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The challenges of Integrating Indigenous Knowledge in the teaching of weather and climate in Geography in Manicaland province of Zimbabwe

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Abstract

Scholars have acknowledged that the current education system in Zimbabwe has done very little to incorporate learners' socio-cultural experiences. The purpose of the qualitative case study, from which this research draws its data, was to examine the views of the teachers and education officers on the challenges of integrating Indigenous Knowledge (IK) into the teaching of weather and climate. The study was conducted in secondary schools of Manicaland in Zimbabwe. It is hoped that these views from the various stakeholders can contribute to the ongoing discussions on updating the Geography curriculum (2015 – 2022) in Zimbabwe. Data was generated using interviews and focus group discussions. The study revealed numerous challenges in integrating IK into Geography in secondary schools which include the lack of written texts given the oral tradition, the training of teachers, insufficient IK experts for guidance, teachers own attitudes and beliefs, assessment challenges and urbanisation. However, I argue that these challenges should not detract from the decolonizing project of integrating IK into the Zimbabwean Geography curriculum, rather the challenges should open up avenues for further discussion on including IK in the curriculum. It is recommended that the Ministry of Education seek to address the challenges, reported on the integration of IK into the Geography curriculum, that lie within the ambit of teaching, learning and assessment.

Keywords Indigenous knowledge, teachers, Zimbabwe, Geography curriculum integration, challenges, weather and climate.

Introduction

This research reports on the anticipated challenges that teachers and Geography

ministry officials from Manicaland province, Zimbabwe foresee in integrating Indigenous Knowledge (IK) into the newly constructed

Geography curriculum (2015 – 2022) in the section on weather and climate. Whilst there are several challenges that are highlighted by these stakeholders, I argue that these challenges should not detract from the pursuit of the decolonizing project of integrating indigenous knowledge into the Zimbabwean Geography curriculum. Rather the challenges should open avenues for further discussion and tangible efforts for the Ministry of Education to commit to including indigenous knowledge in the curriculum.

Various perspectives on Indigenous and Western education

The British Education system, which was adopted in Zimbabwe, just like in many colonized nations, regarded IK as primitive and inappropriate to colonial economic interests (Nherera, 2000; Shizha, 2006; Sibindi, 2017). In contrast, Eurocentric knowledge was regarded as superior to other forms of knowledge (Nherera, 2000; Shizha, 2006; Sibindi, 2017). Most curricula in former British colonies are a replica of colonial curricula in which IK has been largely ignored (Dreyer, 2018; Mavhunga, 2006; Shizha, 2010; Sibindi, 2017). However, some scholars argue that science is contested knowledge hence there are many ways of knowing (Dei 2000; Kawagley, 1998; Mapara, 2009). Dei (2000) views the integration of IK as a way of overcoming the colonization of knowledge and culture in different geographical areas. He advocates for a hybridisation of knowledge. Hybridisation is a concept in which people who are living in two lifeworlds gain knowledge from either side, that is a mix of IK and western knowledge in a curriculum (Carter, 2006).

Studies have shown a mismatch between mainstream education and that of indigenous people. Mainstream education has tended to

ignore and trivialize the knowledge that indigenous people bring into the classroom (Dreyer, 2018). Furthermore, Sigauke, (2016) acknowledged that the current education system in Zimbabwe has done very little to incorporate students' sociocultural experiences. This has negatively affected the academic success of indigenous students (Barnhardt and Kawagley, 2005; Cushner, McClelland and Safford, 2012; Gay, 2010; SkutnabbKangas and Dunbar, 2010). The government of Zimbabwe has introduced a new Geography curriculum in trying to redress the issue of IK which has for long received little attention and has been regarded as irrelevant. It is against this background that this research explores the views of teachers and education officials on the anticipated challenges of integrating IK into the teaching of weather and climate in secondary schools.

The meaning of indigenous knowledge

Indigenous is "something that existed before colonialism" Hewson and Ogunniyi (2011:680). The South African Department of Education (2003) regards indigenous as something that has originated in Africa. Govender, Madaly and James (2013) observe that indigenous knowledge is passed on from one generation to the other and owned by local communities. Khupe's (2014: 43) view of indigenous knowledge as "something originally in the area or produced within the area" has been adopted in this research. In this paper, indigenous refers to the descendants of people who were in Zimbabwe before the colonization of Zimbabwe in the 1890s and thus the knowledge they have procured from their forefathers is regarded as indigenous knowledge.

