their teaching, limiting student engagement and comprehensive assessment. Inadequate facilities, such as limited access to computers, internet connectivity, and software, hinder the creation and dissemination of digital learning materials.

Socioeconomic factors, including poverty and inequality, further impact the students' ability to access and utilize technology effectively. The digital divide exacerbates disparities, disproportionately affecting students from socioeconomically disadvantaged backgrounds and making inclusive education more challenging. Socioeconomic factors, including poverty and inequality, further impact students' ability to access and utilize technology effectively,

thereby constraining collaborative learning and feedback opportunities (Pika, 2024; Sadiki et al., 2023).

4.3.4 Implication for Decolonization

The dominance of the Eurocentric education system is further reinforced by the scarcity of local content, particularly in African languages, which undermines the effectiveness of digital education across the continent. For instance, Turner (2023, p. 580) argued that "Digitalization at universities did not automatically result in an investment in language diversity. Despite making it technically possible, digitalization does not per se bring about diversification in terms of communicative practices." This gap poses a significant challenge to the decolonization of higher education curricula, diminishing the cultural relevance of learning materials in South Africa and beyond. Addressing these issues requires a strategic approach that accounts for massification, resource constraints, and the imperative for culturally inclusive digital education.

5. Discussion

In 2021, South Africa's Post-School Education and Training (PSET) system included 26 Public Higher Education Institutions, 124 Private Higher Education Institutions, 50 Technical and Vocational Education and Training (TVET) colleges, 133 Private Colleges, and 9 Community Education and Training (CET) colleges, collectively offering a diverse range of academic, vocational, and community-focused programs to support skills development, higher education, and lifelong learning across the country (DHET, 2021b). Compared to the apartheid era, when access to higher education and vocational training was heavily restricted along racial lines, with only 19 public HEIs, this is indeed a significant achievement in terms of expansion and diversification of the PSET system. Under apartheid, higher education was segregated by race, with historically white institutions receiving disproportionately higher funding and resources than historically black institutions (Bunting, 2006).

The foregoing analysis highlights how the post-1994 government has sought to redress these inequities, resulting in both significant gains and ongoing challenges. Meanwhile, the challenges at the intersection of decolonization, massification, and technological integration have profound implications for achieving quality education through student-centered pedagogy. Specifically, these challenges focus on ensuring that educational expansion does not compromise pedagogical quality, aligning technological advancements with equitable access, and ensuring that decolonization efforts create culturally relevant and contextually appropriate learning. To enhance the quality of education, ensuring it remains relevant, equitable, and accessible to all students requires an adoption of a student-centered and inclusive approach.

My introduction to the concept of student-centered teaching and learning philosophy at a South African University of Technology in 2018 was pivotal in deepening my appreciation for the complexities of massification. This period coincided with a rise in student protests, highlighting the struggles of historically disadvantaged Black populations in accessing a quality educational experience. Despite efforts to increase overall access to education and transform

the demographics of higher education admissions, a significant disparity in throughput rates persisted. The reality exposed the need for a more targeted, and personalized approach to meet the challenges of historically disadvantaged students. Many students enter higher education with habits rooted in rote memorization rather than critical inquiry, which complicates the learning process (Hornsby & Osman, 2014).

Social constructivism and decolonization, which advocate for active, self-directed learning, present opportunities to target such students and create relevant platforms for their transformation. Consistent with my experience, the findings suggest that strategies such as small group tutorials and peer mentorship programs have proven effective in addressing some of the challenges posed by massification. These approaches emphasize collaborative learning, active student engagement, and knowledge co-construction. By fostering a more inclusive and interactive learning environment, they help mitigate the limitations of large class sizes. Efforts in this regard are evident in South African universities, including DUT, where tutorial programs, peer-assisted learning models, and digital learning platforms are being implemented to enhance student engagement, provide academic support, and improve learning outcomes.

Accordingly, Vygotsky's concept of mediation offers a theoretical foundation for promoting decolonial pedagogy that supports student-centeredness, given its emphasis on collaborative knowledge construction (Hardman, 2024; Vygotsky, 1978). His idea of the Zone of Proximal Development (ZPD) supports the role of educators in guiding students through their learning journey, enabling them to engage with both abstract and culturally relevant content. This is particularly vital in a decolonial context, such as South Africa, where education must transcend rigid curricular structures to incorporate diverse ways of knowing. Mediation underscores the importance of cultural tools and social contexts in learning, reinforcing the decolonial imperative to validate and integrate multiple cultural perspectives. By adopting Vygotskian principles, educators can create more inclusive and responsive learning environments that challenge epistemic hierarchies and promote active, student-centered learning.

