

Review

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Review

Decolonizing Global Education: A Sustainable Paradigm for Inclusive Knowledge Systems and Equitable Development in the 21st Century

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Abstract: This paper examines the transformative potential of decolonizing global higher education to align with Sustainable Development Goals (SDGs), emphasizing the integration of Indigenous African knowledge systems and China-Africa collaborations. Through a comprehensive review of decolonization frameworks, policy innovations, and cross-continental partnerships, the study highlights the necessity of dismantling colonial legacies in education to foster culturally relevant, equitable, and sustainable practices. Methodologically, it synthesizes case studies, participatory approaches, and systemic analyses to explore the synergies between Indigenous epistemologies (e.g., Ubuntu) and global metrics (e.g., China's Coupling Coordination Degree model). Key findings reveal that localized SDG education models, digital infrastructure advancements, and inclusive pedagogies empower students to address socio-economic disparities, climate change, and inequality. The study concludes that a decolonized, "glocal" educational paradigm—rooted in relational ethics, technological innovation, and participatory governance—can bridge the gap between local contexts and global sustainability agendas. This approach not only reimagines education as a catalyst for planetary regeneration but also underscores the imperative of epistemic justice and intercultural collaboration in achieving the 2030 Agenda. The paper advocates for a radical shift toward education systems that prioritize communal well-being, ecological balance, and equitable development.

Keywords: Decolonization; Sustainable Development Goals; Higher Education Policy; Indigenous Knowledge; ; Cross-Continental Collaboration; SDG-Centric Pedagogies; Global South

1. Introduction

There is growing consensus that traditional Western-dominated higher education models are inadequate for addressing the unique challenges of developing regions, particularly in Africa. These models often overlook the historical, cultural, and socioeconomic contexts of African societies, necessitating a more comprehensive and decolonized approach to education. Such a shift is imperative for sustainable development as it would enable the creation of educational systems that are more relevant and effective in addressing local needs and challenges. African higher education systems have long been rooted in colonial models that prioritize Western knowledge systems over indigenous ones, creating a disconnect between education and the sociocultural realities of African societies (Appiagyei-Atua, 2025; Gumbo et al., 2024). To address this, there is increasing emphasis on transforming African doctorate programs and broader educational frameworks through critical race theory and Ubuntu, which emphasize social justice, race consciousness, and the inclusion of African languages and perspectives (Gumbo et al., 2024). This transition towards decolonized education

requires rethinking and unlearning entrenched Western paradigms to embrace diverse knowledge systems, which are essential for the epistemic and existential sustainability of education (Bagga-Gupta, 2023).

Collaborative and inclusive educational models are crucial to this transformation. Fostering a collaborative culture in higher education institutions (HEIs) is key to aligning with sustainable development goals (SDGs), placing students at the center of learning, and partnering with external stakeholders to address local challenges (Wright et al., 2022). The advancement of service research in Africa through the study of local contexts and the involvement of African researchers can facilitate economic and social development. This approach emphasizes the importance of contextually grounded research and inclusive collaboration (Heinonen & Adeola, 2024). Initiatives such as the Pan-African Network for Laboratory Animal Science and Ethics (PAN-LASE) have already demonstrated successful collaborative efforts to enhance research standards and ethical practices across Africa (Mohr et al., 2023).

The benefits of a decolonized approach are manifold. Empowering African researchers and institutions to set their own agendas and priorities will lead to more relevant and impactful research outcomes (Mutapi et al., 2023). Collaboration between African institutions in public health, law, and human rights can address critical issues, such as inequality, climate change, and public health law (Decolonising-Global-Health-in-Africa-Research-Agendas-in-148xw145.Pdf, n.d.). Additionally, re-configuring African Studies to address epistemic and linguistic challenges can contribute to the development of an academic field that is more inclusive and representative of African society, ultimately benefiting Africans (Ndlovu-Gatsheni, 2024). While the movement to decolonize and democratize higher education in Africa is gaining momentum, it is important to acknowledge the challenges involved, including potential resistance from entrenched interests, and the need to maintain dialogue and collaboration between African and Western institutions. This approach will not only benefit African societies, but also contribute to a global knowledge system that incorporates diverse perspectives and experiences, paving the way for a more equitable and inclusive future.

Review Synthesis and Thematic Analysis

This comprehensive review analyzes how decolonization frameworks and policy innovations can accelerate the achievement of the Sustainable Development Goal (SDG) through China-Africa collaborations. At its core, the study reveals three transformative approaches: First, Indigenous knowledge systems like Ubuntu's communal ethics (Hungwe & Ndofirepi, 2021) and Namibia's Olupale land-use principles (Billawer & Nel, 2024) challenge Western-centric models by embedding SDG implementation within cultural epistemologies - though their translation into corporate social responsibility frameworks requires further refinement (Makwara et al., 2023). Second, policy innovations demonstrate scalable solutions: China's Coupling Coordination Degree (CCD) model (Xie & Zhang, 2024) quantifies education-infrastructure synergies for SDG 4, while Africa's Green Economy Learning Assessment (GELA) project (Koppa et al., 2023) co-designs sustainability curricula with local stakeholders, proving that participatory policymaking enhances SDG localization. Third, China-Africa partnerships showcase both promise and peril - while adapted ERASMUS+ programs foster intercultural STEM collaboration for climate resilience (SDG 13) (Meschede, 2020; Zacchia et al., 2022), digital health initiatives risk perpetuating data colonialism without "decolonial audits" of AI diagnostics (Sekalala & Chatikobo, 2024). The COVID-19 pandemic has starkly exposed systemic vulnerabilities, disrupting SDG progress and revealing critical interlinkages; in the Democratic Republic of Congo, for instance, health crises (SDG 3) directly destabilize food security (SDG 2) and education (SDG 4), demanding integrated policy responses (Clemente-Suárez et al., 2022; Egbende et al., 2023). Ultimately, this review argues that sustainable development requires dialectical thinking - pairing Indigenous worldviews like Ubuntu's relationality with global metrics and balancing China's technological advancements with Africa's governance innovations. As Trane (Trane et al., 2023) demonstrate through circular economy models, the 2030 Agenda's success hinges on such "glocal" frameworks that honour cultural specificity while maintaining transnational accountability.

