Sustain Sci (2017) 12:813–827
DOI 10.1007/s11625-017-0461-1

SPECIAL FEATURE: OVERVIEW ARTICLE

Sustainability Science for Meeting Africa's Challenges

Decolonising transdisciplinary research approaches: an African perspective for enhancing knowledge integration in sustainability science

Bagele Chilisa[1]

Received: 13 September 2016 / Accepted: 31 July 2017 / Published online: 29 August 2017

Abstract The main argument in this article is that methodologies rooted in African philosophies, worldviews, and history, bring to the academic discourse, alternative ways of conducting research. Such methodologies question academic and methodological imperialism, and bring to the centre problem and solution-driven research agendas. The methodologies epitomise indigenous and local knowledge (ILK) as a body of thought that embraces all knowledge systems, and legitimise ILK holders, practitioners, and communities as scholars and authors of what they know and how it can be known. The article gives examples of how mainstream methodologies based on European/Western paradigms marginalise other knowledge systems. It illustrates the contested process of integrating academic and ILK. It further discusses the philosophical foundations of methodologies rooted in African cultures and how these methodologies can inform a decolonisation and indigenisation of sustainability science and transdisciplinary research.

Keywords Decolonisation · Indigenisation · Integration · Indigenous methodologies · Indigenous local knowledge

Introduction

A major contemporary challenge is how to conduct democratic scientific inquiry that enables the equal participation of academics, practitioners, indigenous knowledge holders, and local communities in framing research topics, methodologies, and dissemination strategies (Johnson et al. 2016; Chilisa et al. 2017). Sustainability science would require a transdisciplinary research approach focussed on human–environment relationship if it is to contribute to solving the sustainability challenges that Africa is currently facing. This transdisciplinary research approach must seek to bridge the divides between academic disciplines, between producers of knowledge and end users (Brandt et al. 2013), and between an academic system that has been 'created as the epicentre of colonial hegemony' (Shizha 2010) and indigenous knowledge, which is sometimes relegated to 'junk status' through narratives of 'backward', 'irrelevant' superstitious, and inferior knowledge which is 'less' than Western Science and harmful to the environment.

Transdisciplinary research faces challenges of marginalising indigenous knowledge systems (Briggs 2013), contested processes of reintegrating scientists' knowledge and practitioner knowledge (Lang et al. 2012), and unequal power between academic and indigenous and local knowledge (ILK) (Ocholla 2007). In most transdisciplinary research studies, for example, practitioners and indigenous knowledge holders tend to be excluded from the decision making process (Brandt et al. 2013). Consequently, topics, themes, concepts, and practices related to ILK are often excluded from the international discourse on sustainability science and transdisciplinarity (and individual disciplines for that matter), unless if they have been validated through formal academic processes (Sillitoe 2010).

Such an example, totems, a system of belief and practice in which human beings, the living and the non-living are connected spiritually, used among Africans, has informed environmental conservation from time immemorial (Ntiamo-Baidu 2008; Clemence and Chimininge 2015).

Handled by Alexandros Gasparatos, The University of Tokyo, Japan.

✉ Bagele Chilisa
chilisab@mopipi.ub.bw

[1] University of Botswana, Gaborone, Botswana

However, the environmental declarations and laws put in place by different international organisations and environmental unions, are, however, silent on the contribution that such practices can have on conservation (Sibiri 2014). International environmental conservation practices are generally not compatible with such diverse cultural practices and do not encourage indigenous methods of environmental preservation and research inquiry (Sibiri 2014), despite the fact that ILK systems respect nature as a resource that comes with sustainability (Shizha 2010).

Scheurich and Young (1997:7) reminds us that "when any group within a large, complex civilisation significantly dominates other groups for hundreds of years, the ways of the dominant group (its epistemologies, ontologies, and axiologies), not only become the dominant ways of that civilisation, but also these ways become so deeply embedded that they typically are seen as 'natural' or appropriate norms rather than as historically evolved social constructions".

The marginalisation of African perspectives in disciplinary inquiry is not a new phenomenon. The development of research inquiry reveals methodological hegemony with a tendency to perpetuate the dominance of one race over the 'other' by building a collection of theories, concepts, methods, techniques, and rules designed to promote only the knowledge that promoted and profited Eurocentrism (Chilisa 2012). The Porteus Maze, which was used as a test of intelligence among Africans at the height of colonial rule in the 20th century, is an example of how research instruments could be manipulated to privilege the dominance of one race over another (or of the coloniser over the colonised). In these tests, Africans and Europeans were presented with a printed plan of a maze and had to trace with pencil the path which they would follow in getting to the centre of the maze. However, the test was eventually abandoned as a test of intelligence as more Africans than Europeans were successful in getting to the centre of the maze (Oliver 1934). The Porteus Maze is an example of how research instruments in colonial Africa were designed to create patterns that emphasised the difference between Europeans and Africans, as seen from a European/Western eye.

Academic imperialism, a practice where conceptual and theoretical frameworks, research questions, research designs, and research techniques that stem from the developed world continue to promote the European/Western thought systems and build deficit theories that perpetuate distortions of African experiences (Chambers 1997; Pryor et al. 2009; Chilisa 2012).

An example of distortions and deficit-based theorising about Africans comes from Swaziland, a country in Southern Africa, and relates to the introduction of fertilisers to increase crop yield. When the intervention failed to reach the optimal crop yield, the researcher concluded that the women farmers had failed to weed the fields, either because of laziness or because that multiple gender roles left them with little time to weed (Mehta et al. 2013). Some years later, a student conducting a study on the diets of the same farmer communities found that what the earlier researcher had labelled as weeds, was a plant that was an important source of vitamin A for the local communities (Mehta et al. 2013). This research vignettes allude to the uni-dimensional, uni-discipline, and researcher-centric research approaches (Hodge and Lester 2006) that carry with it colonial and imperial baggage based on binary opposites of the superior European/Western knowledge and the irrelevant and superstitious knowledge of the 'other' (Spivak 1988; Said 1993; Blaut 1993; Chilisa 2005).

Considering the above, the premise of this paper is that African scholars, and academia as a whole, need to contest the role that colonisation, imperialism, and its new form of globalisation continue to play in suppressing, marginalising, and silencing knowledge systems of formerly colonised, historically marginalised, and oppressed groups. There is need to reclaim space for indigenous epistemologies and methodologies in the global knowledge system (Chilisa 2012). There is also a need to engage with discourses on the philosophical base that inform indigenous methodologies and the direction in which they move the scholarship in research methodologies (Chilisa 2012). Thus, the main aim of this paper is to discuss the place of African ILK systems as a science and a body of thought in the global knowledge system, and make the case that such ILK driven methodologies can enhance the decolonisation of sustainability science, address power differentials between knowledge systems, and promote the integration of knowledge systems.