In this context, teaching methods that engage learners in collaborative processes, allowing them to interact with one another to explore and share new knowledge, are promoted. Unlike the traditional teacher-led approach, educators serve as facilitators, coaches, and mentors, fostering a more inquiry-based and collaborative learning environment. In my experience, tutorial classes bridge the gap between educators and students, fostering a personalized and inclusive learning environment. Smaller tutorial groups (20–30 students) enhance engagement and comprehension, unlike large first-year classes of over 200 students, where traditional methods are less effective. Tutorials allow tutors to engage directly with students, addressing their specific learning needs in a more approachable and less formal manner, thereby reducing the power distance between educators and students (Hassan, 2022; Wood & Tanner, 2012). Where feasible, the use of local languages further tends to enhance comprehension and

a sense of belonging, particularly for students who may feel lost in the anonymity of large lecture halls. This personalized approach not only improves academic support but also cultivates a sense of community, making students feel seen, heard, and valued in their educational journey, thereby advancing the decolonization objective (Hassan, 2022).

Although efforts to decolonize the curriculum have faced significant barriers, including faculty resistance and a lack of institutional support (Hardman, 2024), integrating Indigenous knowledge systems and culturally relevant pedagogies makes education more inclusive and meaningful for students. For instance, occasionally promoting the adoption of local languages in tutorials has proven to be reliable in promoting inclusivity in my classes. This approach also challenges the dominance of Eurocentric knowledge systems.

Consistent with the ideals of social constructivism, collaborative e-learning tools have become increasingly popular and offer significant benefits for large classrooms. While South African universities have advanced digital integration—accelerated by the COVID-19 pandemic—significant gaps remain in ensuring equitable access to digital learning resources. Unlike OECD countries, where robust digital infrastructures facilitate seamless technology integration, South African institutions—especially historically disadvantaged ones—struggle with a range of issues. For instance, blended learning in rural universities still faces several challenges, including insufficient technological pedagogical expertise, inadequate infrastructure, the digital outcome divide, socioeconomic constraints, and poor network coverage (Pika, 2024). In the few institutions where I have taught, competition for technology-equipped lecture halls has posed challenges to integrating digital tools into teaching. In this context, timetable clashes often force lecturers into under-equipped classrooms. This demonstrates that overcrowding and inadequate infrastructure, including limited access to functional computer laboratories, undermine quality (Moloi & Salawu, 2022).

At my institution during the pandemic the abrupt shift to online platforms led to increased failure rates, prompting the introduction of a "carry-over" session for struggling students. Assessment methods that relied on group collaboration and presentations also struggled to adapt, raising concerns about learning effectiveness. Moreover, poor network coverage disrupts access to online resources, slows internet speeds, and limits real-time engagement, thereby constraining collaborative learning and feedback opportunities. My experience is corroborated by the observations of Sadiki et al. (2023) at another rural university, where students often face unstable connections that frequently disrupt their sessions, even when they manage to log in. In this regard, the deepening of edtech remains crucial, particularly in supporting massification and decolonization policies.

Various studies demonstrate that digital tools and artificial intelligence (AI) can facilitate personalized and adaptive learning experiences by "making it more inclusive and equitable, and by improving the cost-efficiency of the sector"

(Schleicher, 2024, p. 4). For instance, digitalization enhances performance, with VR-based learning improving pass rates by 23% and engagement by 180% compared to traditional distance learning (Grewe & Gie, 2023). Studies in various settings demonstrate how the integration of AI in classrooms can enhance teaching and learning through robotic technology and sensors (Ali et al., 2020). Technological advancements are leveraged to address the growing demand for accessible and scalable learning solutions. Similarly, AI-based assessment systems have been used to evaluate students' knowledge, skills, and traits like collaboration and motivation (Alam, 2023), reflecting a shift toward more inclusive and holistic educational practices. This resonates with the principles of decolonization that seek to move beyond rigid, Western-centric models of assessment. Furthermore, in supporting the efficiency required in massified systems and creating personalized and culturally responsive instruction, AI's assistance comes in handy with administrative tasks such as grading and lesson planning (Kabudi, 2022). Hence, despite achievement in technology integration, there is a need to invest in sustainable digital infrastructure, ensure equitable access to technology, and develop pedagogical strategies that address massification and decolonization.

Meanwhile, funding challenges remain critical, undermining the benefits of technology in managing the increased access and the sustainability thereof. Persistent economic stagnation over the last two decades continues to negatively impact funding of higher education. According to DHET (2021a, p. 85), "all PSET sectors are chronically underfunded, and funding will need to significantly improve if increased access is to be accompanied by enhanced success". South Africa's tertiary education spending is low relative to similar-income countries but high per GDP. The poor economic growth performance raises concerns about the sustainability of education spending. This directly impacts the rising enrollment numbers in higher education, as there is not a commensurate rise in spending with the increase in student enrollment. For the country to sustain its support for massification, it requires corresponding improvements in funding, as the student numbers grow.

6. Conclusion

This study has examined the interplay of massification, decolonization, and technological integration in South African higher education, noting their impact on student-centered teaching and learning. The findings highlight the critical importance of adopting learner-centered approaches to enhance student engagement and foster inclusivity, despite the significant challenges posed by growing class sizes, resource constraints, and the persistent digital divide. The identified challenges call for adequate resources, smaller class sizes, and equitable access to technology. Initiatives aimed at decolonizing the curriculum have sought to transform teaching practices by integrating Indigenous knowledge systems and promoting cultural relevance. By leveraging digital tools, educators can create dynamic learning environments that foster critical thinking and prepare students for the digital-age workforce.