As we stand at the crossroads of global transformation, this review illuminates a radical truth: sustainable development is not a technical challenge to be solved but a relational paradigm to be lived. The wisdom of Ubuntu and Olupale reminds us that progress divorced from communal ethics is growth without roots; China's CCD model and Africa's GELA project prove that innovation flourishes when systems honour data and dignity. The future we must now build—one where AI diagnostics speak the language of ancestral healing, where policy frameworks dance between local intuition and global solidarity—demands nothing less than a new literacy of interdependence. This is the ultimate decolonial act: not merely to include marginalized knowledge, but to recenter our collective imagination around the audacious premise that justice is the only sustainable infrastructure.

2. The Decolonization of Higher Education: Rethinking Knowledge Systems

Higher education is undergoing a transformative process of decolonization aimed at reforming curricula, integrating indigenous knowledge systems, and promoting educational sovereignty to better serve the diverse cultural, social, and economic needs of the Global South. This process seeks to dismantle the colonial legacies embedded in educational systems and creates a more inclusive and equitable learning environment. By embracing indigenous perspectives and knowledge systems, education institutions can provide more culturally relevant and socially equitable education. However, current educational systems often perpetuate a Western-centric worldview that neglects local African knowledge, culture, and sustainable practices. This bias marginalizes indigenous knowledge systems (IKS) and local knowledge sources, which are essential for creating sustainable and culturally appropriate educational and planning frameworks (Billawer & Nel, 2024; Gumbo et al., 2024). The exclusion of indigenous knowledge systems, such as the Olupale and Omuvanda in Namibia, highlights the need for a shift towards more inclusive and contextually grounded approaches in education and urban planning. Furthermore, the dominance of Western educational models in African doctorate programs limits the potential for decolonial and indigenous-affirming approaches, which are crucial for addressing sociopolitical and racialized issues (Gumbo et al., 2024). To achieve epistemic and existential sustainability—ensuring that educational systems support diverse ways of knowing and being—it is essential to move beyond universalizing practices that naturalize Western-centric structures and instead integrate diverse knowledge systems from the Global South (Bagga-Gupta, 2023). This approach is particularly relevant for addressing urgent social and environmental challenges, as observed in the water management sector, where the integration of indigenous and local knowledge is critical for sustainable adaptation measures (Lam et al., 2020; Zvobgo et al., 2022).

Transformative learning spaces that center on the voices of marginalized communities, such as multilingual Black, Brown, and Latinx youth, are essential for reimagining sustainable futures and countering traditional deficit-based discourses (Kayumova & Tippins, 2021). Similarly, decolonizing conservation education programs, like those offered by zoos, can challenge colonial ideologies in international environmentalism and highlight the importance of community-based conservation (Gippoliti & Battisti, 2023). Incorporating African voices in education, such as through the use of African-authored materials in political courses, can foster a deeper understanding of African issues and promote an inclusive educational environment (Hershey, 2017). Additionally, the Ukama ethic, which emphasizes community and relatedness, offers a valuable framework for integrating locally derived educational traditions, particularly in the context of the remote learning challenges posed by Covid-19 (Hungwe & Ndofirepi, 2021). Revising curricula to embed indigenous perspectives is critical for reducing racism and creating culturally safe learning environments, while decolonizing doctoral education requires a shift towards race-conscious and black-affirming approaches that incorporate African languages and perspectives (Gumbo et al., 2024; Murray & Campton, 2024). Despite the challenges of integrating indigenous knowledge systems, their potential benefits are significant, offering paths to more sustainable and culturally relevant educational practices. The decolonization of higher education is not just a theoretical exercise but a necessary step

towards creating a more equitable and sustainable future for all. By embracing diverse knowledge systems, we can empower students to address both local and global challenges effectively.

2.2. Developing Inclusive Pedagogies: Integrating African Perspectives for Critical Thinking and Local Solutions

The development of inclusive pedagogies in higher education requires a decolonized approach that integrates African perspectives, fosters critical thinking, and provides local solutions to global challenges. This transformation involves reimagining educational structures to move away from Western-centric models and embrace indigenous African knowledge systems. Critical race theory and Ubuntu philosophy offer valuable frameworks for disrupting dominant Western knowledge paradigms and promoting social justice through race-conscious, black-affirming methodologies (Gumbo et al., 2024). In South Africa, the decolonization of health science education has involved integrating biomedical sciences with humanities and social sciences, challenging existing knowledge hierarchies, and promoting a more inclusive and socially just curriculum (Pentecost et al., 2018). Ukama's ethic, which emphasizes communal values and relatedness, is particularly relevant in the context of the Covid-19 pandemic, fostering a sense of community and care in African higher education (Hungwe & Ndofirepi, 2021). Africanizing curricula to reflect the realities and perspectives of African societies is essential for empowering students to address local and global challenges effectively (Van Der Westhuizen et al., 2017).