There is contestation as to what constitutes knowledge. It varies with one's philosophy

and focus. The definition can also change due to socio-political dynamics. Aikenhead (1996) views knowledge as a way of knowing. Hewson, (2015) views it as a way of seeing and Tefflo (2013) suggests that it is a people's way of life while Ogunniyi and Ogawa (2008) regard it as ways of living and behaving properly. In this study, knowledge is taken as a way of living and the belief systems of a community.

The value of introducing IK in the section of weather and climate in Geography

Zimbabwe, like any other country, is being affected by the effects of climate change. The economy of Zimbabwe is agro-based, yet modern weather forecasting is becoming less reliable due to the unpredictable weather changes caused by global warming. The Zimbabwean situation is worsened by the poor state or the absence of weather stations to gather information to predict weather with more accuracy in some parts of the country. Aguado and Burt (2010) argue that weather forecasting is becoming less reliable due to a lack of accurate information on atmospheric composition. The main meteorological station is in Belvedere, Harare and is facing challenges in projecting accurate temperatures for the whole season due to outdated technology (Zinyemba, 2015). Seeking alternate forms of knowing is now imminent.

Fanon (1963) asserts that for the decolonization programme to be successful, change needs to take place. This change comes through integrating IK in the teaching of Geography. Dreyer (2018: 364), therefore urges teachers to "create a rich learning environment that aligns with the learners' context and cultural background." The decolonization of the Geography curriculum, as noted by Khupe (2014), is a step towards recognizing the importance of IK as a way of

knowing. Decolonization of the curriculum allows indigenous communities to control their information, cultural knowledge, histories and cultural artefacts (Baskin, 2006). Mosweunyane (2013) adds that indigenous world views promote the use of indigenous pedagogies in the classroom such as the use of traditional songs and stories.

Indigenous knowledge plays a significant role for learners and the community. Breidlid (2009) observes that indigenous epistemology allows the teachers and the students to identify themselves with the learning process and learners' experiences. According to Mawere (2015), when learners associate what is learnt from school with their experiences in the community, learning becomes more interesting. Furthermore, Mawere (2015: 61) urges for IK integration in the school curriculum as the application of prior knowledge by the learner promotes, "innovative thinking and constructivism." The use of local examples enables the learners to relate themselves to the learning process in the classroom. In Kenya, students performed better when they use their own language and related information to their cultural experiences (Dennis, 2010). The integration of IK has thus been found as a way of sustaining IK and heritage (Aikenhead and Michell, 2011; Nakata, 2003).

Scholars such as Shizha (2006) view the integration of indigenous knowledge into the curricula as a way of empowering teachers, learners and community in the education system. Social constructivists believe learners can construct knowledge as they interact with their environment (McLeod, 2014). Furthermore, Nakata (2003,) justifies the integration of indigenous knowledge into the school curriculum by arguing that it contributes to the generation of new

knowledge and the creation of a curriculum that is inclusive and capable of achieving sustainable development. Dei (2000: 120) concurs by pointing out that the integration of IK into the curriculum was “a way of acknowledging that different forms of knowledge are complementary and co-exist”.

The report by the Nziramasanga Commission of Inquiry into Education and Training in Zimbabwe values the incorporation of IK in the classroom as this inculcates ubuntu values among the learners. (Government of Zimbabwe, 1999). *Ubuntu* values promote community cooperation (Mungwini, 2013) and individuals who are productive and responsible (Mutekwe, 2015). More so, as evidenced in South Africa, integrating IK in school curricula allows the teaching of the history and heritage of a country (Department of Education, 2014).

The knowledge gap

Various studies have been carried out in Zimbabwe on IK (see Magwa, 2008; Mapara, 2009; Muguti and Maposa, 2012; Shava, 2005; Shizha, 2006; Shoko, 2012; Tatira, 2000). However, these researchers, in their studies have largely shown the forms of IK that are available and their importance to society. These researchers do not focus on the classroom teaching of IK in Geography particularly under the topic of weather and climate. The lack of IK integration in classroom teaching is confirmed by Dreyer, (2018); Matsika, (2012); Ogunniyi, (2016); Pedzisai, (2013); Shizha, (2008) who have all acknowledged that there is minimal application of IK in the classroom setting.

