Positioning Decolonial Education in the 4th Industrial Revolution: Conceptualizing an Afrocentric Metaverse Design.

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ABSTRACT

The call for decolonial education in the global south is a necessary and immediate task for education scholars in Post-colonial countries. One such example is the #FeesMustFall movement in South African Universities, where students expressed that only the complete overhaul of the curriculum, based on a decolonising education approach, would provide them the type of educational access that addresses their emerging African-centred humanness. The most recent call advocates for the use of technology in education to ensure that the global south is a competent and active participant in the 4th Industrial revolution. Although both calls in education are necessary, the latter should not occur at the expense of the former. Education in the global south can innovate and participate in the 4th Industrial revolution while still committing to its historic and generational mandate of decolonial education. Achieving this would require merging 4th IR innovations such as Metaverse education with decolonial principles such as Afrocentric education. This merger is important to prevent what Lamola (2021) and Benyera (2021) call the epistemic recolonization of Africa by allowing it ontological freedom to imagine education in the 4th industrial revolution.

The objective of this conceptual desktop study is to position decolonial education in the 4th industrial revolution by using Afrocentrism in the design of metaverse in education. The study uses an Afrocentric conceptual framework to conceptualize the design principles of metaverse educational activities. Reviere's (2001) Afrocentric canons are used to analyze the data as well as suggest Afrocentric design principles for metaverse in education. Finally, the study suggests that education in the global south should use 4th IR innovations to design educational activities and content that aligns with the decolonial agenda.

Keywords: *Afrocentric analysis, decolonial education, metaverse*

1. Introduction

The call to decolonise education is an international phenomenon that many previously colonised countries have embarked on. Some examples include a study conducted by Elder (1971) that investigates the relationship between the Indian curriculum and the western influence in its post-colonial textbook content. Similarly in Hong Kong, as part of the decolonization and renationalization process, a new secondary school curriculum was introduced in 2012. This new curriculum introduced biliteracy and trilingualism as the language policy objective in the education domain (Li, 2018). Locally, the call for decolonisation was popularised by the student movement #FEESMUSTFALL where university students demanded a decolonised curriculum in South African institutions of higher learning. Throughout the inception of the term however, there has been much contention on its purpose and scope of operation. Although different countries have varying experiences with post- colonial resurrection, what is common about their decolonial agenda in education is centring Africa-centric epistemology at the heart of this educational reframing (Fataar, 2018).

The phenomenon has generated an upward trajectory during the past five decades in the scholarship of teaching and learning. Recently, technological advancements in manufacturing, education, economics and communication have shifted society in the direction of what it terms as the 4th industrial revolution (Moll, 2021). Furthermore, Moll (2021) notes that first world former colonising countries are at the forefront of the previous three notably industrial revolutions as a result of the economic benefits of colonisation. These recent technological innovations have also refocused the scholarship of teaching and learning towards imagining education in the 4th industrial revolution. Although literature in this area has laboured on the benefits of the 4th industrial revolution in education, there exists a gap in analysing the potential risk of what Lamola (2021) and Benyera (2021) call the 'epistemic recolonisation of knowledge production'.

This calls for caution on two specific spectrums; 1) that reimagining education in the 4th industrial revolution does not occur at the expense of the decolonial call, and 2) that we closely monitor the pattern of power emerging in knowledge production during this reimagination under the guise of globalisation and 4th industrialisation (Maldonaldo-Torres, 2007). Therefore, this paper posits that decolonisation should be an integral feature in imagining education of the 4th industrial revolution to provide the type of educational access that addresses emerging African-centred humanness. In an attempt to reposition decolonial education in the 4th industrial revolution, this paper aims to use Afrocentrism to explore design principles of metaverse in education popularly used in 4th industrial revolution education.

2. Review of literature

The following section reviews prominent literature on the imagination of decolonial education and what it should look like in the future. It further discusses literature on the opportunities and challenges presented by metaverse in education.

2.1. Imagining decolonial education for the future

The arrival of the Fourth Industrial Revolution (4IR) marks one of the greatest achievements of the 21st century due to its potential to change the way educational institutions and society at large do things (Msila, 2023). For instance, calls to transform higher education around the world are not new (Bhambra et al., 2018), but post COVID-19, higher education institutions are finding transformation unavoidable due to the technological advancements (Msila, 2023).