The article starts with illustrating the hegemony of mainstream research methodologies and how ILK is often times marginalised and not integrated properly with academic discourses. The article discusses the philosophical assumptions that inform a decolonisation and indigenisation of knowledge production, and introduces methodological frameworks that can speak to power differentials between indigenous and academic knowledge. It outlines the ontological, epistemological, and axiological assumptions derived from African philosophies and how they inform indigenous research methodologies. The paper proposes a typology of indigenous research methodologies that can promote the decolonisation and indigenisation of knowledge production, and discusses their implications for sustainability science in African contexts.

The marginalisation of ILK systems in academic research

While it is recognised that Africa's ILK systems can offer sustainable solutions to the eradication of poverty and other challenges facing Africa, the unequal power relations

between European/Western knowledge and other knowledge systems poses a threat to meaningful integration. According to the World Bank (1998), ILK represents an underutilised resource that can be the foundation for developing problem-solving strategies for local communities. Investigating first what communities know and have can improve the understanding of local conditions and provide a productive context for solution-oriented research activities designed to help local communities (Briggs 2013).

In response to the recognition of ILK systems, academic researchers are increasingly called upon to collaborate with ILK holders and indigenous communities to co-design and co-frame research problems, co-create methodological frameworks that support the integration of knowledge systems, co-create solution-oriented knowledge, and apply it to address complex problems (Chilisa et al. 2014). Such practices constitute one of the core principles of transdisciplinary research and sustainability science. However, the challenge is whether current mainstream research paradigms can effectively address the unequal power relations between Western and non-Western knowledge. Some critical scholars suggest that as the African intelligentsia went through a Western Education system, it was transformed into "slaves" of Western ideas and Western mentality (Shizha 2010), with African universities becoming a mirror of European/Western institutions using research methodologies embedded in European/Western culture. In such contexts, it can be argued that research collaboration can become a form of colonisation (Boshoff 2009).

An on-going programme in South Africa that seeks to integrate ILK with knowledge coming out from the conventional academic disciplines can demonstrate the contested space of integrating ILK with academic knowledge, and the inevitable reproduction of academic knowledge. In South Africa, the National Research Foundation (NRF) manages an ILK research programme that seeks to study ILK systems in conjunction to climate change, the bio-economy (e.g., African traditional medicine and food security), and energy and indigenous epistemologies informed by Ubuntu and African cosmologies (NRF 2012). One of the requirements in this programme is that there should be a joint and active participation, and equal ownership of the research project by scientists and ILK holders, indigenous practitioners, and community members. ILK holders are expected to either participate as Principal Investigators or Co-investigators.

However, a review of funded projects between 2009 and 2014 revealed that there were no funded projects where ILK holders, practitioners, or community members were Principal Investigators jointly with academics (Chilisa et al. 2014). Community members and ILK holders perceive that the research model used in the programme is simply a mirror of European/Western research approaches. This reinforced when considering the assessment scoreboard and ethics guidelines that have normalised academic science practices as the universal, natural norms that should guide research practice. The process that drives the application of research, the framing of the studies, the methodologies adopted, and the dissemination of research findings inhibits ILK holders, practitioners, and community members, reducing them in most cases to data sources. Their knowledge is not integrated into the research process as researchers pursuing their own research questions that are informed by their own worldviews. Consequently, ILK holders generally are not co-authors, and are in fact seldom acknowledged in publications arising from their collaborative research efforts with academics. Worse still, they do not have access to the produced knowledge as it is usually packaged in forms and language that they cannot comprehend, or that is useful for their community needs (Chilisa et al. 2014).

Africa (and a large part of the world) is still intellectually captive to the traditional academic disciplines 'grounded in cultural views which are either antagonistic to other world views or have no methodology for dealing with other knowledge systems' (Smith 1999:65). The tendency to ignore the role of imperialism, colonisation, and globalisation in shaping the production of knowledge still continues. How can research traditions designed to support the European/Western traditional academic disciplines founded on the differences between the West and the 'other' take centre stage without distorting the lives, histories, and experiences of Africans? How should Africans and other marginalised groups speak about research rooted in their cultures?

Contested knowledge: indigenous perspectives or paradigm?

An evolving discourse on ILK and research methodologies (Smith 1999; Wilson 2008; Chilisa 2012; Muwanga-Zake 2009; Nabudere 2011; Romm 2015; Ping Li 2011; Russon 2008) is calling for a fifth knowledge paradigm to add to the typology of current paradigms, namely the post-positivist, the constructivist, the transformative, and the pragmatic paradigms.

Indigenous research embraces culturally specific discourses that root research methodologies in the ILK, cultural practices, worldviews, values, and practices of often formerly colonised societies, whose knowledge has been excluded from discourses related to knowledge production (Smith 1999; Kovach 2009; Wilson 2008; Walter and Andersen 2013). Recent discourses critique mainstream research methodologies and disrupt the colonial logic that

underlies researchers' perspectives and practices, and call for the decolonisation of academia [and its individual disciplines and research methodologies (Romm 2015)]. Sustainability science, as an emerging academic interdisciplinary field, must be challenged to interrogate the methodologies currently used for the production of knowledge and the place of ILK in the search for solution to address Africa's sustainability challenges.

There is, however, disagreement over whether the cultural specific perspectives deserve a space as a distinct paradigm. Kovach (2009), for instance, maintains that the four paradigms provide space for the inclusion of indigenous perspectives. Romm (2015) in a review of the transformative paradigm as explained by Mertens in various publications notes: when explicating the transformative paradigm Mertens cites Indigenous authors work 'as fitting in and contributing to the transformative paradigm'. Mertens (2009) and Mertens and Wilson (2012) have, for example, included indigenous evaluation within the transformative paradigm (Mertens and Cram 2016:166). They do not, however, necessarily ague against a distinct space for a fifth paradigm.

In contrast, Wilson (2008) is more explicit about a space for a fifth distinct paradigm. He maintains that inserting an indigenous perspective into one of the major paradigms discussed may not be effective, because it is hard to remove the underlying epistemology and ontology on which the paradigms are built. Arguing for an indigenous paradigm, Wilson (2008:41) notes that *"…we have tried to adapt dominant systems research tools by including our perspective into their views. We have tried to include our cultures, traditional protocols and practices into the research process through adopting suitable methods. The problem with that is that we can never really remove the tools from their underlying beliefs*". Romm (2015) concurs that it is possible to appreciate an indigenous paradigm without subsuming it under the 'big four' mainly because of its focus on value systems that emphasise the connections with place, people, past, present, future, the living, and the non-living.

Adding to the debate is the question on whether one can name any type of indigenous research, methodology, or paradigm. There is an argument that it is a false idea to use a specific name to characterise research by the formerly colonised societies. It is argued that instead of focusing on the naming, the focus should be on how the research was contextualised to respond to the needs of local communities (Yantio 2013). Scholars expressing this view convey the fear that indigenous perspectives may be defined in terms of the exotic, sometimes labelled as romanticism of Africa's past, and, therefore, not taken seriously thus leading to its further isolation and further marginalisation. This fear could, also, partly be a sign of 'captive minds' (Alatas 2004), which is prone to mimicking Western research paradigms. It could also be an indication of the cultural betrayal, self-dehumanisation, and inferiority complex of the African intelligentsia (Nyasini 2016; Makgoba et al. 1999; Buntu 2013; Chilisa et al. 2017).