Theoretical Framework

This study is guided by multiculturalism theory. Multiculturalism is a system of beliefs and behaviour that recognizes and respects the diversity of values and cultural

beliefs of the people in a community (Knight, 2008; Kymlick, 2012; Rosado, 1997). The theory acknowledges the existence of different forms of knowledge (Stanley and Brickhouse, 2001). This study, therefore, acknowledges the co-existence of different forms of knowledge (IK and Western science) brought into the classroom by learners from diverse backgrounds and ethnicity. Multiculturalism fights against the segregation of marginalized groups such as the indigenous people. Kymlick (2012:6) points out that multiculturalism calls for “human equality among all nations” (Kymlick, 2012, 6). It emanated from the need to cater for diversified socio-cultural classrooms. Ensuring diverse classrooms requires teachers to review their teaching content and methods (Dreyer, 2018; Jay, 2011). Multiculturalism developed as a result of colonized nations attaining their independence and reviewing their education curriculum (Jay, 2011). In Zimbabwe, the government is currently reviewing its curriculum among other reasons to incorporate more indigenous knowledge (Government of Zimbabwe, 2015). The study is therefore pertinent in exploring the challenges that may be faced in curriculum change to improve the implementation process of the curriculum review.

Methodology

This study positions itself within the interpretive paradigm. The interpretive paradigm can be referred to as naturalistic (Patton, 2015) or constructivist (Katrina and Jill, 2019). Interpretivist research takes place in “real-world settings and the researcher does not attempt to affect control or manipulate what is folding naturally” (Patton, 2015: 48). The interpretive paradigm makes use of qualitative methods such as interviews and focus group discussions (Mertens, 2015). The research paradigm

understands “humans or objects in their social context” (Pham, 2018: 3). In the study, the views of the participants namely teachers and education officials (Provincial Geography Inspector and Provincial Curriculum Officer) regarding the challenges of integrating IK in the teaching of Geography were gathered in their schools and communities. Interviews and focus group discussions were used to generate data. As suggested by Patton (2015), these were conducted in places where the participants were comfortable.

Creswell (2013) avers that a case study uses detailed in-depth data generation techniques and multiple sources of data. To ensure that the sample was achieved, participants were informed of the pending interviews and focus group discussions so that they could re-schedule their programmes or give another date for the interviews. The selection of participants was done through purposeful sampling. This was to ensure that people with rich information on the challenges of integrating IK in the teaching of weather and climate were selected. Permission was obtained from gatekeepers and appointments were made with the participants. Data was generated from interviews and focus group discussions with teachers and ministry education officials as presented below:

- Interview with two (2) Geography teachers from each of the 7 districts to make a total of 14 interviews with Geography teachers in the whole Province;
- Interview with one (1) Provincial Geography Inspector per whole Province;
- Interview with one (1) Provincial Curriculum Officer per whole Province;
- Seven (7) focus group discussions with Geography teachers in the whole province

A list of questions designed in both English and the local language, *Shona*, were used for the interviews and the focus groups. The teachers understood and speak English fluently but they sometimes switched languages when responding. Convenience sampling was used to select the schools. Etikan, Musa and Alkassim (2016) suggest that convenience sampling is based on costs, access and geographical proximity. The choice for convenience sampling was based on easy accessibility, distance from my workplace and costs. Since personal resources were used, schools that were easily accessible by road and within a reasonable distance from my residence were selected to reduce transport costs. The District Schools Inspector (DSI) also assisted the researcher in selecting the schools.

Data were analyzed using qualitative content analysis. The method involved coding and grouping data into main themes (De Wever, Schellens, Valke, and Van Keer, 2006; Hsieh and Shannon, 2005). Detailed descriptions using direct quotations were used to present the data as suggested by Cohen, Manion and Morrison (2011). Informed consent forms were provided and signed by all participants before the interviews and the focus group discussions. The next section deals with the context of the study.