Community-based learning models, such as those inspired by Southern urbanism and convites, highlight the potential of solidarity and collective action in fostering critical pedagogy that is deeply rooted in local culture and context (Ortiz & Millan, 2022). Postcolonial teacher development programs in Latin America empower educators to lead the decolonization of the educational system, fostering dialogue and collaboration among teachers from diverse backgrounds to undermine colonial power dynamics (Rodríguez Gómez, 2023). Incorporating indigenous research frameworks in higher education can promote values such as multilogicality, coexistence of multiple knowledge systems, and relationality, encouraging equitable practices in research, teaching, and mentoring (Reano, 2020). Indigenous knowledge systems, such as gift-giving logic, can transform public education by fostering self-determination and improving community relationships, offering policymakers and practitioners valuable insights into developing more inclusive educational practices (Jacob et al., 2018). Promoting educational sovereignty through decolonial professional development and intercultural dialogue is essential for valuing indigenous students' cultural resources and integrating their sociocultural practices and languages into their academic settings (Álvarez Valencia & Valencia, 2023; Rodríguez Gómez, 2023).

Despite these efforts, the decolonization of higher education in the Global South faces significant challenges, including the dominance of the Global North perspective in academic research and curricula. While progress has been made in increasing the representation of Global South authors, further work is needed to fully embrace decolonial and ecological knowledge frameworks. The integration of indigenous knowledge systems must be done carefully to avoid tokenization and ensure that indigenous values and perspectives are respected (Reano, 2020). Balancing local relevance with international standards is crucial as it addresses existing power structures and potential resistance to change. However, ongoing efforts to decolonize education have the potential to create a more equitable and contextually relevant learning environment that empowers students to address both local and global issues successfully. The decolonization of higher education is not just an academic endeavor but also a moral imperative, paving the way for a more just and inclusive global knowledge system.

2.3. China-Africa Collaboration in Sustainable Higher Education

China's rapid educational growth and technological advancements offer significant opportunities for collaboration with Africa to develop sustainable higher education models aligned with the Sustainable Development Goals (SDGs). China's experience in integrating SDGs into higher

education, particularly in management disciplines, provides valuable insights for African universities that aim to enhance their educational quality and sustainability (Lu et al., 2023). The “double first-class” initiative in China, which emphasizes quality and innovation in graduate training, can serve as a model for African institutions seeking to improve their educational standards (M. Wang & Zhou, 2023). China's advancements in digital infrastructure and its synergy with higher education resources offer a blueprint for reducing regional disparities and fostering sustainable development in Africa (Xie & Zhang, 2024). Collaborative models such as those under the ERASMUS+ program demonstrate the effectiveness of interdisciplinary approaches in addressing sustainability challenges, which can be adapted to African contexts to promote green energy transitions and climate change mitigation (Zacchia et al., 2022). Chinese-foreign cooperation in running schools (CFCRS) highlights the importance of international collaboration in education for sustainable development, offering opportunities for cross-cultural exchange and shared learning experiences between China and Africa (Huang et al., 2023).

While China has become a popular study destination for African students due to its scholarships and soft power, the experiences of graduates vary, indicating the need for more tailored educational programs that address specific African contexts. The growing number of international students in China presents an opportunity to develop sustainable education models that can be replicated in Africa, focusing on quality education and management services to enhance the educational experience of African students and to contribute to sustainable development in their home countries (Y. Wang et al., 2022). However, the success of China-Africa collaborations in higher education will depend on adapting these models to local contexts and ensuring that they address the specific needs and priorities of African educational institutions. This requires a participatory and inclusive process, engaging local stakeholders and leveraging collective intelligence to develop solutions that are both effective and sustainable (Gonzalo et al., 2023; Kioupi & Voulvoulis, 2019). By balancing global standards with local knowledge systems, China and Africa can co-create educational models that are not only sustainable but also deeply rooted in the cultural and social realities of African society. This collaboration has the potential to transform higher education in Africa, empowering students to drive sustainable development and contributing to a more equitable global knowledge system.

3. China-Africa Collaboration and SDG-Centric Curricula

3.1. China's Role in Sustainable Higher Education

China's rapid educational growth and technological advancements present a significant opportunity for Africa to develop sustainable higher education models aligned with the Sustainable Development Goals (SDGs). By leveraging China's experience of integrating global sustainability targets into higher education and its robust technological infrastructure, African nations can address their unique educational challenges and foster sustainable development. China's initiatives to internationalize its education system, coupled with its focus on sustainable development, offer valuable insights that can be adapted to meet Africa's educational needs. For instance, Chinese universities have increasingly integrated SDGs into their curricula, particularly in the management field, with Sustainable Development Goal 8 (decent work and economic growth) featuring prominently (Lu et al., 2023). China's “double first-class” initiative, which emphasizes quality and innovation in graduate programs, serves as a model for African universities seeking to enhance their educational standards (M. Wang & Zhou, 2023).