The counter argument to the faceless and nameless approach discussed above is that when the word indigenous is applied to research, scholars seek to understand the ways of knowing, ways of perceiving reality, and the philosophies and value systems of a cultural group, and how it informs their way of life (Cram et al. 2013). Used in this context, it can be argued that the European/Western paradigms are indigenous to European and Western societies. However, the fact remains that there are major groups of people, among them African, whose perspectives are not included in the European/Western paradigms. Indigenous research that draws from ILK goes beyond contextualisation to bring to the centre the philosophical foundations of research methodologies that lie at the centre of an indigenous research paradigm. Thus, scholars have already discussed perspectives on an indigenous research paradigm (Wilson 2008), a postcolonial indigenous research paradigm (Chilisa 2012), and an Eastern paradigm of evaluation (Russon 2008). These debates give credibility to the on going discussions about the philosophical assumptions that inform research in Africa.

Philosophical foundation of indigenous research in Africa

Different philosophical beliefs can inform the decolonisation and indigenisation of research in an African context. These include ethno-philosophy, philosophic sagacity, nationalistic–ideological philosophy, and professional philosophy (Kaphagawani 2000) and are discussed in the subsequent sections (Table 1). Sustainability science can draw from these philosophies to decolonize the discipline and to envision culture-rooted methodologies that support the integration of academic and ILK.

Ethnophilosophy

Ethnophilosophy is an African philosophical trend that focuses on how the mythical concepts, ritual practices, language, proverbs, metaphors, folklores, stories, songs artefacts, and art can inform epistemological assumptions and can guide the theoretical or methodological frameworks in knowledge production (Chilisa and Preece 2005) (Table 1).

A weakness of most research studies in Africa is that the context of the study is often derived from literature that is not inclusive of the researched people's relationship with

Table 1 Characteristics of African philosophies

	Assumption about knowledge	Field of application	Type of research	Source of knowledge
Ethnophilosophy	Source of literature and history Knowledge connect people with their environment Knowledge valorises African identities	Social and cultural studies of science and technology Critical science research	Academic and community collaborative research North and south collaborative research Multi-epistemological research Indigenous research Sustainability science research	Language Oral traditions Folklores, legends Songs Proverbs Chants Artefacts
Philosophic sagacity	Give legitimacy to indigenous knowledge holders and traditional African communities as critical independent thinkers	Social and cultural studies of science and technology Critical science research	Collaborative research Indigenous research	Sages
Nationalistic ideology	Decolonisation of global knowledge Decolonisation of the mind Indigenisation of dominant knowledge	Social and cultural studies of science and technology Critical science research	Indigenous research	African renaissance perspectives

the environment, their history, and their identities (Chilisa 2012; Chilisa et al. 2017). Ethno-philosophy empowers indigenous researchers to invoke ILK to inform the literature review, study context, data collection/analysis and reporting, and dissemination of research findings. Asking for the people's environmental knowledge, such as stories and songs that connect them to their place, identity, ways of knowing, and their practices, can raise people's level of consciousness. It can thus offer invaluable insights about the world surrounding them, and also help the researcher to understand and appreciate the complexity of the problem or phenomena under study. These ways of building contextual background to the study can allow for a revitalisation, restoration, and protection of what is valued, and how what is valued can connect it better to other relevant systems.

An example of ethnophilosophy comes from the Bakalanga people of Botswana, and how they are connected to the living, the non-living, and to each other through the sharing of totems. These totems are symbolically represented through non-living things, for example, a heart, or through living things and animals such as elephants and lions (Chilisa 2012). Figure 1 shows 18 totems marking the identities of the Bakalanga people. Men and women are addressed by their totems as a sign of respect for their identity. They, in turn, have an obligation to respect the living and non-living that represent their totems. Stories about the living and the non-living in the totem system can serve as the literature that teaches school learners for example, to love and value their connection with the environment (see Fig. 1). In that way, seeking solutions to Africa's challenges on a multi-dimensional issue such as environmental sustainability, for example, becomes a joint venture between academic institutions researching the challenges and communities and their children as they take up responsibilities for the conservation of their environment.

Philosophic sagacity

A key aspect of the marginalisation of indigenous research methodologies is that there is no recognition of ILK holders in the academic process of peer-reviewing. Philosophic sagacity legitimises ILK holders and practitioners as scholars that deserve a space and a more visible role in the academic literature (Table 1). Sagacity is an African philosophical trend that promotes the idea that there are philosophers in Africa even among those who did not go to school (Oruka 1998). Sagacity is a 'reflective system of thought based on the wisdom and the traditions of people' (Emagalit 2000). Through sagacity, the wisdom and beliefs of individuals who have not been formally schooled can be exposed (Chilisa and Preece 2005). These philosophers, called sages, are well versed in the wisdom of their people and communities, and have a reputation for their knowledge.

An interesting approach to promote such practices in Africa is documented in Berger-Gonzalez et al. (2016). These authors describe a multi-epistemological research

Fig. 1 Totems of the Bakalanga people in Botswana

partnership where indigenous Maya medical specialists from Guatemala worked with Western biomedical physicians to study cancer healing systems. They documented Mayan knowledge about healing and published a book in a local language as a way of protecting, restoring, and revitalising Maya knowledge on healing. During this study ceremonies that promoted the ecological sensitivity, Maya ILK holders acknowledged and practiced, and particularly ways how to maintain a healthy relationships with the living and the non-living. To achieve this, space was provided for the Maya ILK holders to conduct rituals that raised their levels of consciousness and insights about healing. The Bidirectional Emic–Etic tool (BEE) tool was developed to promote reflexivity, reduce power differential between knowledge systems, and promote knowledge integration. The BEE tool consists of five steps to enhance the contribution of ILK and indigenous methodologies in transdisciplinary research including:

- Each cultural group reflects on the variability of its knowledge and approaches (Step 1);
- The groups try to understand each other's knowledge system (Step 2);
- Each group highlights areas where knowledge integration seems possible, and where there is divergence (Step 3);
- Groups explore possible contradictions between mental constructs of knowledge and actual practice (Step 4);
- Groups come up with an integrated research protocol to address the objectives of the study/research (Step 5).

The study by Berger-Gonzalez et al. (2016) serves as a good example of how ILK holders and community members can become scholars and authors of their own histories, experiences, and practices, and essentially how they can be instrumental in revitalising and restoring ILK that can add value to problem-solving in Africa. It is an example of an indigenised transdisciplinary research process that can be applied by research teams that intend to decolonise research processes.

Nationalistic ideology

The nationalistic ideological philosophy challenges researchers to decolonize social science research in a way that the human condition is not constructed through Western hegemony (Elabor-Idemudia 2002) (Table 1). This type of philosophy utilises a variety of concepts and worldviews such as the African Renaissance and Afrikanization, to frame the research agenda and process. The objective of these philosophies is to allow Africans negotiate from a strong position on the rules of what can be known and how it can be known.