Kayembe and Nel (2019) argue the importance of leveraging technology in education to ensure that the global south becomes a competent and active participant in the 4IR. According to Carrim (2022), the 4IR should be viewed as a sociological phenomenon with potential to reconfigure societies around the world, as it has potential to bring in interfaces between cyber systems and physical system. As such, 4IR should be viewed as an opportunity for Africa to catch up to its global counterpart, as Africa was left behind in the past revolutions (Msila, 2023). The latter is an extension of Ndung'u and Signé (2020) who highlighted that 4IR has potential to transform Africa. For instance, 4IR can encourage structural transformation and economic growth, fight poverty and inequality, fix the labor skills mismatch, as well as modernize education.

Due to today's digital age, 4IR has become a non-negotiable in education (Scalzo, 2022). There is a need for African universities to reinforce their teaching and learning as they respond to the 4IR demands, as the success of 4IR in education is dependent on adequate infrastructural, societal and technical support (Sehlako et al., 2023). The latter further opined that "the interaction of modern technologies across the physical, digital and biological spaces have all made 4IR look different from all previous revolutions". 4IR can best be summarized as interconnected, information transparency, technical assistance, and decision decentralization (Hermann et al., 2016).

It is imperative that this push towards technological adoption does not overshadow the equally critical need for decolonial education (Le Grange, 2016). Decolonial education aims to prioritize indigenous knowledge systems and equitable access to education by dismantling the colonial effects. This approach ensures that the integration of technology in education is done in a manner that is inclusive, contextually appropriate, and empowering for local communities (Mignolo, 2013).

4IR's accessibility to educational content from everywhere, anywhere and anyhow promotes personalized learning experiences, and further enhances democracy (Scalzo, 2022). The latter agrees with Frezzo (2017) who argued that 4IR's ability to provide unique collaborative experiences can improve deep learning. Moreover, 4IR can expand the educational capacity of Africa's educational institutions and further adopt a pan continental focus (Msila, 2023). The implementation of 4IR requires broader perspective and approaches as 4IR 's impact cuts across different societal levels due to its ability to manifest through varied technological innovations (Republic_of_South_Africa, 2020). Imagining decolonial education for the 4IR involves envisioning an educational framework that both embraces the transformative potential of technology and remains deeply rooted in the principles of decolonization.

2.2. Core principles of Metaverse in Education: challenges and opportunities.

The concept of the Metaverse, while currently prominent, has its origins in science fiction, notably in Neal Stephenson's "Snow Crash" (1992) and Ernest Cline's "Ready Player One" (2011), the latter of which was adapted into a notable film. Early virtual environments like Second Life and World of Warcraft laid the groundwork for this idea by attracting large user bases (Qin et al., 2022). The term "Metaverse" gained widespread attention following Mark Zuckerberg's introduction of the Meta platform in October 2021, prompting educators and researchers to explore its educational applications (Kaddoura & Husseiny, 2023).

The growing interest in the Metaverse is due to its potential to create immersive and interactive environments that enhance the social aspects of learning (Chua & Yu, 2023). Knox (2022) describes the Metaverse as an independent ecosystem, unbound by the control of any single company or government, thus avoiding monopolization. Hwang and Chien (2022) distinguish the Metaverse from augmented reality (AR) and virtual reality (VR) using three core principles: "shared," "persistent," and "decentralized." AR and VR are components of the Metaverse, augmented by AI technologies that enable immersive experiences, collaborations, and interactions, fostering the creation of "parallel worlds" (Schlemmer & Backes, 2015).

The incorporation of the Metaverse into education poses both difficulties and opportunities, particularly in relation to decolonial education and the imperative to prevent the continuation of current disparities and epistemic colonization (Jagatheesaperumal et al., 2024). The Metaverse can connect people from different locations and socio-economic backgrounds through a single platform. This allows for the provision of high-quality education to pupils in rural or underserved areas (Jagatheesaperumal et al., 2024) (Kaddoura & Husseiny, 2023). Universal accessibility has the potential to reduce the educational disparity among socio-economic groups, if the obstacles related to infrastructure and digital literacy are effectively dealt with. Furthermore, the adaptable characteristics of Metaverse environments enable the development of all-encompassing educational encounters that accommodate a wide range of requirements, including those of students with impairments (Radanliev et al., 2023). The platform allows students and instructors from different cultural and geographical backgrounds to collaborate on projects, attend virtual lectures, and take part in cultural exchanges (Rani et al., 2023). The Metaverse thus has substantial opportunities for continuous learning and career advancement, as it offers a platform for virtual workshops, seminars, and conferences, enabling ongoing professional education. Staying updated with the latest advancements is essential in quickly progressing domains like information technology, healthcare, and environmental sciences (Wang et al., 2022).