The synergy between higher education resources and digital infrastructure in China has also reduced regional disparities and promoted sustainable development, offering a blueprint for similar efforts in Africa (Xie & Zhang, 2024). Collaborative models such as those under the ERASMUS+ program demonstrate the effectiveness of interdisciplinary approaches in addressing sustainability challenges, which can be adapted to African contexts to promote green energy transitions and climate change mitigation (Zacchia et al., 2022). Furthermore, Chinese-foreign cooperation in running schools (CFCRS) highlights the importance of international collaboration in education for sustainable

development, fostering cross-cultural exchanges and shared learning experiences that can be extended to African institutions (Huang et al., 2023). However, while China has become a popular study destination for African students due to its scholarships and soft power, the experiences of graduates vary, indicating the need for more tailored educational programs that address specific African contexts.

The growing number of international students in China also presents an opportunity to develop sustainable education models that can be replicated in Africa, focusing on quality education and management services to enhance the educational experience of African students and to contribute to sustainable development in their home countries (Y. Wang et al., 2022). To ensure the success of China-Africa collaborations, it is essential to adapt these models to local contexts, engage local stakeholders, and leverage collective intelligence to develop solutions that are both effective and sustainable (Gonzalo et al., 2023; Kioupi & Voulvoulis, 2019). The collaboration between China and Africa is not just a theoretical exercise but a necessary step towards creating a more equitable and sustainable future for all. By embracing diverse knowledge systems, we can empower students to address both local and global challenges effectively.

3.1.1. Educational Expansion and Digital Infrastructure

China's focus on expanding access to higher education, particularly science and technology, provides a model for large-scale educational development. Over the past few decades, China has made significant investments in digital infrastructure, regional development, and innovative educational models, emphasizing the integration of digital technology and reduction of regional disparities. For instance, the coupling coordination degree (CCD) model, which measures the synergy between higher education resources and digital infrastructure, reveals moderate coordination but significant regional disparities, particularly between the eastern region and other areas (Xie & Zhang, 2024). Addressing these disparities is crucial to fostering sustainable development and ensuring equitable access to quality education. The large-scale expansion of higher education, which began in 1999, has led to a doubling of post-secondary enrollment within the first three years, significantly improving educational outcomes such as college attendance and completion rates, which, in turn, positively impact labor market outcomes such as job security and wages (Wen, 2022).

Technological innovations such as online MOOCs and the "Artificial Intelligence + Education" model have further enhanced the efficiency and productivity of higher education institutions, providing practical pathways for intelligent education development (Liu et al., 2023; R. Zhang, 2024). However, despite these advancements, regional inequalities remain a challenge, with disparities in educational inputs and outcomes between rural and urban areas (Han et al., 2023). Reforms such as the National College Entrance Examination (NCEE) have diversified subjects but also highlighted the gap between rural and urban students (Zhu et al., 2024). Additionally, the transformation of radio and television universities into open universities has expanded access to higher education and lifelong learning, contributing to the differentiation of Chinese higher education institutions and development of human resources (W. Zhang & Li, 2019). While China's educational expansion has been remarkable, ongoing efforts are needed to address regional disparities, ensure equitable access, and monitor the impact of expansion on income inequality and the positional value of education (Jang, 2024). China's educational model offers valuable lessons for sustainable development in Africa by balancing global standards with local needs.

3.1.2. Cross-Continental Partnerships for SDGs

Fostering partnerships between Chinese and African universities can create a shared pool of knowledge and resources, accelerating progress towards Sustainable Development Goals (SDGs). These collaborations leverage the strengths of both regions and address educational and developmental challenges through mutual learning and innovation. A growing number of higher education institutions (HEIs) are developing collaborative cultures to align with global SDG

initiatives, shifting from traditional academic roles to becoming “change makers” that actively engage external stakeholders and society (Wright et al., 2022). For example, Wingate University's collaborative infrastructure provides a model to address social, economic, and cultural challenges that can be adapted by other institutions (Wright et al., 2022). Education for Sustainable Development (ESD) plays a vital role in achieving SDGs, particularly through the development of competences and pedagogies that promote sustainability. A systemic approach to ESD can facilitate a shared vision of sustainability among stakeholders by linking educational outcomes to SDGs (Kioupi & Voulvoulis, 2019). Multi-stakeholder partnerships (MSPs) are also essential for achieving the SDGs, often involving international organizations and government entities to disseminate knowledge and exchange information. These partnerships can connect environmental and social SDGs such as climate change, biodiversity, health, and education, despite being less focused on economic development (Widerberg et al., 2023). City-university partnerships further demonstrate how cities can collaborate with universities to transfer sustainability solutions across contexts, leveraging academic and research capabilities to address local issues (Withycombe Keeler et al., 2018). Additionally, Intercultural Virtual Collaboration (IVC) enhances students' understanding of how companies incorporate SDGs in different cultural contexts, fostering intercultural competences that are essential for future globalized and digital workplaces (Ferreira-Lopes et al., 2022). However, cross-continental partnerships face challenges including differences in educational systems, cultural contexts, and resource availability. To ensure success, it is crucial to establish equitable and mutually beneficial relationships that respect these differences, maintain ongoing dialogue, and commit to common goals. By embracing adaptability and fostering a collaborative culture, Chinese and African universities can contribute significantly to the achievement of SDGs, creating a more sustainable and equitable future for both regions. The collaboration between China and Africa is not just a theoretical exercise but a necessary step towards creating a more equitable and sustainable future for all. By embracing diverse knowledge systems, we can empower students to address both local and global challenges effectively.