The African Renaissance philosophies call for a search for identity, a redefinition, and a re-evaluation of the self (and of Africa for that matter) in the context of a globalising world (Makgoba et al. 1999). Afrikanization seeks legitimacy for African scholarship embedded in the histories, experiences, ways of perceiving realities, and value systems of the African people (Msila 2009). Afrikanization can thus be viewed as an empowerment tool directed towards the mental decolonisation, liberation, and emancipation of Africans, so that they do not see themselves only as objects of research, but also as producers of knowledge.

Considering the above, African researchers are capable of theorising about the production of knowledge in ways embedded in the cultures and experiences of the African people (Chilisa and Preece 2005). Research with decolonisation intent thus acknowledges knowledge outside the traditional academic disciplines, and can more clearly specify the role and place of ILK literature and indigenous knowledge holders and communities in the research inquiry. Decolonisation challenges academic disciplines, the institutions, and the academic scholars to concede power as centres of what knowledge is how it is produced and validated and how it can be organised.

A University of Stellenbosch microbiologist's collaborative research with the Khoi and San is an example of how researchers can acknowledge ILK holders and work with them to address the multiple challenges faced by communities. The Stellenbosch researcher studies flora medicinal plants and incorporates ILK systems by working with the Khoi and San ILK holders to study how communities interact with plants and how plants are utilised to build economies at home and at a national level. The project also aims at bringing back some Khoi and San practices to urban spaces, linking the people to their past and reviving valuable IK. The information from the ILK has been documented in film and other media accessible to IK holders and other community members. The research team is involved in the planting of medicinal gardens in the community and visits to schools to disseminate local knowledge on medicinal plants.

Professional philosophy

Among some African scholars, there is a view that philosophy is universal and that there is no such thing as African philosophy (Hountondji 1983). This view discusses professional philosophy as a discourse engaged in a critical analysis and reflection of ILK using universal tools of analysis. It is from this philosophical standpoint that scholars debate and sustain arguments that research methodologies are universal. This type of African

philosophy challenges African scholars to guard against romanticising ILK systems.

Reality, knowledge, and values in African indigenous research

Relational ontology

Ontology deals with questions about what is there to know and what is 'being' and existence. Among the people of Southern Africa, the nature of existence and 'being' is captured in the abadage *nthu nthu ne bathu* (I am because we are). Reality refers to ways of understanding the nature of existence and the many relationships that make up the web of connections that sum up existence.

Human relationships in Southern Africa are captured in the concept of *botho* or *Ubuntu* (humanness). Ubuntu requires respect and the recognition of all things living and non-living. Reality is all our connections and all our marginalised efforts to protect and preserve those that are essential to the continued existence of all relations. Relatedness is at the core and permeates all research activities. The relationships are neither oppositional, nor binary, but are inclusive', uniting and creating harmony and balance with all knowledge systems and all living and non-living things (Goduka 2000). Communality, collectivity, social justice, and human unity are implicit in the *Ubuntu* principle. Similarly among the people of the Democratic Republic of the Congo (DRC), being and relatedness is expressed in the concept of 'us-ness' and 'we-ness' (Nyasini 2016), which like 'I am because we are' is in direct contrast to individualistic approach of 'I am therefore I think'.

This way of understanding reality is in contrast to the theoretical base of traditional academic disciplines with their emphasis on studying differences and their focus on an "I/You relationship" (Chilisa et al. 2017). The epistemological beliefs reiterate the importance of an inclusive research approach that accommodates ILK, the interconnectedness of people with the environment, each other, and the rest of humanity, and practices that honour the relationships.

Relational epistemology

African indigenous ways of knowing entail the ways and practices of doing and the networks, relationships, connections, and systems that make up and inform the reality that can be known and how it can be known. There are diverse epistemologies that contribute to indigenous research process.

The Afrikology epistemology, which is derived from the African cosmology of connectedness, promotes critical inquiry and 'fearless aspiration for new paradigms' (Buntu 2013). It derives its assumptions from the 'we-ness' and 'us-ness' (Nyasini 2016), and the "I/We relationship" to propose an epistemology that is not African-centric or Afro-centric, but a universal relational epistemology that cuts across (and goes beyond) geographic borders and forms of Eurocentricism (or other forms of ethnocentrism) (Nabudere 2011). In this system of connections and relationships, each person has a set of knowledge according to their role in the system (Karen 2003). Thus, the study of the reality to be known through Afrikology embraces an indigenous transdisciplinary approach, which is opposed to the standard configuration of academic disciplines as they usually exist in academic institutions.

Relation axiology

Relational axiology draws from the *Ubuntu* worldview, "I am because we are," to invite researchers to see their "Self" as a reflection of the researched 'Other' (Chilisa 2012). It honors and respects the researched as one would wish for their self, and to feel belongingness to the researched community without feeling threatened or diminished (Chilisa 2012). *Ubuntu* ethics require fairness realised through research that grows from (and safeguards the growth of) African ILK systems. *Ubuntu* ethics further sustains a balanced representation of the African multiple realities, embraces methodologies that integrate ILK systems with other knowledge systems, and promotes socially relevant research by the people, with the people to address their needs.

There is no *Ubuntu* without communal justice. A person is incomplete unless they maintain an active connection with their culture or community (Letseka 2014). In this context, researchers play the role of transformative healers engaged in self-reflection and self-questioning about their relationships with others and their responsibilities as researchers. The four Rs of "relational accountability", "respectful representation", "reciprocal appropriation", and "rights and regulations" inform an *Ubuntu*-based ethical framework (Chilisa 2012).

Towards a typology of indigenous methodologies

Indigenous methodologies are relational. As discussed above, they advance collaborative research that is (a) transdisciplinary and inclusive of communities' voices, (b) revitalises and restores lost identities and value systems, and (c) legitimises ILK as content and as a body of thinking

(Fig. 2). The shield in the inner circle of Fig. 2 illustrates the importance of protecting, restoring, and revitalising valuable ILK. The system of totems discussed above is such an example of valuable knowledge that mobilises each and every member of the community to contribute towards living in harmony with nature (Fig. 1).

A relational indigenous methodology is driven by decolonisation intent and a reflection on the philosophies and worldviews that inform the research process. The outer circle in Fig. 2 captures the influence of African philosophies on the methodologies. The middle circle shows the methodological frameworks that grow from these philosophies.

The relational indigenous methodologies can be viewed along a continuum scale that ranges from the least indigenised frameworks to third space methodologies (Moquin 2007; Bhabha 1994) or geo-centric approaches (Ping Li 2011). What follows is a description of the indigenous research methodological frameworks that arise from the philosophical beliefs and assumptions discussed above (Table 2).

Least indigenous approach

Coming from the 'philosophy is philosophy' view, the contention in least indigenous approaches is that research is research and that methodologies are universal. There is limited attention to decolonise relationships between knowledge systems (Table 2). There is also limited effort to reflect on the diversity of indigenous ways of knowing and how they are aligned to the choice of research design, data collection methods, and reporting of findings.