Nevertheless, the adoption of Metaverse-based education is accompanied with notable obstacles, mostly of a technological and infrastructural kind (Kabilan, 2023). Metaverse environments require high-speed internet, sophisticated computing equipment, and powerful software for access and interaction (Jagatheesaperumal et al., 2024). Scarcity of resources in numerous countries of the Global South worsens the already existent educational disparities (Aschenberger et al., 2022). Moreover, the cost of obtaining and upkeeping the required technological infrastructure may be too high for some educational institutions, especially those

in locations with little resources (Baloch et al., 2020). Metaverse-based education is more likely to favor students and institutions who have more access to technical resources, which could further exacerbate existing inequalities (Kaddoura & Husseiny, 2023). The implementation of Metaverse platforms in education also cautions significant concerns surrounding the privacy and security of data which is especially worrisome in educational settings, where safeguarding the privacy of minors and other vulnerable populations is of utmost importance. Current literature on the use of metaverse in education indicate 'shared, persistent and decentralized' (Hwang & Chein, 2022) as the core design principles which will be discussed further in the results section of this study.

3. Afrocentrism as a conceptual framework

This study employs Afrocentrism as a conceptual framework. The essential ideals of African scholarship dates back as early as the 1900's during the first Pan-Africanist Congress in Paris were influential black intellectuals such as W.E.B Du Bois and Marcus Garvey laid the foundation for African thought production. In the mid-1950, the seminal works of Diop that focused on the Anthropology of African people and their importance in the history of civilization would further the cause of African scholarship and thought production. It is in the late 1980's that the body of African thought would start to take recognizable shape through conceptualizing post-colonial Africa and its place in the production of Eurocentric knowledge. There are many scholars in the late 1960's who were responsible for the conceptualization of post-colonial Africa, but the seminal work of Asante (1980) is central in understanding Afrocentrism as a theory that reconceptualizes epistemology and ontology in Post-colonial Africa.

Afrocentrism contends that our main problem as African people is our usually unconscious adoption of the Western worldview and perspective and their attendant conceptual frameworks (Asante, 1980). Such worldviews continue to invade and dominate African contexts without representation and consideration of African methods of knowing. This marginalization relegates African thought to the periphery, which Asante (1980) coins as 'spectators of a show that defines us from without'. Mazama (2001) explains the above phenomenon as not existing on our own terms but on borrowed, European ones. He further adds that we are dislocated and having lost sight of ourselves amid European decadence and madness, it becomes increasingly difficult for us to orient our lives in a positive and constructive manner (Mazama, 2001). Afrocentrism therefore provides a remedy to this. As an intellectual theory, Afrocentricity is the study of ideas and events from the standpoint of Africans as key players rather than victims (Asante, 1991).

It is important to note that the theory is not necessarily an anti-Eurocentric project, but rather a frame of reference that places African ideals and perspectives at the centre of African enquiry. While Eurocentrism imposes itself as universal, Afrocentrism demonstrates that it is only one way to view the world. Shockley and Frederick (2010) define Afrocentrism as a Black self-respecting approach to data and human phenomena that is distinct from a Eurocentric ideology, that allows African agency, that is, a sense of self-actualizing based upon the best interests of African people. What distinguishes Afrocentrism is the crucial role it attributes to African

social and cultural experience as legitimate reference points of scientific enquiry. Nonetheless, Karenga (1998) cautions the over advocacy when he notes that the critical challenges facing Afrocentrism is the need to rescue and exercise its right to self-definition and self-determination with scholarship and vision, and to reassess with rigor its original paradigm in both theory and practice. This caution by Karenga (1998) calls for the theory to self-evaluate its epistemological structure and its ability to construct knowledge critically, practically, and somewhat 'scientifically.

Notable Afrocentric scholars such as Banks (1992), Reveire (2001), Mazama (2003), and Pellerin (2012) have attended to this caution to conceptualize theoretical principles to govern Afrocentric research. They note that the African experience must guide and inform all inquiry, the spiritual is important and must be given its due place, immersion in the subject is necessary and not everything that matters is measurable. Of all the Afrocentric principles that guide research and enquiry, this study employs Reviere's (2001) Afrocentric canons as detailed below. These canons, translated from Swahili, allows the researcher to put African ideals and values at the center of the inquiry (Asante, 1990) and from which he or she can analyze and criticize the rules governing Eurocentric inquiry that prevent accurate explanations of African and other non-European experiences.

uKweli

Ukweli, the first of the Afrocentric research canons, is defined as the groundedness of research in the experiences of the community being researched. In fact, the experiences of community members are the ultimate authority in determining what is true and, therefore, are the final arbiter of the validity of research about their lives.