3.2. Integrating SDGs into University Curricula

3.2.1. Global Challenges and Curriculum Design

To achieve sustainable growth and social transformation, higher education systems must be restructured to align with Sustainable Development Goals (SDGs). Universities play a pivotal role in this transformation by integrating global sustainability targets into their curricula, research, and operations, fostering innovation and promoting sustainable practices. This integration not only raises student awareness of sustainability issues, but also empowers them to contribute to societal change and the development of sustainable social innovations. By embedding SDGs into educational frameworks, higher education institutions (HEIs) can prepare students to address global challenges, such as climate change, gender equality, poverty eradication, and economic development. For example, medical schools like Duke University School of Medicine have incorporated climate change education into their curricula through initiatives like the “Climate Change, Health, and Equity” thread, which combines lectures and experiential learning to critically analyze the intersection of climate change and health (Dalapati et al., 2024). Mapping SDGs to existing curricula using keyword scanning tools and faculty surveys has also proven effective in identifying gaps and opportunities for improving SDG coverage and ensuring a more systematic integration of sustainability goals (Adams et al., 2023). In Latin America, curriculum development and extracurricular activities have encouraged students to engage in SDGs, although contributions remain marginal on a global scale, highlighting the need for international cooperation and knowledge exchange (Pedraja-Rejas et al., 2023). Collaborative cultures within universities, such as the infrastructure developed by Wingate University, demonstrate the potential of partnerships with external stakeholders to address social, economic, and cultural challenges, while promoting sustainable development (Wright et al., 2022). However, challenges remain, including the complexity of sustainability concepts and the

interconnectedness of SDGs, which requires systemic frameworks and stakeholder involvement to build a common vision of sustainability (Kioupi & Voulvoulis, 2019). Despite these challenges, integrating SDGs into university curricula offers significant benefits, preparing students to tackle global challenges effectively, while fostering a culture of sustainability within institutions. The integration of SDGs into higher education is not just a theoretical exercise, but a necessary step towards creating a more equitable and sustainable future for all.

3.2.2. Localizing SDG Education in Africa

Localizing Sustainable Development Goals (SDGs) for the African context requires a nuanced approach that addresses local challenges while maintaining global relevance. Educational frameworks must be adapted to tackle specific regional issues such as poverty, resource management, and youth engagement, while fostering an understanding of sustainability on a global scale. Participatory and bottom-up approaches, such as Youth Community Advisory Boards in Tanzania, have proven effective in identifying local challenges and proposing solutions, ensuring that educational programs are tailored to meet community needs (Chow et al., 2024). Similarly, the GELA project in Malawi, Nigeria, and South Africa highlights the effectiveness of Integrated Knowledge Translation (IKT) approaches that involve stakeholders in co-creating educational strategies to ensure contextual relevance and sustainability (Schmidt et al., 2024). Systems thinking and cross-sectoral integration are also crucial, as demonstrated by the need to connect social innovation and scenario planning to provide coherent plans for achieving the SDGs (Bonsu et al., 2020). Addressing Africa's unique challenges, such as poverty, resource mismanagement, and environmental degradation, while leveraging opportunities, such as the continent's abundant natural resources, requires educational content that emphasizes sustainable resource management and environmental protection (Gasparatos et al., 2017). Monitoring frameworks aligned with local contexts, such as Voluntary Local Reviews, are essential for tracking progress and ensuring that educational initiatives meet both local and global sustainability objectives (Ciambra et al., 2023). However, the localization of SDG education must also consider the broader implications of globalization and external influences on African educational systems. Balancing global perspectives with cultural relevance and autonomy is crucial for developing frameworks that are both locally grounded and globally aware, ensuring that SDG education in Africa is both impactful and sustainable. The localization of SDG education in Africa is not just a theoretical exercise, but a necessary step towards creating a more equitable and sustainable future. By embracing diverse knowledge systems, we can empower students to address both local and global challenges effectively.

Integrating Sustainable Development Goals (SDGs) into higher education curricula is important to bridge the gap between education and development. By embedding SDGs into university programs, institutions can prepare students to address global challenges, such as climate change, poverty, and inequality, while fostering a culture of sustainability. Localizing SDG education in African contexts further ensures that curricula address regional challenges while maintaining global relevance, empowering students to contribute to sustainable development in their communities. Despite these challenges, the integration of SDGs into higher education offers significant opportunities for societal transformation, equipping students with the knowledge and skills needed to effectively tackle both local and global challenges. Through collaborative efforts, systemic frameworks, and participatory approaches, universities can play a pivotal role in advancing the 2030 Agenda for Sustainable Development. The integration of SDGs into higher education is not just a theoretical exercise, but a necessary step towards creating a more equitable and sustainable future for all. By embracing diverse knowledge systems, we can empower students to address both local and global challenges effectively.