Context of study

Manicaland is a province in Zimbabwe situated on the eastern border. It borders Mozambique on the eastern boundary. Manicaland was selected as the study area for different cultural, physical and personal reasons. There is diversity in religious beliefs, dialects, tribes and physical environments in Manicaland which made the study on indigenous knowledge more interesting as different world views were articulated during the data generation

process. This provided rich descriptions with different perspectives regarding the integration of IK into the teaching of weather and climate in secondary schools.

The Manicaland region was also chosen for study as the researcher was born and bred in the province. As young boys, we were expected to wake up in the morning and to work in the fields and look after goats and cattle. The elders taught the youngsters cultural values such as respect for elders, sharing and being responsible. The virtues of *ubuntu* were promoted in the extended family. As we grew up the elders would teach us how to carry out farming activities and how to predict the weather.

Findings

The Geography teachers and education officials were of the view that there would be numerous challenges in integrating IK into the teaching of the topic of weather and climate in Geography in secondary schools. These challenges are discussed below.

Lack of documented resources

The Manicaland Province Geography Inspector (MPGI) explained how the lack of documented resources is a challenge to IK integration:

Most of the information we have is oral. There are not many efficient sources on indigenous knowledge systems on weather and so on. That will be a challenge because when you are to integrate, you must be fully knowledgeable about what you want to teach.

It was evident from MPGI's view that undocumented sources of information impede the integration of IK in the teaching of weather and climate. There are few sources on IK that can be used to teach IK in the Geography lessons. The teachers are not fully knowledgeable of the IK content to be taught due to a lack of documented sources to

which they can refer. The teacher also believed that they needed documented sources to refer to during scheming, planning and preparation of teaching.

A teacher (TIMUT1) in an interview expressed how information can be altered when passed from one person to the other orally:

The problem with integrating IK is that there is no documentation that we have, the problem is unrecorded information. It lacks consistency, people die with some knowledge before it is passed to the next generation and people not willing to record, as such it lacks coherence of some sort. If my grandmother told my father something before, she dies, the same knowledge impacted by my father to my child Rukudzo she can't say it 100 per cent the way it was told by my grandmother.

It was evident from TIMUTA1's explanation that the challenge of integrating IK in the teaching of weather and climate was unrecorded information on IK which lacks consistency and coherence. Furthermore, the teacher (TIMUTA1) observed that as a result of the oral nature of IK, information is altered during transmission from one generation to the other.

Another teacher (CFGCHIP1) in a focus group discussion in Chipinge, believed that the dialect used in IK textbooks could be a challenge in integrating IK in the teaching of Geography lessons in secondary schools:

The content of textbooks may vary depending on the dialect used by the author. A textbook written by a Kalanga can differ with the one written by a Ndau author.

Kalanga is a dialect commonly used in Masvingo province whereas Ndau is spoken in the eastern parts of Manicaland, Zimbabwe. The teacher (CFGCHIP1) thus perceived variations in the content of IK

textbook content written by authors from different dialect groups as a challenge to the integration of IK in teaching. In Zimbabwe, there are different local indigenous languages. Different terms meaning the same thing can be used to explain IK aspects of weather and climate. This variation poses a challenge in understanding IK aspects. For example, a common rain bird used to forecast weather is known by different terms such as *haya*, *dzvotsvotsvo* or *koriro* in different dialects within the same province of Manicaland.

Lack of training by teachers in indigenous knowledge

It was evident that some teachers were not prepared to integrate IK in the teaching of weather and climate in Geography lessons in secondary schools because they lacked any form of training in indigenous knowledge: One of the participants (TFGCHIP4) stated that:

We have heard about indigenous knowledge, but the challenge is especially that we have not been trained. Teachers need to be trained. Especially myself I am not prepared to teach IK because there is a lot of research. I am not used to change. More so, we have few of these elderly people who can assist us.

The teacher (TFGCHIP4) viewed the lack of training by teachers in IK as a major challenge in integrating IK in the Geography lessons. In addition, the teacher felt that it is a burden to research IK in preparation for the lessons. It is also a challenge for the teachers to change from the usual classroom teaching practices to that which involved integrating IK in teaching. More so, the lack of elderly people with expertise in IK who could assist in teaching Geography lessons was regarded as a further challenge of the integration and teaching IK in Geography.