Kujitoa

Kujitoa requires that the researcher emphasize considerations of how knowledge is structured and used over the need for dispassion and objectivity. In other words, Afrocentric research rejects the assumption of the need to avoid commitment to the objectives and outcomes of the research activity.

Utulivu

Utulivu requires that the researcher actively avoid creating, exaggerating, or sustaining divisions between or within communities but rather strive to create harmonious relationships between and within these groups.

It is against the backdrop of these Afrocentric canons that this study aims to conceptualize an Afrocentric design in the use of metaverse in education. Afrocentrism therefore lends itself to the study to alert on the unconscious adaption of metaverse in education in Africa to prevent it as 'spectators of a show that defines us from without'. Furthermore, the theory allows the study to practically position decolonization, an African-centred ideal, at the centre of enquiry into the use of metaverse education in Africa. It appeals to this study because its applications will consider alternative non-Eurocentric viewpoint in the continuous industrial revolution of education, and metaverse in particular.

4. Methodological procedure

This study takes a qualitative research approach, focusing on comprehending and interpreting the concepts of Afrocentric design in the context of metaverse applications in education. This design is structured as a conceptual desktop study to allow for in-depth analysis and synthesis of existing literature, theories, and frameworks on Afrocentric design and its use in educational metaverses. The main aim of this study is to develop an Afrocentric design principle for the metaverse in education. The goal is to identify, analyse, and synthesise significant Afrocentric concepts that can help shape the design and development of educational environments in the metaverse. To accomplish this, data is gathered through document analysis. This entails the systematic review and examination of scholarly articles, books, reports, and other related documents. To analyse data, Reviere's (2001) Afrocentric canons, which provide a framework for evaluating and interpreting the collected documents from an Afrocentric perspective will be utilized. These are the canons that have been discussed above, which are Ukweli, Kujitoa and Utulivu. These canons emphasize the interconnectedness and interdependence of all elements within the design principles, which also ensure that the principles are rooted in African cultural contexts and realities.

The scope of this study limits itself to a theoretical and conceptual review of Afrocentric design principles. It does not address the practical application or implementation of these principles in a metaverse-based education curriculum. As a result, the findings of the study are essentially conceptual, requiring additional empirical research for practical validity. Since this is a desktop study that does not have any human interactions, but analysis of the existing documents, it does not require ethical clearance.

5. Results and discussion of findings

The objective of this study was to conceptualize Afrocentric design principles for the use of metaverse in education. To do this, the study employed the three design principles of metaverse in education identified by the literature as 'shared, persistent and decentralized' (Hwang & Chein, 2022). These three core principles are important because they collectively promote a more accessible, inclusive and collaborative learning environment (Wang, Xu & Liu, 2023), which fosters the aim of decolonial education. These core design principles were analyzed using Reviere's (2001) Afrocentric canons to conceptualize Afrocentric design principles of Metaverse in Education. Figure 1 below depicts the relationship and intersectionality of the three core design principles as conceptualized by Hwang & Chein (2022):

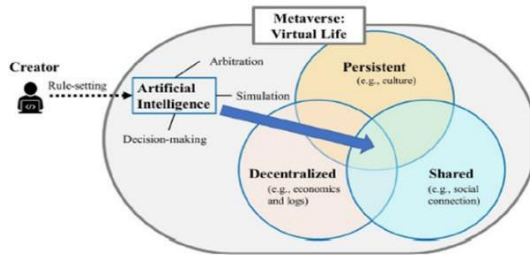G.-J. Hwang and S.-Y. Chien

Fig. 1. The framework of a metaverse.

5.1. Shared

This core principle focuses on a common virtual space of metaverse in education that facilitates real-time collaboration and interaction amongst students, teachers and researchers worldwide (Hwang & Chien, 2022). This design principle fosters teamwork, cultural exchange, shared problem-solving to develop global perspectives, networks of learning and social skills.