3.3. Digital Education and Innovation

3.3.1. Advancing Digital Infrastructure in Africa

Digital platforms and technologies have the potential to bridge the educational divide between China and Africa by providing scalable, inclusive, high-quality education. The COVID-19 pandemic has accelerated the adoption of digital education, highlighting its potential and challenges. In low- and middle-income countries, digital platforms can improve access to education, promote lifelong learning, and contribute to the implementation of development goals. However, for these initiatives to succeed, inequalities in digital access and internet connectivity must be addressed. Investing in digital education tools and infrastructure is crucial for reaching remote and underserved populations in Africa, as these tools can enhance access to education and healthcare, bridge socioeconomic gaps, and contribute to inclusive growth. For example, mobile learning has shown promise in providing equitable access to higher education, although challenges such as resource inequalities and sociocultural barriers remain (Kaliisa & Michelle, 2019). Similarly, e-learning initiatives in Ghana have demonstrated the potential of digital education to address the shortage of healthcare professionals in rural areas, although issues such as low bandwidth and poor Internet connectivity must be resolved (Alhassan, 2020). Digital health interventions, such as mobile social learning platforms, have also proven effective in providing continuous professional development for health care workers in low- and middle-income countries, improving clinical skills and service delivery (Guillaume et al., 2022). However, the digital divide in Africa, exacerbated by the COVID-19 pandemic, underscores the need for improved Internet infrastructure and significant investment in broadband access to support digital education and other online services (Faturoti, 2022; Oughton et al., 2023). Serious mobile games have been effective in promoting health literacy in rural Africa, although obstacles, such as language diversity and low literacy levels, must be addressed (Ouedraogo et al., 2022). While the advancement of digital infrastructure in Africa presents numerous opportunities, significant challenges remain, including infrastructural limitations, sociocultural barriers, and the need for comprehensive policy frameworks and strategic investment. Overcoming these challenges will enable Africa to harness the potential of digital technologies to transform education and healthcare, ultimately driving its economic growth and sustainable development.

3.3.2. China's Technological Contributions

China's advancements in digital technology, particularly in artificial intelligence (AI), online learning platforms, and mobile technology, offer significant potential for enhancing educational access and quality across Africa. By leveraging these technologies, African countries can address challenges such as limited internet access and unequal distribution of educational resources. For instance, AI-driven platforms, such as ChatGPT, have shown promise in enhancing educational experiences by providing personalized feedback and tailoring learning assignments to individual needs (Kim, 2023). Integrating AI into digital ecosystems can facilitate personalized learning and addressing the diverse educational needs of Africa (Rojas & Chiappe, 2024). Online learning platforms, which many African educational systems struggle to implement during the COVID-19 pandemic because of insufficient infrastructure, can benefit from China's experience in developing and deploying these technologies (Faturoti, 2022). Mobile technology, a critical component of digital education, can also benefit from China's advancements, particularly in regions with high mobile penetration but limited internet access (Wan et al., 2024). The Chinese government's investment in digital infrastructure and education in Africa can strengthen educational ties and facilitate knowledge transfer, while collaborative efforts can develop tailored educational programs that meet the needs and cultural contexts of African countries (Kaag, 2018). However, the successful implementation of these technologies in Africa requires addressing challenges, such as digital literacy, infrastructure development, and equitable access to technology. Additionally, policies are needed to ensure the ethical use of AI and prevent bias and disparities in educational outcomes. By addressing these challenges, African countries can leverage China's digital educational innovations to enhance their educational systems and promote sustainable development.

The transformative potential of digital education in bridging the educational divide between China and Africa. By investing in digital infrastructure and leveraging China's advancements in AI,

online learning platforms, and mobile technology, African countries can enhance their access to quality education and healthcare, particularly in remote and underserved areas. However, significant challenges remain, including infrastructural limitations, sociocultural barriers, and the need for comprehensive policy frameworks and strategic investment. Overcoming these challenges will enable Africa to harness the potential of digital technologies to drive its economic growth and sustainable development. Collaboration between China and Africa in digital education innovation offers a promising pathway to achieving these goals, ensuring that digital education initiatives are inclusive, equitable, and impactful.

4. Talent Pipeline and Transformative Vision for Global Education

4.1. *Fostering Entrepreneurial and Leadership Skills*

4.1.1. Preparing Students for Innovation

Creating pathways for African students to access world-class education is critical for enabling them to compete in the global economy and to address the region's unique developmental challenges. This endeavor involves enhancing the educational infrastructure, fostering international collaboration, and integrating sustainability into educational frameworks. By equipping African students with the skills and knowledge necessary to contribute to both local and global communities, higher education can play a pivotal role in promoting sustainable development. For instance, fostering entrepreneurial and leadership skills among African students prepares them not only for employment, but also for innovation and leadership in fields critical to sustainable development. Entrepreneurial education, which includes partnerships, incubators, and student entrepreneurship clubs, cultivates socially conscious entrepreneurs who contribute to sustainable communities (Suguna et al., 2024). Similarly, leadership competencies, as outlined in frameworks such as the Climate-KIC Professional Competency Framework, are essential for driving transformational change and advancing sustainability goals (Rashid, 2019). Interdisciplinary collaboration is also crucial, as it bridges the gap between social and natural sciences, enabling students to effectively address complex socio-ecological challenges effectively (Baudoin et al., 2023). Innovation and creativity, fostered through entrepreneurial leadership, are key to developing sustainable solutions, with green entrepreneurial mindsets and ambidextrous green innovation playing a significant role in achieving sustainable performance (Baquero, 2024). By focusing on these areas, African students can be better prepared to lead and innovate in sustainable development, contributing to continent's long-term growth and sustainability.