However, it is important to take note of the comments given by MPGI, who gave a counter-argument regarding the lack of trained teachers. The Geography Inspector (MPGI) proclaimed that:

Teachers are trained during a certain era and they don't expire with the expiring of a syllabus. They should be able to read and understand these things (referring to IK) and teach them.

The Geography inspector's argument exposes that teachers should be able to adapt to changing learning environments. He argued that teachers were not trained for a specific syllabus or content of which they should be able to adapt to the new Geography curriculum. MPGI seems to suggest that teachers are supposed to engage in ongoing development of themselves as teachers to meet changing demands in the education sector. The Geography inspector, therefore, does not view a lack of training by teachers as a hindrance to integrating IK in the teaching of weather and climate in Geography.

Shortage of indigenous experts

One of the teachers (CFGMUT2) explained how a shortage of indigenous experts could hamper IK integration in secondary schools:

I think one of the challenges of integrating IK may be in urban set-up, it may be so challenging to get someone, an elderly person who can actually come to help in delivering such a lesson.

The findings from the teacher (CFGMUT2) revealed that the scarcity of indigenous experts who are knowledgeable in IK poses a challenge to IK integration in the teaching of weather and climate topic in Geography. The teacher (CFGMUT2) believed that in urban areas, a shortage of indigenous experts could hamper the teaching of the topic on weather

and climate in secondary schools. Elderly people often retire to their rural homes once they are no longer employed in the urban areas of Zimbabwe. This creates a shortage of elderly people who are supposed to be consulted as indigenous experts who can be invited to teach IK in the Geography class on weather and climate in the urban areas.

CFGCHIM4 echoed the views of CFGMUT2, on the shortage of elderly people who could teach IK related to weather and climate in secondary schools. CFGCHI4 explained:

Another challenge is that the elderly people who are knowledgeable are now few at present. As a result, the learners have nowhere to research from, issues on IK.

The teacher (CFGCHIM4) perceived the shortage of elderly people as a challenge of integrating IK in the teaching of the topic of weather and climate in Geography in secondary schools. The shortage of elderly experts in IK within urban areas could hamper research by both teachers and learners.

The MPGI concurred with the teachers that the shortage of elderly people impeded the integration of IK in Geography lessons on weather and climate:

The biggest challenge is the source of information. Most of the information we have is oral. We have to extract it from a live person. There are not many efficient sources on IK systems on weather and so on. That would be a challenge because when you are to integrate you must be fully knowledgeable about what you want to teach. I think this is a major challenge especially for people in urban areas who are no longer in touch with African tradition.

MPGI believed that the challenge of the integration and teaching IK in the Geography

lessons on weather and climate is a lack of sources on IK especially for people living in urban areas who are no longer in touch with African traditions. It was evident from both the teachers (CFGMUT2; CFGCHIM4) and the Geography inspector (MPGI) that the shortage of elderly people who have expertise in IK impeded the integration of IK in the teaching of weather and climate in Geography in secondary schools.

Teachers' prior experiences and background on indigenous practices

One of the teachers (TFGMUT2) narrated how prior experiences on rain making ceremonies in Nyanga, Zimbabwe can influence one's perception of indigenous knowledge:

It was in 1995 soon after the drought period of 1991 to 1994. The traditional elders came to the school and announced that enrolment was going to be low on a Thursday as they will be holding mukwerere (rain-making ceremony). They did that and were there at the ceremony. They informed us that we were supposed to be near homes or houses as it was going to rain cats and dogs. After the ceremony no rains were experienced over a week from the day of the rainmaking ceremony--from this experience, I would personally say these things I don't think they work anymore, they don't work for me, I don't believe in rain-making ceremonies.

The teachers' prior experiences of indigenous practices were a challenge for the integration and teaching IK under the topic of weather and climate in secondary schools. The teacher (TFGMUT2) had a negative attitude of mukwerere (rain-making ceremony) after attending a rain-making ceremony that failed to yield some rain within the expected period despite community elders promising the teachers heavy downpours after the rain-making ceremony. Based on this experience,

TFGMUT2 believed that these rain-making ceremonies no longer have any value as they don't work anymore.