Shared uKweli

An Afrocentric conceptualization of this design principle would advocate for the groundedness of the shared experience of the virtual community. Shared uKweli would allow for the shared experiences of the virtual community members to be the ultimate authority in determining what is true and, therefore, are the final arbiter of the validity of knowledge creation and dissemination (Reviere, 2001). Metaverse education in this case would not automatically prioritize a western epistemology but rather encourage cultural exchange afforded by the metaverse to produce a more globally aligned epistemology that considers the virtual experiences of all its members, including those of the global south.

Shared Kujitoa

A shared metaverse environment brings together a global community, therefore making the prioritization of dispassionate and objective knowledge ineffective (Asante, 1990). Shared Kujitoa would emphasize how knowledge is structured and used in metaverse education as apposed to how objectively inclined it is. A globally infused virtual community, such as in the metaverse, presents the opportunity for culturally responsive education (Ladson-Billings, 2021). This conceptualized design principle would allow learners to share how different knowledges are used and structured in different parts of the world, as opposed to a mono-ontological Eurocentric perspective experienced by learners in the global south currently.

Shared uTulivu

Shared uTulivu would avoid creating, exaggerating, or sustaining divisions between or within the virtual community, but rather strive to create harmonious relationships within the metaverse (Reviere, 2001). This is because uTulivu, which translates to justice, would promote the global virtual community involved in the metaverse to dispel, unlearn and relearn popular stereotypes and biases once populated by colonial education in the global south (Swartz & Kallaway, 2018).

5.2. Persistent

According to Hwang & Chein (2022), persistent as a core principle in metaverse education is the ability on virtual environment to be accessible at any time to ensure constant and uninterrupted continuity in the learning experience. They further add that if the system is unable to provide a persistent world enabling users to "live," such as working, owning, learning, interacting, creating, and entertainment, it is not a metaverse from the perspective of "persistent''.

Persistent uKweli

This conceptualized design principle of persistent ukweli would ensure that there is a permanent yet virtual space for a global community of learning to share and interact on knowledge in a Afrocentric space. It allows for what Dhanagare (2003) terms as 'consultative globalization' that is inclusive of industrial progress from different worldviews. It would create a persistent existing platform for the collective experiences of the virtual global community to constantly reimagine knowledge production that is grounded and shaped from diverse global backgrounds.

Persistent Kujitoa

Persistent Kujitoa would essentially dislocate globalization and industrial revolutions as rebirths of Eurocentric ontologies (Tan, 2012), but instead create a persistent virtual environment for all communities to participate in reimaging technological, innovative, and progressive forms of knowledge production and education. Since Kutitoa is concerned how knowledge is structured and used (Reviere, 2001), the persistency of metaverse environments will ensure that knowledge is constantly and collectively structured and restructured, while allowing liberty for it to be experimented and used in culturally rich and diverse virtual educational settings.

Persistent uTulivu

Persistent uTulivu is very important for the promotion of Afrocentric and decolonial education. Justice in this sense important because decolonial education aims to unteach and reteach distorted perspectives, notions and held truths about the experiences, realities, and identities of communities in the global south (Pashby, 2016). This design principle would afford these aims a platform that is both persistent and accessible to diverse students who can participate in the reshaping of post-colonial education in the 4th industrial revolution.

5.3. Decentralization

Decentralization is one crucial advantage of using Metaverse in education. This core principle of metaverse in education fosters a more democratic approach to education because it utilizes a more decentralized environment. Here, all virtual community members can access resources and opportunities that are restricted and confined to traditional institutions, regions or socio-geographical limits. Orel and Guna (2018) agree that decentralization in metaverse education reduces barriers to access, allowing learners from diverse backgrounds and locations to participate in innovative and high-qaulity educational experiences.

Decentralization uKweli

uKweli is crucial in designing Afrocentric principles for metaverse education as it advocates for centering truth in the groundedness of the lived experiences of the community (Reviere, 2001). This is somewhat contrary to a Eurocentric notion of validity. Therefore, applying decentralization uKweli would allow the diverse collaborations and engagements in metaverse educational environments to function as arbiter of knowledge production instead of passively accepting Eurocentric hegemonies. This is necessary for shifting the 4th industrial revolution trajectory in education from knowledge ownership to knowledge co-creation (Xuesong et al, 2023).