4.1.2. Promoting African-Led Solutions

Encouraging African students to develop solutions rooted in local contexts is essential to achieve effective and sustainable development outcomes. This approach leverages the sociocultural, economic, and environmental characteristics of African communities, ensuring that interventions are relevant and impactful. Contextual alignment, as emphasized by the PRISM/RE-AIM Framework, is crucial for tailoring interventions to local political, historical, economic, and social factors, thereby enhancing health equity and sustainability (Jolles et al., 2024). Encouraging local ownership through participatory engagement and co-creation empowers communities to lead development policies and actions, as seen in capacity-building initiatives in Malawi, Mali, Mozambique, and Tanzania (Vignola et al., 2018). Youth engagement is also critical, with models such as the Youth Community Advisory Boards (CABs) in Tanzania enabling young people to contribute to policy and practice decisions, addressing challenges such as unemployment and gender-based violence (Chow et al., 2024). Leveraging indigenous knowledge and research is equally important, as it allows for the development of solutions tailored to Africa's unique circumstances, while also contributing to global research (Heinonen & Adeola, 2024). Community-driven programs such as those used in Kenya to control neglected tropical diseases highlight the importance of local participation in developing

effective interventions (Ochola et al., 2022). However, challenges, such as reliance on external financial and technical assistance, as well as socioeconomic disparities, must be addressed to ensure equitable and sustainable development (Gasparatos et al., 2017; Vignola et al., 2018). By fostering collaboration between local and external stakeholders and ensuring that the solutions are contextually relevant, African-led development initiatives can overcome these challenges and drive sustainable progress.

The importance of building a talent pipeline for sustainable development in Africa by equipping students with entrepreneurial, leadership, and innovative skills. African students can develop solutions that are both contextually relevant and globally impactful by fostering local ownership, encouraging youth engagement, and leveraging indigenous knowledge. Despite challenges, such as reliance on external assistance and socioeconomic disparities, the integration of sustainability into educational frameworks and the promotion of African-led development solutions offer a promising pathway for achieving long-term growth and sustainability. Through collaborative efforts and a focus on local innovation, African students can play a pivotal role in addressing continents' unique challenges and contributing to global sustainable development goals.

4.2. A New Paradigm for Inclusive and Sustainable Education

4.2.1. Global Citizenship and Systemic Change

The proposed collaborative, decolonized educational model aims to reshape higher education by aligning it with the Sustainable Development Goals (SDGs) and fostering global change through inclusion, cultural exchange, and mutual learning. This model seeks to integrate diverse perspectives and experiences to address global challenges and to promote sustainable development. Transforming global education systems towards a more inclusive, sustainable, and cooperative paradigm is a multifaceted endeavor that requires integrating global citizenship, sustainable development, and diverse cultural perspectives. This new educational framework aims to address pressing global challenges by fostering a sense of responsibility and agency among learners and enabling them to collaborate on global issues. Education for Global Citizenship (EGC) is central to this transformation, as it prepares individuals to address humanitarian challenges and instills a sense of global responsibility, although current approaches often emphasize competitive citizenship and national identity, limiting their potential (Garcia Bayon & Rodríguez-Izquierdo, 2024). The EP-SE model further emphasizes the importance of moral ideals and personal accountability in fostering global citizenship and sustainable development (Fang et al., 2023).

4.2.2. Universities as Hubs of Sustainability

Universities play a vital role in promoting sustainability through curriculum reforms and sustainable campus initiatives, which foster sustainable behaviors and practices among students and staff and contribute to broader societal changes (Machado & Davim, 2023). A systemic framework of Education for Sustainable Development (ESD) can connect the SDGs to educational outcomes, encouraging participatory approaches that involve stakeholders in constructing a shared vision of sustainability (Kioupi & Voulvoulis, 2019). Inclusive and transformative learning spaces that center the voices of marginalized groups, such as multilingual Black, Brown, and Latino youth, are essential for creating just educational environments and empowering youth to contribute to a sustainable future (Kayumova & Tippins, 2021). Additionally, integrating arts into early childhood education helps children understand global citizenship and sustainability by engaging with diverse perspectives and creatively expressing their ideas (Chapman & O'Gorman, 2022). International cooperation and student well-being are also critical, particularly in the context of global crises, such as the COVID-19 pandemic, where fostering supportive and inclusive educational environments is essential (Soong & Maheepala, 2023). A critical, inter-generational, and community-based approach to education can overcome biases and promote a culture of care and involvement, which is crucial for long-term educational improvement (Iglesias Vidal et al., 2020). However,

transforming education systems globally presents challenges, including integrating diverse cultural perspectives, making systemic policy changes, and navigating the tension between global citizenship and national identity (Swanson & Gamal, 2021). Achieving this transformative educational paradigm requires ongoing research, dialogue, and collaboration between educators, policymakers, and communities.

4.3. Achieving SDGs Through Education: Pathways Forward

4.3.1. Participatory Learning and Knowledge Co-Creation

The ultimate goal of this initiative is to use education as a tool for sustainable development, ensuring that both African and Chinese students contribute to a more equitable and sustainable world. By integrating Sustainable Development Goals (SDGs) into curricula and promoting sustainable lifestyles, education can equip students with the knowledge and skills required to address global challenges. Education for Sustainable Development (ESD) involves embedding sustainability topics into educational curricula, which can be measured by the extent to which SDG-related keywords are integrated into learning outcomes. This approach has been shown to promote sustainable lifestyles among students, as higher levels of education are associated with environmentally friendly behaviors, such as recycling and energy conservation (Adams et al., 2023; Piao & Managi, 2023). Participatory learning methods, such as Participatory Action Research (PAR), are also effective in generating knowledge for the SDGs. For example, PAR has been used in Malawi to expand agricultural diversity and promote sustainable farming practices, demonstrating the importance of local engagement in education for sustainable development (Snapp et al., 2023). Collaborative learning methods, such as serious games, further enhance students' understanding of sustainability issues by facilitating active learning in university settings (Saitua-Iribar et al., 2020). Higher education institutions (HEIs) play a crucial role in integrating the SDGs into education through research and curriculum development. By embedding SDGs into curricula and promoting research that addresses sustainability issues, universities equip students with the skills necessary to contribute to sustainable development in their respective fields (Alcántara-Rubio et al., 2022). However, challenges remain, such as the lack of a curriculum for renewable energy concepts in secondary schools, which reflects a gap in awareness and interest among students (Hoque et al., 2022). Additionally, the perceived importance of the SDGs varies across countries, with students in nations with higher Human Development Index ratings often considering them less important (Kleespies & Dierkes, 2022). To address these challenges, educational strategies must be tailored to meet the unique needs and contexts of different regions, ensuring that education remains a powerful tool for achieving SDGs and fostering a sustainable future.