The South African National Research Foundation (NRF) ILK systems program, discussed earlier, is an example of research driven by the least indigenised approaches. While its intentions are to promote locally relevant research to eradicate poverty, and to revitalise, restore, and develop ILK epistemologies, in reality, the research practice lacks a reflection on the philosophies and values that drive the research practice. Most of the research conducted fails to apply indigenous methodologies to explore locally derived research agendas, and to build unique and novel constructs and local theories (Ping 2012). It applies instead,

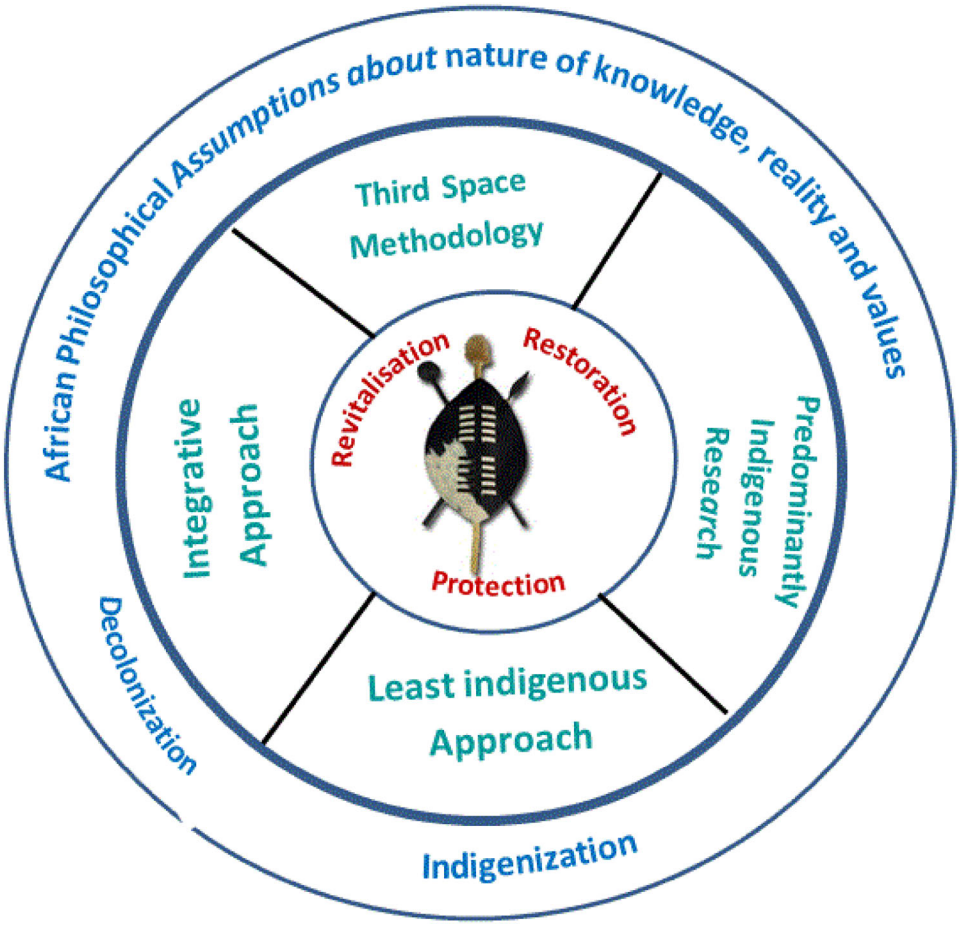

Fig. 2 Source: Mukani Action Campaign (2002). Francistown, Botswana. Used by permission

Table 2 Characteristics of indigenous research approaches

Indigenous research approach	Relation between ILK and western science	Themes and fields of application	Value systems
Least indigenous approach	Dominance of Western science	Conventional research	Conventional ethics values
Integrative approach	Integration of indigenous with western knowledge	Academic and community collaborative research North–South collaborative research Participatory multi-epistemological research Participatory Problem solving research Indigenous research Sustainability science research	Inclusiveness Build connections/relationships between (a) knowledge systems, (b) between academic and community members, and (c) between people and ecological systems
Predominantly indigenous research framework	Dominance of indigenous knowledge approaches	Indigenous research	Values Spirituality Connectedness and relationships Collectivity Communality
Third space methodologies	Research in a neutral third space	Integrative research	Hybridized practices and knowledge

universalised European/Western research standards across diverse contexts. For example, researchers fulfil the requirements outlined in standards research methods such as translating research protocols into local languages. However, there are some specific concerns that emerge, as for example, in biomedical research the moment an indigenous plant is put in the laboratory, it loses its indigenous name, its history, and its benefits to the community.

The Mokgola Community in Zeerust, South Africa illustrates the negative consequences of this approach. In the early 2000s, the local community collected leaves from a tree which elderly community members had used for medicinal purposes and for making tea and presented it to the Department of Science and Technology (DST) to find out if there was any commercial benefit to be derived. The community signed an agreement with the Medical Research Council (MRC) in Cape Town, and provided trees to use in the research. The MRC did not honour this agreement, but instead pursued its own interests by conducting interviews with elderly community members about the best time to harvest the leaves. The traditional healers were later involved in the project and the community was asked to identify land where trees could be planted that had access to water, which they did. DST, however, researchers would not admit the ILK holders and community members who had approached them in their laboratories. They decided a scientific name for the plant, and to date, the research findings, although published have not been shared with the community (Chilisa et al. 2014). In this case, community attempts to work jointly with academic researchers to harness ILK to alleviate poverty was unsuccessful. The community had transferred their knowledge to academic researchers, and got nothing in return. This is against the principles of an Ubuntu *ethical* framework of relational accountability, respectful representation, reciprocity, and community rights under the relational axiology discussed in the previous section.

Integrative approach

The second relational indigenous methodology along the continuum scale is the integrative approach. In this approach, the decolonisation intent is explicit. Researchers draw from the relational, ontological, epistemological, and axiological assumptions to build (and sustain) relations and connections between (a) knowledge systems, (b) between academics and sages, (c) between researchers and the researched, and (b) between people and ecological systems (Table 2). African-centred conceptual frameworks serve as critical tools to provide insights into researchers' beliefs about the research process, the research goals, its

methodology, and interpretation of its findings. It is an approach where there is integration of knowledge coming from a western perspective and an indigenous perspective.

Such as example is how the evaluation research practice of Muwanga-Zake's (2009) has been informed by *Ubuntu* worldview (Chilisa et al. 2016). In this study, the Ubuntu principles (see below) were combined with aspects of Western participative paradigms, namely post-modern, developmental, and constructivist evaluation paradigms, to evaluate a computer educational program for teachers in South Africa (Muwanga-Zake 2009). Using the *Ubuntu* elements of collaboration, togetherness, cooperation, and consensus building, teachers were involved in the planning and execution of the evaluation. Becoming a Muntu is described as a method that involves evaluators being transformed and submitting themselves to Ubuntu. It is *Ubuntu,* for instance, to share with participants one's family, history, clan, and totem, with the participants' depth of knowledge of the evaluator determining the quantity and quality of ILK accessed (Muwanga-Zake 2009:418). Through the application of *Ubuntu* and the "I/We relationship" with its emphasis on inclusiveness, a non-Muntu can become a *Muntu* through a complete transformation by embracing generic African values and moving further to embrace the ethnophilosophy that is dominant in a particular location.