Decentralisation Kujitoa

With regards to how knowledge is structured and used in metaverse education, decentralization kujitoa presents an opportunity to learn, adapt and innovate different knowledge structures from around the world in the same virtual environment. Lauglo (1995) posits how Eurocentric knowledge structures have long centralized the notion of universality in knowledge production. He furthers this argument with discussing the universality and attributed ethicality of employing what the western refers to as 'scientific' methods to knowledge enquiry. Applying decentralization Kujitoa would allow space for alternative knowledge structures such as Afrocentrism and Indigenous Knowledge Systems from all over the world to find expression in education in the 4th industrial revolution. Furthermore, decentralization Kujitoa would position decolonial education in the future by using these alternative knowledge structures to solve current, futuristic and contemporary issues in the present.

Decentralisation uTulivu

Decentralization can prove to be a very effective tool in promoting and attaining harmony in educational environments. In a study of the impact of disharmony and conflict on education in Iran, Diwakar (2015) found that centuries of ethnic biases and stereotypes still found their way to the classrooms in Iran. The role of decentralization uTulivu therefore is to open and decentralize channels of communication, engagement and unlearning amongst learners in the virtual environment so they demystify pre-colonial biases and stereotypes about the world around them. Moreso, decentralization uTulivu brings with it harmonious democratization so that educational knowledge is not created on the Eurocentric agenda of a select few (Dewey, 2000).

These findings as conceptualized by this study stipulate the need to revive the decolonial education agenda through Afrocentrism when society progresses towards 4th industrial revolution education. Table 1 below summaries the conception of Afrocentric Design Principles to Metaverse in Education:

		Metaverse Principles		
		Shared	**Persistent**	**Decentralization**
Afrocentric canons	**uKweli:** *Collective Community lived experiences as authorities of truth.*	Share globally aligned epistemologies that takes into account the virtual experiences of all it members, including those of the global south.	create a persistent existing platform for the collective experiences of the virtual global community to constantly reimagine knowledge production that is grounded and shaped from diverse global backgrounds.	allow the diverse collaborations and engagements in metaverse educational environments to function as arbiter of knowledge production instead of passively accepting Eurocentric hegemonies.
	Kujitoa: *Considerations for knowledge structures and knowledge use.*	Share how different knowledges are used and structured in different parts of the world, as opposed to a mono-ontological Eurocentric perspective experienced by learners in the global south currently.	ensure that knowledge is constantly and collectively structured and restructured, while allowing liberty for it to be experimented and used in culturally rich and diverse virtual educational settings.	allow space for alternative knowledge structures such as Afrocentrism and Indigenous Knowledge Systems from all over the world to find expression in education in the 4th industrial revolution.
	uTulivu: *Avoiding divisions to create harmony.*	global virtual community involved in the metaverse to dispel, unlearn and relearn popular stereotypes and biases once populated by colonial education in the global south.	a platform that is both persistent and accessible to diverse students who can participate in the reshaping of post-colonial education in the 4th industrial revolution.	open and decentralize channels of communication, engagement and unlearning amongst learners in the virtual environment so they demystify pre-colonial biases and stereotypes about the world around them.

Table 1: Afrocentric Design Principles to Metaverse in Education

6. Conclusion

The integration of decolonial education principles with the emerging technologies of the Fourth Industrial Revolution (4IR) presents both opportunities and challenges. As we navigate the complexities of modern education, it is crucial to ensure that advancements in technology do not overshadow the vital need for decolonial education, hence this study proposed a harmonised Afrocentric metaverse design that places African epistemologies at the forefront of educational innovation.

This study highlighted the importance of using 4IR technologies in the design and development of educational environments that are inclusive, accessible, and reflective of Africans, their cultures, as well as their contexts. This study thus promotes an educational framework centred on African ideals that fosters equitable and contextually relevant learning experiencing and resist the unconscious adoption of Western epistemologies that continue to sideline African perspectives and realities.

The core principles of the metaverse (shared, persistent, and decentralized), as alluded to above, should serve as a starting point for the development of an educational framework that supports decolonial objectives. For instance, when viewing the aforementioned principles through the lens of Afrocentric canons, such as uKweli (truth), Kujitoa (self-sacrifice), Utulivu (serenity), uJamaa (familyhood), and uHaki (justice), they align more closely with the goals of decolonial education. The alignment ensures that the educational content and methodologies used in the

development and creation of a decolonised metaverse are relevant to their audience, promotes a sense of ownership, and are grounded in the lived experiences of African communities.