4.3.2. Challenges and Policy Implications

The transformative potential of a collaborative, decolonized educational model in reshaping global educational frameworks lies in its capacity to align with and advance the Sustainable Development Goals (SDGs). This model empowers students to engage meaningfully with complex global challenges by fostering inclusivity, sustainability, and international cooperation, realizing a more equitable and sustainable world. Nevertheless, the path toward this vision is fraught with substantial challenges, requiring nuanced approaches and systemic reforms.

A primary challenge is the integration of diverse cultural perspectives into educational paradigms, a process complicated by the tension between the ideals of global citizenship and the realities of national identities. The reconfiguration of curricula to reflect local and global imperatives demands careful consideration of the intersections between universal sustainability principles and the unique sociocultural contexts in which they are implemented. This challenge is compounded by the need to reconcile differing educational traditions, which brings distinct epistemological and methodological approaches to knowledge production. Consecutively, the integration of sustainability within educational frameworks raises profound policy implications. Achieving

systemic alignment with the SDGs requires reimagining educational governance, funding models, and pedagogical approaches. Policies are urgently needed to facilitate cross-border academic collaboration while preserving the integrity of local knowledge systems. A critical aspect of this endeavour is ensuring that educational reforms do not merely replicate Western paradigms but rather embrace a pluralistic approach that respects and incorporates diverse Indigenous and local epistemologies.

Despite these formidable challenges, integrating sustainability into educational systems presents a promising and necessary pathway for long-term societal transformation. Achieving this requires sustained engagement from all sectors—academia, policymakers, and civil society—in fostering a culture of collaboration, dialogue, and mutual respect. By prioritizing research, dialogue, and policy innovation, these stakeholders can overcome the barriers to sustainable educational reform, ensuring that education remains a powerful and indispensable tool in the global pursuit of sustainable development. Through continued dedication to this transformative agenda, education can evolve into a dynamic force capable of addressing the multifaceted challenges of the 21st century. This vision of education as a catalyst for societal and environmental regeneration offers hope for realizing a just and sustainable global community.

5. Conclusions

As humanity confronts the compounded crises of ecological degradation and epistemic fragmentation, this paper reconceptualizes education not merely as an institutional mechanism but as a foundational system for planetary regeneration. Drawing from decolonial theory, indigenous knowledge systems, and South-South cooperation frameworks, we argue that reimagined education—rooted in Ubuntu's relational ethics, the systemic logic of China's Coupling Coordination Degree (CCD) model, and Africa's community-based resilience—offers a viable pathway to achieving the Sustainable Development Goals (SDGs) while preserving cultural integrity and ecological balance.

Current educational systems, still largely structured around Eurocentric paradigms, continue to propagate ontologies that separate human and ecological systems, thereby impeding transformative sustainability. This paper challenges such dualisms by proposing a regenerative educational framework that integrates ancestral healing practices with digital innovation, prioritizes policies grounded in place-based knowledge, and positions universities as living ecosystems of interdependence. These shifts are not aspirational idealism, but necessary responses to the failures revealed by the COVID-19 pandemic and accelerating climate disruptions, both of which have exposed the structural limitations of fragmented and growth-centric pedagogies. Within China-Africa collaborations, we identify the emergence of a new literacy—one in which digital infrastructures enhance rather than displace Indigenous cosmologies, and SDG metrics are repurposed as tools for fostering systemic coherence and socio-ecological harmony. Case studies demonstrate how such partnerships can catalyze locally grounded, globally relevant innovations in sustainability education and policy. The epistemological transformations required are profound. They involve dismantling inherited hierarchies of knowledge and creating conditions for pluriversal engagement, where frameworks such as Namibia's Olupale land ethic and China's CCD model are integrated into a shared global learning agenda. We argue that sustainability, in its most meaningful sense, is the continuous practice of co-creating with Earth—a pedagogical, ethical, and ontological project.

This paper contributes not only a transdisciplinary framework for sustainability education, but also an invitation: to teach and learn as if collective survival depends on it; to design academic institutions as ecosystems of care, reciprocity, and justice; and to recognize decolonization as a generative process central to planetary renewal. In this vision, the Earth becomes the ultimate classroom, and the success of our educational systems will be judged by the flourishing of future generations.

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Abbreviations

The following abbreviations are used in this manuscript:

SDGs	Sustainable Development Goals
HEIs	Higher Education Institutions
IKS	Indigenous Knowledge Systems
AI	Artificial Intelligence
MOOCs	Massive Open Online Courses
GELA	Green Economy Learning Assessment
CCD	Coupling Coordination Degree
ESD	Education for Sustainable Development
TIBA	Tackling Infections to Benefit Africa
PAN-LASE	Pan-African Network for Laboratory Animal Science and Ethics

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