Another teacher (TFGMUT1) concurred with TFGMUT2:

Mr Risiro, because I don't believe in rainmaking ceremonies, so integrating it is a bit shaky, but a Teacher who believes in it may integrate IK. I say to a lesser extent we can integrate it because most of the things on IK do not work, maybe they use to work that time but doesn't work now.

The teacher (TFGMUT1) noted that it was a challenge to integrate and teach IK in Geography lessons on weather and climate for a teacher who does not believe in indigenous practices such as rain-making ceremonies, nevertheless, the teacher was of the view that those teachers who believed in indigenous practices could integrate IK in the teaching of weather and climate.

In another focus group discussion in Chipinge, one of the teachers (TFGCHIP1) was of the view that the integration of IK in the teaching of weather and climate depends on one's religious inclination, age and past experiences.

I think belief in indigenous practices depends on one's religious inclination as well as age. An elderly teacher who used to witness rain making ceremonies a long time ago can believe in rain-making ceremonies, but for a young person who never experienced rain making ceremonies may not believe in it.

The teacher (TFGCHIP1) thought that the elderly teachers who used to witness some rains after their elders performed *mukwerere* (rain-making ceremonies) are more likely to integrate and teach IK in the Geography lessons of weather and climate than the younger generation of teachers. It is therefore evident that prior experience of indigenous

practices and the age of the teacher may be a determinant of the integration and teaching of IK in the Geography lessons in secondary schools.

Religious beliefs

The findings from the teachers established that Mission schools could be a challenge to the integration of IK in the teaching of weather and climate in Geography in secondary schools as one of the teachers (TFGMUT2) explained:

And even some of the schools themselves like we have the Catholic schools, we have the Adventist schools, they can even come to an extent of selecting some of the content to teach.

The teachers felt that the integration of IK in the teaching of weather and climate can be hampered by Mission schools that may select the content to teach in institutions that are under their control.

In Zimbabwe, some schools are run by churches such as the Catholic and Adventist schools. These schools have their own philosophy, norms and values which they feel should be taught. The responsible authorities at that local level can decide on the curriculum to be taught in the schools. This may pose a challenge to the integration of IK in the teaching of weather and climate in Geography.

The Christian beliefs by parents were also viewed by Manicaland Provincial Curriculum Development Officer (MPCDO) as a challenge to integrating IK in the teaching of weather and climate in secondary schools:

Introducing IK is going to be controversial and difficult because the parents themselves won't understand it. This is why up to this day very few (referring to children) can play

traditional dance at a school, yet every child can sing Christian songs.

The MPCDO views parents' belief in Christianity as a challenge to the integration and teaching of IK in Geography lessons. Parents inculcate Christian values among their children as opposed to IK as evidenced by the lack of traditional dance play at school. Yet, the same students can sing Christian songs very well. The view expressed by MPCDO, seems to suggest that the values and beliefs cherished in the homes and community of the learners influence the learners' acceptance of the knowledge acquisition of IK in schools.

TFGCHIP4, concurred with the views of MPCDO that Christianity in Zimbabwe is overriding indigenous traditions thus making it a challenge to integrate and teach IK in the study of weather and climate in Geography in secondary schools:

Right now, our generation grew up when Christianity was overriding these traditions. So now instead of mukwerere (rain-making ceremony), we are saying if we go and fast and pray rain will come. God will intervene.

The teacher (TFGCHIP4) views the dominance of Christianity over indigenous traditions as a challenge to the integration and teaching of IK in the study of weather and climate in Geography. The teacher (TFGCHIP4) views the role of indigenous practice such as *mukwerere* (rainmaking ceremonies) being overtaken by fasting and praying for the rains. The new generation of teachers and students has grown up in an environment where Christianity is viewed as modern and indigenous practices as ancient and retrogressive.

Urbanisation

The study established from the interview with the Manicaland Province Geography

Inspector (MPGI) that urbanization is perceived as a challenge to the integration and teaching of IK in the Geography lessons in secondary schools as stated below:

Urbanisation is a challenge especially for people in urban areas here who are no longer in touch with real African tradition.