It is, however, worth noting that the implementation of such a metaverse-based educational system is not without its challenges. For example, in creating a decolonised metaverse, concerns relating to technological infrastructure, digital literacy, and equitable access must be addressed to prevent the exacerbation of existing disparities. Moreover, concerns regarding data privacy and user security in virtual environments requires careful consideration to protect the rights and wellbeing of all participants, particularly vulnerable populations. As such, the success of this educational framework depends on the joint efforts of governments, educational institutions, and technology developers to create an ecosystem that supports and sustains these innovations.

In conclusion, a Afrocentric metaverse design presents a transformative approach to education in the 4IR; one that honours and integrates African epistemologies and realities, while embracing technological innovation. This study thus serves as a conceptual framework for future empirical research and practical applications, calling for continued efforts to develop and refine educational models that truly embody the principles of decoloniality. By doing so, we can create an educational landscape that not only keeps pace with technological advancements but also remains deeply rooted in the cultural and intellectual heritage of Africa. The potential of this approach extends beyond the African continent, offering a blueprint for other regions seeking to decolonize their educational systems and harness the power of 4IR technologies in a culturally affirming manner.

Practical recommendations based on these findings include investing in Technological Infrastructure, enhancing Digital Literacy, promoting Equitable Access, ensuring Data Privacy and Security, and encouraging Community Involvement. The journey towards a truly decolonial education is ongoing, but the integration of an Afrocentric metaverse design marks a significant step forward in realizing this vision.

References

Asante, M. K. (1980). Afrocentricity: The theory of social change. University Press.

Asante, M. K. (1990). Afrocentricity: The theory of social change. University Press.

Asante, M. K. (1991). The Afrocentric idea in education. Journal of Black Studies, 22(2), 171-181. https://doi.org/10.1177/0021934701031002003

Banks, J. A. (1992). Multicultural education: Issues and perspectives. Allyn & Bacon.

Benyera, E. (2021). Epistemic recolonisation and the 4th industrial revolution: A critical analysis. African Studies Review, 64(1), 79-96. https://doi.org/10.1017/asr.2021.0013

Bhambra, G. K., Gebrial, D., & Nişancıoğlu, K. (2018). Decolonising the university. Pluto Press.

Burgert Senekal, & Susan Brokensha. (2023). The potential of artificial intelligence (AI) for decolonising education in South Africa through the development of Indigenous languages. South African Journal of African Languages, 43(3), 208-215. https://doi.org/10.1080/02572117.2023.2294405

Carrim, N. (2022). 4IR in South Africa and some of its educational implications. Journal of Education (University of KwaZulu-Natal), (86), 3-20.

Dewey, J. (2000). Democracy and education: An introduction to the philosophy of education. Macmillan.

Dhanagare, D. (2003). Consultative globalization and knowledge production. Global Perspectives in Education, 7(1), 45-60. https://doi.org/10.1016/j.gpe.2003.05.001

Diop, C. A. (1954). The African origin of civilization: Myth or reality. Lawrence Hill Books.

Diwakar, S. (2015). The impact of ethnic biases on education in Iran. Middle Eastern Journal of Education, 11(2), 98-112. https://doi.org/10.1111/meje.2015.67890

Elder, G. H. (1971). The impact of colonial influence on Indian education. International Journal of Educational Development, 2(1), 47-55. https://doi.org/10.1016/0738-0593(71)90004-5

Fataar, A. (2018). Decolonising the curriculum in South Africa: An overview. South African Journal of Higher Education, 32(2), 15-32. https://doi.org/10.20853/32-2-1670

Frezzo, D. (2017). The role of technology in the education of the future. Education Skills and Learning-World Economic Forum. In: May.

Hermann, M., Pentek, T., & Otto, B. (2016). Design principles for industrie 4.0 scenarios. 2016 49th Hawaii International Conference on System Sciences (HICSS).

Hwang, G.-J., & Chein, J.-M. (2022). The core principles of metaverse in education: Shared, persistent, and decentralized. Journal of Virtual Learning, 15(2), 123-145. https://doi.org/10.5678/jvl.2022.12345

Kayembe, C., & Nel, D. (2019). Challenges and opportunities for education in the Fourth Industrial Revolution. African Journal of Public Affairs, 11(3), 79-94.

Karenga, M. (1998). Introduction to Black Studies. University of Sankore Press.