In another study on how to design and test the efficacy of an age and culturally appropriate HIV risk reduction intervention, Chilisa and Tsheko (2014) used an indigenous mixed-method approach to integrate ILK with academic knowledge on behavioural change. The conventional methods utilised the theory of planned behaviour to design interview guides to elicit adolescents' views on sexually risky behaviours. Indigenous methods accessed adolescents' views through the use of local language, metaphors, proverbs, songs, taboos, stories, folklores, and myths. Other indigenous methods used in this study such as talking circles, yarning, naming, and the use of symbols focussed on building relationships to sustain intervention outcomes. In particular, the talking circle was used to build group trust and cohesion as well as develop openness and confidence among all stakeholders. The talking circle symbolised and encouraged the sharing of ideas, respect for each others' ideas, togetherness, and a continuous and an unending compassion and love for one another. In talking circles, sacred objects that symbolise collective construction of knowledge and the relations among group members were passed around from speaker to speaker. The yarn method, a way of holding a conversation or talk (Kovach 2009), was used to evaluate participants' views on the effectiveness of the intervention. Participants reflected on what they had learnt from the intervention and how the intervention impacted on their goals and dreams. The conversation involved connecting to each other by throwing a thread ball. At the end, a web of connections was visible showing how each participant was connected through the thread to one another. The web of connections essentially summarized and emphasised the relationships that were built throughout the intervention process. Such indigenous methods can build relationships and access local knowledge that may not surface when the conventional research methods are used.

Predominantly indigenous researchers' framework

There is a view that where the subject of inquiry is a local or indigenous phenomenon, then methodologies derived from African epistemologies and worldviews should be used (Pascual et al. 2017). The starting point for this view is that ILK should not be mainstreamed into the conventional knowledge, but should be allowed to co-exist with western science, because they are two distinctly different systems (Table 2).

In such cases, ILK research should be informed by worldviews that emanate from knowledge holders and the assumptions of indigenous communities about the nature of knowledge, reality, and values. Augmenting this view, the Seboka researchers in South Africa argue that the health system operates in two parallel systems: a western system and an indigenous system, where 70% of the plants are used for psych spiritual purposes (Chilisa et al. 2014). It is estimated that about 82% of indigenous people still prefer indigenous health practices and community-based care (Pascual et al. 2017). Thus, it is essential that indigenous primary health systems are revitalised, and that respect is cultivated for both indigenous and mainstream primary health care systems. Pascual et al. (2017) has proposed an African health research framework that emanates from community worldviews about their understanding of health. The framework places at the centre of the research process ILK systems, community participation, and the use of indigenous methodologies to collect, analyse, and disseminate data.

In the predominantly indigenous research approach, researchers are empowered by philosophical systems with decolonisation intent such as Afrikanization and the African renaissance and draw, for example, from ethno-philosophy to inform the entire research process, starting from the conceptualisation of the study to the reporting the findings.

The use of proverbs and languages as theoretical frameworks is now a common practice with research that has decolonisation intent (Chilisa 2012; Chilisa et al. 2016; Easton 2012). Easton (2012), for example, has developed ways to conceptualise five common evaluation concepts based on proverbs from Nigeria, East Africa, and Senegal.

Easton (2012: 527) notes that in his evaluation research practice, proverbs were an integral part of the discussions in all the evaluation stages and helped to 'embody a mind set and establish a climate for an unprecedented level of stakeholder buy in'.

The proverbs can serve as a reminder of the cultural context in which the research inquiry occurs and the meaning conveyed by the culture. They also provide critical guidance for probing motives behind actions and behaviours, while they can also mobilise local stakeholders to actively engage with the research inquiry, thus promoting local ownership of the program. Towards this end, Chilisa (2002, 2012) has used proverbs to explore community-constructed ideologies, while Musyoka and Mertens (2007) has used proverbs to challenge deficit theorising about people with disabilities. Hanks (2008) used *Ubuntu* as an epistemological framework to design therapy for out of prison youth.

Carroll (2008) suggests a methodological framework that could drive a predominantly indigenous framework in Africa that is guided by the following research questions:

- How does the research inquiry reflect the interdependent and interconnected nature of the universe?
- How does the research inquiry compensate for the spiritual and material nature of reality?
- How does the research inquiry reflect the communal nature of African people?
- How does the research inquiry access the non-material reality?
- How does the research inquiry reflect the both/and logic?
- How does the research inquiry advance the interests of the African community?
- How does the research inquiry contribute to the liberation of the African people?

These research questions are derived from African worldviews and philosophies that value spirituality, connectedness, collectivity, and communality. They reflect embeddedness in the African renaissance and the search for African identity and renewal. The questions challenge researchers, academia, and its institution to decolonise European/Western research practices, as well as reframe and reclaim indigenous practices, and come up with other ways of doing research that are embedded in African worldviews.

The third space methodologies

Third space methodologies are integrative approaches that involve a balanced borrowing and combination of less hegemonic European/Western knowledge (and its democratic and social justice elements), with indigenous methodologies that have decolonisation intent (Table 2). Nabudere (2011) proposes Afrikology as a philosophy that also promotes balanced and sustained relationships with people of other cultures, the environment, and the living and non-living, among others. Homi Bhabha (1994) discusses "the space in between" where western research paradigms are contested and declared invalid, because they are based on a culture that has been made static and essentialized. There is also a recognition that essentialized views of indigenous cultures inform indigenous research paradigms and methodologies. Such views of indigenous cultures must be interrogated and opened up to include the voices and knowledge systems of the subgroups within indigenous essentialized cultures that are potentially excluded within the already marginalized indigenous cultures and research paradigms (Chilisa 2012).

Thus, in the third space, indigenousness is interrogated to include the voices of those disadvantaged on the basis of gender, race, ethnicity, ability, health, socioeconomic status, sexual orientation, age, and so on (Chilisa 2012). In the space in between, "all cultural statements and systems are constructed; therefore, all hierarchical claims to the inherent originality or 'purity' of cultures are untenable" (Bhabha 1994: 54).

Glasson et al. (2010) discuss a study based on a third space methodology. In this study, US and Malawian science educators explored the potential of including indigenous ways of living with nature in the school science curriculum. They investigated the agricultural practices of elders that contribute to environmental sustainability, and how elders negotiate their traditional practices within discourses of a third space that is influenced by western agricultural methods. The conclusion drawn from the study is that as farmers continue to interact in the global economy (and are exposed to western agricultural methods), hybridized practices and knowledge continue to emerge. In addition farmers had conserved indigenous ways of living with nature and understanding of the environment as demonstrated by their practices. Glasson et al. (2010)'s study in a way demonstrates how the integration of western science with indigenous knowledge took place in a third space.