Ultimately, the study suggests that effective integration of technology in education is crucial to a student-centered pedagogy in modern terms as it

significantly enhances students' learning experiences by providing access to diverse resources, promoting interactive and collaborative learning, and accommodating various learning styles. While technology integration holds immense potential to enhance pedagogy and bridge educational gaps, the digital divide, particularly for students from historically disadvantaged backgrounds needs adequate attention. These insights are crucial for driving meaningful change and fostering an inclusive, effective, and forward-thinking educational environment.

7. Recommendations and implementation strategies

Considering the demand for a decolonized curriculum that reflects the realities of the massifying educational contexts in Africa, as well as the unique challenges associated with technology integration, the following recommendations are put forward to enhance student-centered teaching and learning approaches for both lecturers and institutions as well as for policymakers.

7.1 For Lecturers

To foster more inclusive and collaborative learning environments, educators should consolidate the use of small group discussions and peer-assisted learning. Incorporating culturally relevant examples and Indigenous knowledge systems into assignments will enhance inclusivity and align with the decolonization agenda. Additionally, educators should utilize various digital tools available in different contexts to provide timely feedback. Resistance to cost-effective platforms that benefit students, such as WhatsApp, should be carefully reconsidered in the interest of student-centered learning.

To leverage technology effectively, lecturers must make continuous efforts to deepen the integration of interactive tools while ensuring that students receive adequate training on the effective use of digital resources. Blended learning should be maintained wherever possible to accommodate diverse learning needs and enhance accessibility.

In line with decolonization and digitalization goals, lecturers should adopt flexible assessment methods. Implementing formative assessment strategies, such as peer reviews, group work, and reflective journals—including e-portfolios—can promote continuous learning and self-regulation. Additionally, culturally responsive assessment practices should be employed to value diversity and foster inclusion.

7.2 For Institutions

To improve teaching and learning in higher education, institutions should invest in faculty development and support by providing regular professional development workshops on student-centered pedagogies, decolonization, and technology integration. Establishing mentorship programs where experienced educators guide newer faculty members in adopting innovative teaching practices can further enhance instructional quality. In addition, allocating resources and funding for lecturers to attend conferences and training sessions on emerging educational trends will ensure that the faculty remain informed and adaptable.

Enhancing digital infrastructure and accessibility is crucial for bridging technological gaps and promoting inclusive learning. Institutions should upgrade ICT infrastructure to provide reliable internet access and modern digital tools for both students and staff. Collaborating with telecommunications companies to offer affordable data packages can alleviate financial barriers for low-income students. Moreover, developing offline digital resources, such as downloadable lecture materials, will ensure continued access to learning content for students with limited internet connectivity.

Promoting decolonization through curriculum reform is essential for fostering inclusivity and diverse perspectives in education. Institutions should establish curriculum review committees to identify and integrate Indigenous knowledge systems and culturally relevant content. Encouraging interdisciplinary collaboration can facilitate the development of courses that address both local and global challenges. Additionally, faculty training on decolonial pedagogies and the ethical integration of Indigenous knowledge will strengthen efforts to create a more representative and equitable learning environment.

7.3 For Policymakers

To sustain quality education and support institutional improvements, policymakers must increase funding for higher education. Allocating additional government resources for expanding higher education while maintaining quality standards is essential. Public-private partnerships should be introduced to secure financial support for infrastructure development, particularly in historically disadvantaged institutions. Targeted grants should also be provided for initiatives that advance student-centered learning, decolonization, and technological innovation.

Addressing the digital divide is critical to ensuring equitable access to education. Policymakers should implement national broadband initiatives to improve internet connectivity in rural and underserved areas. For effective ICT integration, South Africa must focus on reducing data costs, improving rural connectivity, and ensuring digital skills development to fully leverage its existing infrastructure. Subsidizing the cost of digital devices for students from low-income households can further reduce technological barriers. In addition, developing digital literacy programs in secondary schools will prepare students for technology-enhanced learning in higher education, fostering greater adaptability and readiness.

Supporting decolonization efforts at the national level is vital for fostering an inclusive and representative education system. Policymakers should develop national guidelines for decolonizing curricula and promoting inclusivity in higher education. Funding research initiatives that examine the impact of decolonization on student outcomes and institutional practices will provide valuable insights for policy formulation. Encouraging collaboration between universities to share best practices and resources will further strengthen decolonial efforts across institutions.

7.4 For Further Study

Future research should incorporate empirical studies involving diverse stakeholders to broaden the understanding of the lived experiences of both students and educators navigating the intersection of massification, decolonization, and technology integration, given some of the methodological limitations of this review. Such studies should explore innovative teaching and learning strategies tailored to the diverse student population, as well as professional development programs that assist lecturers in navigating the challenges of massification and technological integration in education.

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