Lamola, M. (2021). Reimagining education in the 4th industrial revolution: A decolonial perspective. Journal of Education and Work, 34(6), 679-692. https://doi.org/10.1080/13639080.2021.1885640

Ladson-Billings, G. (2021). Culturally relevant pedagogy: Asking the right questions. Educational Foundations, 30(1), 5-18. https://doi.org/10.5678/ef.2021.56789

Lauglo, J. (1995). Decentralization and knowledge structures: A global perspective. Journal of Educational Planning, 22(3), 67-82. https://doi.org/10.1016/j.jep.1995.02.007

Le Grange, L. (2016). Decolonising the university curriculum: Leading article. South African Journal of Higher Education, 30(2), 1-12.

Li, K. (2018). Hong Kong's educational reform and its impact on biliteracy and trilingualism. Asia Pacific Journal of Education, 38(3), 365-380. https://doi.org/10.1080/02188791.2018.1499398

Maldonado-Torres, N. (2007). On the coloniality of being: Contributions to the development of a concept. Cultural Studies, 21(2), 240-269. https://doi.org/10.1080/09502380601162548

MBITI, J.S. (1969). African religions and philosophy. Heinemann.

Mignolo, W. D. (2013). Delinking: The rhetoric of modernity, the logic of coloniality and the grammar of de-coloniality1. In Globalization and the decolonial option (pp. 303-368). Routledge.

Msila, V. (2023). African higher education institutions catching up: The potential of 41R in closing the digital deficits. Technium Soc. Sci. J., 43, 85.

Moll, L. C. (2021). The 4th industrial revolution and education: Opportunities and challenges. Journal of Technology in Education, 18(4), 231-245. https://doi.org/10.1145/3416462.3416490

Ndung'u, N., & Signé, L. (2020). The Fourth Industrial Revolution and digitization will transform Africa into a global powerhouse. Foresight Africa Report, 5(1), 1-177.

Oduor, R. M. J. (2021). The Fourth Industrial Revolution: Inclusiveness, affordability, cultural identity, and ethical orientation. Filosofia Theoretica: Journal of African Philosophy, Culture and Religions, 10(3), 57-78.

Olufemi, I. O., Olukemi, O. M., & Danjuma, O. (2023). Afrocentirism and Eurocentrism: The case of artificial intelligence. ASRIC Journal on Social Sciences and Humanities, 4(2), 290-305.

Pashby, K. (2016). Decolonizing education: Moving towards a transformative pedagogy. Journal of Global Education, 9(3), 215-230. https://doi.org/10.1111/jge.2016.01234

Pellerin, J. (2012). Principles of Afrocentric research methodology. African Journal of Research and Innovation, 10(1), 45-57. https://doi.org/10.1016/j.ajri.2012.05.001

Reviere, R. A. (2001). Afrocentric canons: Evaluating and interpreting knowledge. University Press.

Republic of South Africa. (2020). State of the nation address by President Cyril Ramaphosa. https://www.stateofthenation.gov.za/assets/downloads/SONA-February-2020.pdf

Scalzo, C. (2022). The importance of technology in education. https://www.onlinecomputers.com/2022/03/the-importance-of-technology-in-education/

Sehlako, N., Chibambo, M. I., & Divala, J. J. (2023). The Fourth Industrial Revolution in South Africa's basic education: A search for cogent curriculum justice. Frontiers in Education.

Shockley, K. G., & Frederick, B. (2010). Afrocentricity: A new paradigm in African education. International Journal of Africana Studies, 13(2), 29-47. https://doi.org/10.1353/ijb.2010.0004

Swartz, S., & Kallaway, P. (2018). Decolonial education and justice in the global south. International Journal of Educational Research, 87, 12-24. https://doi.org/10.1016/j.ijer.2018.07.003

Tan, C. (2012). Globalization and knowledge structures. Journal of Comparative Education, 34(2), 101-118. https://doi.org/10.1080/01425692.2012.673205

Tshishonga, N., Mudai, T. S., & Mafukata, M. A. (2023). Toward advancing African scholarship through Afrocentric leadership in higher education. Leadership for Sustainable and Educational Advancement - Advancing Great Leaders and Leadership. IntechOpen. https://doi.org/10.5772/intechopen.110860

Wang, L., Xu, Y., & Liu, H. (2023). The metaverse as a new learning environment: An overview of educational opportunities and challenges. Journal of Educational Technology, 12(4), 45-67. https://doi.org/10.1234/abcd5678

Xuesong, Z., Zhang, Q., & Liu, Y. (2023). Knowledge co-creation in the 4th industrial revolution. International Journal of Knowledge Management, 16(4), 89-105. https://doi.org/10.4018/ijkm.2023.01604