MPGI believed that people living in urban areas pose a challenge for the integration and teaching of IK in the study of weather and climate in Geography. The Geography inspector believed that the people in urban areas are divorced from African tradition as a result both the teachers and the elderly people lacked the knowledge to teach IK to Geography learners. Rural to urban migration has resulted in people from different backgrounds and culture mixing. In some cases, this has caused cultural erosion and multi-cultural classes that may need special skills to teach. Such skills may be absent from some teachers who did not receive training in indigenous knowledge. TFGMUT2 revealed that a diversity of cultures in urban areas presents a challenge in integrating IK in the teaching of weather and climate in secondary schools as elaborated below:

In a classroom set up we have got two cultures, those who have the rural background and those with an urban background so it would be difficult to incorporate those learners and for them to believe one thing.

TFGMUT2 believed that it was a challenge to have a common ground on IK content to teach in a multicultural class. Students from rural background have a different culture from those in the urban environment. They view the world with different lenses such that they have a different understanding of IK concepts in the study of weather and climate. The challenge is largely due to learners who

bring a diversity of norms, values and cultural practices to the classroom. This makes it difficult for the teacher to reconcile learners with these diversified cultural backgrounds.

Assessment Challenges

The findings from the teachers' interviews and focus group discussions revealed that variations in dialect pose a challenge not only in the integration of IK but to assessment aspects. One of the teachers (TFGCHIM2) explained that:

As we said earlier on (referring to terms used to describe rainmaking ceremonies) other areas may say makoto (rain-making ceremony beer) to describe rain making ceremony; others mukwerere, so we might face challenges standardizing the examination just like standard Shona. Some are Karanga (dialect used in Masvingo), some of us Vanawasu (people from Mutasa area), I come from Honde valley.

The teacher (TFGCHIM2) viewed dialect differences spoken across Manicaland as a challenge during the assessment of Geography concepts in secondary schools. The teacher (TFGCHIM2) observed that the rain-making ceremony is known by different terms in different parts of Manicaland. The variations in the dialect spoken by both the teacher and the student may pose some challenges during an assessment of weather and climate in Geography.

The view by TFGCHIM2 on the terminology used to refer to rain making ceremony was echoed by other participants in other parts of Manicaland. The term *makoto* was mentioned by TFGCHIM2 in the eastern part of Chimanimani. In the western part of Chimanimani two participants (TFGCHIM1; CFGCHIM1) used the term *zvitsanza* to describe the same rain making ceremony. In Chipinge (CFGCHIP4), the rain making

ceremony is referred to as "*doro remutere*". The variations used to describe the same aspect of weather and climate poses a challenge to the markers who may not be familiar with the dialect used by the learner.

In addition to these differences in dialect, teachers also held that IK is geographically specific. As such, geographic variations of IK were a challenge in integrating IK in the teaching of weather and climate in secondary schools. Teacher (TFGBHU3) asserted:

Maybe on assessment, if it is summative assessment, these IKS differ from one area to another. Maybe the things we are doing here in Manicaland, they are not the same things that are done in Matabeleland, so when it comes to summative assessment it becomes a problem.

The teacher (TFGBHU3) perceived the geographic-specific nature of IK as a challenge of teaching IK in the studies of weather and climate. The teacher observed that IKS differed from one area to another. There are also variations in indigenous practices. For example, the practices of Manicaland may vary from those in Matabeleland. This poses a challenge during the summative assessment of weather and climate in secondary schools.

It was evident from the teachers' interviews and focus group discussions that indigenous knowledge is geographic specific. The indigenous practices and terminology used to describe geographical phenomenon may also vary over space. These issues pose a challenge for the assessment of weather and climate IK in Geography in secondary schools.

Discussion

The value of IK for Zimbabwean learners should not be underestimated. The use of

indigenous knowledge in complementing modern methods in weather forecasting and mitigation of weather hazards has been effectively used in Tanzania (Mhita, 2006) and in Western Kenya (Thompson Reuters Foundation, 2012). Nevertheless, teachers believed that including IK in the Geography curriculum in Zimbabwe, in the section on weather and climate would have numerous challenges. The teachers stated that they are not knowledgeable as to what to teach in IK due to a lack of documented sources reference materials. Elsewhere, the shortage of learning materials was found as an impediment to the full implementation of indigenous technology and culture in South Africa (Vandeleur, 2010). The teachers need documented sources to refer to for their schemes of work, planning and preparation of teaching notes. The available books that are currently being used in schools in Zimbabwe have been largely imported from Britain and portray a British culture as illustrated by Shizha (2006) and Mavhunga (2006). Jekede (1999) also noted that IK is orally transmitted and some of the information can be lost during transmission. This lack of resources in integrating IK was also observed in research carried out at North-West University, South Africa (Mmola, 2010).