Implications for sustainability science

Scientists and policy-makers are calling for the integration of ILK and western science, as demonstrated in the ongoing deliberations of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (e.g., Diaz et al. 2015). While ILK is receiving attention within the sustainability science community as discussed in

a recent special issue in Sustainability Science (Johnson et al. 2016), it still remains an under-researched topic in African contexts.

However, as demonstrated in the Makgoba project, academic researchers can view ILK as a resource to be appropriated and explored. Sustainability science needs to interrogate ways in which ILK systems have been undermined in addressing Africa's sustainability challenges. In transcidisciplinary research, each member of the collaborative team has specific knowledge of his or her discipline. The question is, in which and whose disciplines?

Disciplines, and their organisation, are largely the product of the Western academia, and its institutions. From the discussion in this article, Africa's sustainability challenges cannot be solved through academic disciplinary knowledge alone. In fact, some challenges require local solutions using predominantly approaches using ILK. African ontological, epistemological, and axiological beliefs show that there are indigenous perspectives, on ways that human beings and the environment can interact to maintain the sustainability of their communities and the environment.

Transdisciplinary research approaches require the involvement of actors from outside academia, such as stakeholders from business, government, and civil society to address sustainability challenges and develop solutions (Lang et al. 2012). The question is whether in practice, these stakeholders include the sages and other ILK holders. Often, practitioners from business and government operate within the boundaries and framings of conventional academic disciplines. Thus, a major challenge in transdisciplinary research approaches is how to involve sages or ILK holders not as practitioners, but as scientists operating with a body of science that like academic disciplines has its own structures. Transdisciplinarity needs to forge bridges between academic disciplines and ILK systems. Such ILK systems should be recognised as a transdiscipline with its assumptions about what constitutes reality and how reality can be investigated to address Africa's sustainability challenges.

Considering the above, there is need for sustainability science to add as a discipline to its terminologies concepts such as indigenous sustainability science, indigenous transdisciplinary research, and indigenous research methodology frameworks. These concepts need to bridge the boundaries between academic science and science based on ILK. The typology of methodological frameworks presented in this article can guide an assessment of the extent to which transdisciplinary research geared towards meeting Africa's challenges is inclusive of African voices. This typology can serve as a tool in the process of decolonising and indigenising sustainability science and transdisciplinary research.

Conclusions

The article begs recognition of African philosophies and worldviews as foundations of methodological approaches. They can be harnessed by indigenous communities and academic researchers adopting collaborative transdisciplinary research, to investigate and find solutions to complex sustainability problems that Africa faces. There is recognition that most of the research taking place in African spaces attempts to contextualise the research process but that contextualisation alone without decolonization, and a reflection on the philosophies that inform the research process is not sufficient. The unequal power relations between indigenous and western academic knowledge are the greatest threat to any form of collaborative research that seek to address Africa's sustainability challenges. In fact, the collaboration whether coming from mono-disciplinary, interdisciplinary or transcidisciplinary research, sometimes borders on a form of colonisation of ILK. There is need to decolonise mainstream methodologies that inform sustainability science inquiry, reclaim indigenous epistemologies, and envision indigenous methodologies that promote the co-existence of knowledge systems. Towards this end, this paper outlines a series of African philosophies and indigenous methodologies that can spearhead such efforts. It is time that Africans adopted a no knowledge production without Africans and without indigenous knowledge systems.

References

Alatas SH (2004) The captive mind and creative development. In: Mukheriji PN, Sengupta C (eds) Indigeneity and universality in social science: a South African response. Sage, New Dehli

Berger-Gonzalez M, Stauffacher M, Zinsstag J, Edwards P, Krutli P (2016) Trans-disciplinary research on cancer-healing systems between biomedicine and the Maya of Guatemala: a tool for reciprocal reflexivity in a multi-epistemological setting. Qual Health Res 26(1):77–91

Bhabha H (1994) The location of culture. Routledge, New York

Blaut JM (1993) The coloniser's model of the world: geographical diffusionism and eurocentric history. Guilford Press, New York

Boshoff N (2009) Neo-colonialism and research collaboration in central Africa. Scienometrics 81(2):413–434

Brandt P et al (2013) A review of transdisciplinary research in sustainability science. Ecol Econ 92:1–15

Briggs J (2013) Indigenous knowledge: a false dawn for development theory and practice? Prog Dev 12(3):231–243

Buntu BA (2013) Claiming self: the role of Afrikology in social transformation. Scrptura 112:1–12

Carroll KK (2008) Africana studies and research methodology: Revisiting the centrality of Afrikan worldview. J Pan Afr Stud 2(2):5–27

Chambers R (1997) Whose reality really counts? Putting the first last?. International Technological Publications, London

Chilisa B (2002) National policies on pregnancy in the education system in sub-saharan Africa: a case of botswana. Gend Educ 14(1):21–35
Chilisa B (2005) Educational research within postcolonial Africa: a critique of HIV/AIDS research in Botswana. Int J Qual Stud 18(6):659–684
Chilisa B (2012) Indigenous research methodologies. Sage, Los Angeles
Chilisa B, Preece J (2005) Research methods for adult educators in Africa. Pearson, Cape Town
Chilisa B, Tsheko GN (2014) Mixed methods in indigenous research: building relationships for sustainable intervention outcomes. J Mixed Methods Res 8(3):222–233
Chilisa B, Moletsane L, Simms M (2014) The department of science and technology-national research foundation (DST-NRF) review of the NRF managed indigenous knowledge systems (IKS) programme. Science and Technology Department, Pretoria, Republic of South Africa
Chilisa B, Major TE, Gaotlhobogwe M, Mokgolodi H (2016) Decolonizing and indigenizing evaluation practice in Africa: toward African relational evaluation approaches. Can J Program Eval 30(3):312–328
Chilisa B, Major T, Khudu-Petersen L (2017) Community engagement with an African-based relational paradigm. Qual Res 17(3):326–339
Clemence M, Chimininge U (2015) Totem, Taboos and Sacred places: an analysis of Kalanga people's environmental conservation and management practices. Int J Humanit Soc Sci Invent 14(11):7–12
Cram F et al (2013) The journey Begins. In: Mertens D, Cram F, Chilisa B (eds) Indigenous pathways in social research: voices of a new generation. Left Coast Press, Walnut Creek, pp 11–40
Diaz S, Demissew S, Carabias J, Joly C, Lonsdale M, Ash N, Larigauderie A, Zlatanova D (2015) The IPBES conceptual framework—connecting nature and people. Curr Opin Environ Sustain 14:1–16
Easton PB (2012) Identifying the evaluative impulse in local culture: insights from West African, proverbs. Am J Eval 33(4):515–531
Elabor-Idemudia P (2002) Participatory research: a tool in the production of knowledge in development discourse. In: Saunders K (ed) Feminist post-development thought: Rethinking modernity, post colonialism and representation. Zed Books, London, pp 227–242
Emagalit Z (2000) Contemporary African philosophy. http://homepages.acc.msmc.edu/fuculty/lindeman/af.html. Accessed 26 June 2001
Glasson G et al (2010) Sustainability science in Africa: negotiating indigenous ways of living with nature. Int J Sci Educ 32(1):125–141
Goduka IN (2000) African/indigenous philosophies: legitimizing spiritually centered wisdoms within the academy. In: Higgs P, Vakalisa NCG, Mda TV, Assie-Lumumba NT (eds) African voices in education. Juta, Lansdowne, pp 63–83
Hanks LH (2008) The Ubuntu paradigm: psychology's next force? J Humanit Psychol 48(1):116–135
Hodge P, Lester J (2006) Indigenous research: whose priority? Journeys and possibilities of cross cultural research in geography. Geogr Res 44(1):41–51
Hountondji PL (1983) African philosophy: Myth or reality. Indiana University press, Bloomington, Indianapolis
Johnson JT, Howitt R, Cajete G, Berkes F, Louis RP, Kliskey A (2016) Weaving indigenous and sustainability sciences to diversify our methods (WIS2DOM). Sustain Sci 11:1–176
Kaphagawani DN (2000) What is African philosophy? In: Coetzee PH, Roux APJ (eds) Philosophy from Africa: a text with readings. Oxford University Press, Oxford, pp 205–216
Karen M (2003) Ways of knowing, ways of being and ways of doing: a theoretical framework and methods for Indigenous re-search and indigenist research, voicing dissent, new talents 21C: next generation Australian Studies. J Aust Stud 76:203–214
Kovach M (2009) Indigenous methodologies: characteristics, conversations and contexts. University of Toronto Press, Toronto
Lang DJ et al (2012) Transdisciplinary research in sustainability science: practice, principles, and challenges. Sustain Sci 7:25–43
Letseka M (2014) Ubuntu and justice on fairness. Mediterr J Soc Sci 5(9):544–551
Li PP (2011) Toward and integrative framework of indigenous research: the geocentric implications of Ying-Yang balance. Asia Pac J Manag 29(4):849–872
Makgoba MW, Shope T, Mazwai T (1999) Introduction. In: Makgoba M (ed) African renaissance: the new struggle. Mafube Publishing and Tafelberg Publishing, Cape Town
Mehta K et al (2013) AcademIK connections: bringing indigenous knowledge and perspectives into the classroom. J Community Engagem Scholarsh 6(2):83
Mertens DM (2009) Transformative evaluation. Guilford Press, New York
Mertens DM, Wilson AT (2012) Program evaluataion theory and practice. A comprehensive guide. Guilford Press, New York
Mertens DM, Cram F (2016) Negotiating solidarity between indigenous and transformative paradigms in evaluation. Eval Matters 2:162–189
Moquin H (2007) Postcolonial reflections on research in a Inuit community: learning in community. In: Proceedings of the joint international conference of the Adult Education Research Conference (AERC) (48th National Conference) and the Canadian Association for the Study of Adult Education (CASAE), University of Glasgow, Scotland
Msila V (2009) Africanisation of education and the search for relevance and context. Educ Res Rev 4(6):310–315
Musyoka M, Mertens DM (2007) Making research and evaluation our own: ethical implications for strengthening the foundations for Africa-Rooted and Africa led enquiry. Mosenodi 13:104–113
Muwanga-Zake IWE (2009) Building bridges across knowledge systems: Ubuntu and participative research paradigms in Bantu-communities. Stud Cult Politics Educ 30(4):413–426. doi:10.1080/01596300903237198
Nabudere N (2011) Afrikology. An Epistemology. Cape Town African Books Collective, Philosophy and Wholeness
National Research Foundation (2012) Indigenous knowledge systems, knowledge fields development framework document. Department of Science and Technology, Pretoria, South Africa
Ntiamo-Baidu Y (2008) The effectiveness of sacred Grove, Taboos, Totems in Ghana for habitat and species conservation. J Study Relig Nat Cult 12:309–326
Nyasini J (2016) The ontological significance of "I" and "We" in African philosophy. Retrieved from http://www.galerie-inter.de/kimmerle/frameText8.htm. Accessed 14 Aug 2017
Ocholla D (2007) Marginalized knowledge: an agenda for indigenous knowledge development and integration with other forms of knowledge. Int Rev Inform Ethics 7:236–245
Oliver AC (1934) Mental tests in the study of the African. J Int African Institute 7(1):40–46
Oruka O (1998) Sage philosophy: indigenous thinkers and the modern debate. Nairobi University Press, Nairobi
Pascual U, Balvanera P, Díaz S, Pataki G, Roth E, Stenseke M, Watson RT, Yagi N (2017) Valuing nature's contributions to people: the IPBES approach. Curr Opin Environ Sustain 26:7–16
Ping L (2012) Toward and Integrative framework of indigenous research: the geocentric implications of Ying-Yang Balance. Asia Pac J Manag 29:849–872

Pryor J et al (2009) Exploring the fault lines of cross cultural collaborative research. Compare 39(6):769–782

Romm NRA (2015) Reviewing the transformative paradigm: a critical systemic and relational (indigenous) lens. Syst Pract Action Res 28:411–427

Russon C (2008) An Eastern paradigm of evaluation. J Multidiscip Eval 5(10):1–7

Said EW (1993) Culture and imperialism. vintage, London

Scheurich JJ, Young MD (1997) Coloring methodologies: are our research epistemologies racially biased? Educ Res 26(4):4–16

Shizha E (2010) Rethinking and reconstituting indigenous knowledge and voice in the Academy in Zimbabwe: a decolonisation process. In: Kappor D, Shizha E (eds) Indigenous knowledge in learning and Asia/Pacific and Africa. Palgrave Macmillan, New York, pp 115–129

Sibiri EA (2014) Totemism and environmental preservation among nembe people in the South–South Zone, Nigeria. Mediterr J Soc Sci 5(7):519–529

Sillitoe P (2010) Trst in development: some implications of knowing indigenous knowledge. J Roy Anthropol Inst 16:12–30

Smith IT (1999) Decolonising methodologies: research and indigenous people. Zed Books, London

Spivak GC (1988) Can the subaltern speak? In: Cary N, Grossberg L (eds) Marxism and the interpretation of culture. University of Illinois Press, Urbana, IL, pp 271–313

Walter M, Andersen C (2013) Indigenous statistics: a quantitative research methodology. Left Coast Press, Walnut Creek

Wilson S (2008) Research is ceremony: indigenous research methods. Fernwood, Manitoba, Canada

World Bank (1998) Indigenous knowledge systems in sub-Saharan Africa: An overview. IK Notes

Yantio DY (2013) Drawn from the traditions of cameroon: lessons from 21 years of practice. In: Mertens N, Cram F, Chilisa B (eds) Indigenous pathways to social research, voice from a new generation. Left Coast Press, Walnut Creek, pp 123–132