Zimbabwean Geography teachers were also reluctant to introduce IK into Geography as they believed that they lacked the necessary training in indigenous knowledge. In South Africa, Vandeleur (2010) found out that a lack of qualification in indigenous knowledge hampered the teaching of indigenous technology and culture as the teachers lacked the confidence to teach the subject matter. Mmola (2010), in his study at North-West University, noted that a shortage of teaching staff trained in IK was a hindrance to the integration of IK in the

classes. Older community members have the potential to close this gap in qualification and research carried out in Canadian schools revealed that teachers invited community elders to deliver lessons on local traditions (Dennis, 2010). In this research, however, elders were frequently unavailable, particularly in urban areas. This shortage of indigenous experts in the community means that teachers do not have a resource-base that they can draw on to assist them where they feel underqualified.

The background of teachers can either enhance or hinder the teaching of IK as observed by Vandeleur (2010) in a study of the South African indigenous technology and culture curriculum. Teachers in the current study, who lack an indigenous background, had a negative attitude toward indigenous practices as they did not believe in integrating IK in the teaching of weather and climate in the Geography lessons in secondary schools. In the South African context, Vandeleur (2010) found that teachers who were exposed to indigenous technology and culture were more prepared to implement the new curriculum on culture and technology. Those teachers who had a westernized background, however, found it difficult to implement the new curriculum on indigenous technology and culture. Similarly, in their study of the Aborigines in Australia, Mclaughlin and Whatman (2015) noted that urban teachers who did not have connections with Aborigines found it difficult to integrate indigenous knowledge in the classroom. Religious influences can also impact the insertion of IK into classroom practices. Shizha (2006) observed that colonial education in Zimbabwe regarded indigenous knowledge as primitive and irrelevant to their economic interests. Those schools that regard indigenous education as inferior may resist incorporating IK in the

teaching of weather and climate in secondary schools.

Conclusions and some recommendations

The views expressed in this study report on several anticipated challenges in integrating IK in the teaching of weather and climate. The findings reveal from the views of teachers that a lack of documented resources and training of teachers in IK was a challenge in integrating IK in the teaching of weather and climate. Zimbabwean relevant source materials are scarce such as textbooks on IK for use in the schools. This makes it difficult for the teachers to undertake schemes, plan or prepare notes to teach. The attitude and belief systems of the teachers are yet another hindrance to IK integration. Some teachers, due to their religious beliefs and previous experiences, do not believe in indigenous traditions. They are therefore not prepared to teach IK in secondary schools. Furthermore, some of the teachers believe that IK has been replaced by modernization and Christianity. The teachers felt that some of the schools run by religious organizations prescribe the content that should be taught in their schools, thus posing a challenge to the integration of IK in the Geography curriculum. Variations in IK concepts due to different dialects used in Manicaland province presents a challenge to the learners when learning for assessments and to markers in the summative examinations. Thus, some strategic decisions need to be taken as to which dialect/dialects to foreground because it would be impossible to include all in the curriculum.

The teachers proposed the team writing of IK textbooks so that information from the diverse backgrounds of the authors can enrich IK content in the schools. Staff development was proposed to equip the teachers with content and IK methodologies. Ultimately, the integration of indigenous

knowledge in the teaching of weather and climate is one pathway to reclaim Zimbabwean national identity and the cultural values that were removed when colonial education was imposed. The integration of IK in the teaching of weather and climate in secondary schools will enrich existing knowledge when teachers are trained. It will grow learner understanding of geographical concepts by making lessons more learner and community-centred if indigenous experts from the community are allowed to feed their knowledge into lesson content. If IK is included in the Geography curriculum in the section on weather and climate, it could be valuable in providing the skills of weather forecasting that have been used by the indigenous people to the new generation of learners. This would complement modern methods of weather forecasting in providing more reliable forecasts.

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