

The Place of Indigenous Knowledge Systems (IKS) in the Teaching of Science: A case study of Fifteen Primary Schools in Gwanda South

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ABSTRACT

Given the multicultural configuration of Zimbabwean classrooms, teachers of science and technology, like educators across the field of all learning areas, are gradually being challenged to reflect how they and their learners perceive of and, as a result, construct knowledge. In an expanding globalised world, learners can easily become isolated from what is taught in science and technology, as well as the way it is taught. Using the Indigenous Standpoint Theory (IST) which purports that, when working in a community, there is need to involve and respect the ethos of the local people culturally, morally, socially and spiritually, this article looks into the value of incorporating indigenous knowledge systems in the teaching of science in primary schools. The paper recommends the inclusion of SeSotho indigenous knowledge systems in the school curriculum as means of demystifying science and technology to the indigenous communities.

Keywords: Indigenous Knowledge Systems, Mainstreaming, Ethno-Science, Basotho, Curriculum

INTRODUCTION

All nations, the world over are working hard to achieve socio-economic development in various spheres of their economies. However, development can never be complete and meaningful without scientific innovation. To have innovations, the education systems of different economies need to produce scientists and nurture a powerful scientific resource base for sustainable socio-economic development. Science is a pillar and springboard for economic development and success. Discoveries made by scientific researcher are key to a healthy prosperous community as science has the capacity to solve some socio-economic problems such as poverty, inequality and unemployment.

Zimbabwe is multilingual and multicultural in nature. As a post-colonial state, Zimbabwe is not completely free from the shackles of colonialism. During the colonial era, English was the lingua franca with Shona and Ndebele being widely used as dominant national languages. Other indigenous languages like Sotho or Sesotho, Venda and Kalanga were viewed as minority languages and as such were not accorded enough space in the school curriculum. Due to this approach, these so-called minority languages suffered severe marginalisation to the extent that they were removed from the primary school curriculum. At independence, in 1980, SeSotho is one of those languages which were no longer offered in primary schools. This implies that Sesotho was replaced by Ndebele and this had a bearing on the cultural development of the Sotho people. This further implies that the Indigenous Knowledge System of the Sotho community were negatively affected since there was no one to teach the language and produce the relevant literature.

This paper argues for the integration of Indigenous Knowledge System (IKS) in the teaching of Science at primary school level. It is a case study seeking to establish how IKS could be part of Science teaching through mainstreaming Sotho as one of the formerly marginalised indigenous languages.

Indigenous Knowledge Systems

Indigenous Knowledge Systems refers to unique local knowledge that is particular to a given culture or society (<http://www.sedac.ciesin.columbia.edu>). The website further argues that this body of knowledge is particular to

a geographical area upon which the indigenous people have been surviving for years. In the light of colonialism, such knowledge forms have endured the onslaught of Western imperialism. IKS are forms of knowledge whose origins are local and natural (Alteri,1995). According to Ermine (cited in Hammersmith 2007), IKS are linked to the communities that produce them. He further observes that the communities have complex kinship relationships among the people, animals and other natural phenomena. IKS are known by different names such as indigenous ways of knowing (Nyota and Mapara 2008), or rural knowledge or ethno-Science or people's science (Altieri 1995).

The term Sesotho refers to a language that is spoken by Sotho people. It is important to point out that SeSotho was taught in pre-independent Zimbabwe until the late sixties when the colonial government recognised only chiShona and isiNdebele as the two national indigenous languages. Reasons for the termination of SeSotho in schools were not clear. As a result of extensive lobbying by civic organisations like the Zimbabwe Indigenous Languages Promotion Association (ZILPA) and the provisions of the new national constitution, Sotho language has been reintroduced in some Gwanda South primary schools where the language is predominantly spoken. The removal of SeSotho from the school curriculum meant that infant classes in Gwanda South were to be taught in Ndebele as an indigenous language. This situation dealt the Sotho speaking children a double blow since Ndebele to them was a second indigenous language. Thus, the children were faced with a language and cultured dilemma. The learning of subjects like science could therefore not easily be linked with the Sotho indigenous knowledge systems, hence the focus of this paper to seek ways of using IKS to enhance the teaching of science at infant level through mainstreaming SeSotho.

Purpose

This study sought to establish the link between Sotho IKS and conventional science by searching for ways of infusing IKS in the school curriculum using the mainstreaming of SeSotho. It further sought to identify successes and challenges in using SeSotho and infusing IKS in science teaching.

Importance of the study

The study focused on identifying the role of IKS in the teaching of science through mainstreaming SeSotho as an indigenous language. The infusion of IKS in the teaching of science could strengthen the learners' understanding of the subject since they would be moving from the known to the unknown. It is further envisaged that the findings from the study will influence planning and policy making in the field of education at various levels.

REVIEW OF RELATED LITERATURE AND THEORETICAL FRAMEWORK

This paper is grounded in the Indigenous Standpoint Theory (IST) which purports that, when working in a community, there is need to involve and respect the ethos of the local people culturally, morally, socially and spiritually. As a theory, the indigenous standpoint theory is a method of enquiry and a process of making more intelligible, the corpus of objectified knowledge about indigenous communities as it emerges and organises the understanding of people's lived realities (Nakata, 2007). The theory underscores the important agentive role that ought to be played by the indigenous people in matters that benefit or impact their lives. The theory explores the actualities of the lived everyday experiences from an endogenous perspective as opposed to deploying predetermined exogenous concepts and categories for explaining experiences. Regarding education, the theory states that any type of knowledge should be ontologically and epistemologically reflect the values and beliefs of the people who are meant to benefit from it.

Within the education fraternity, particularly teaching, the theory finds relevance in that it offers important insights to teachers and learners for shaping and validating factual, subject specific content and critically conceptualising and integrating social and personal skills, processes and information that learners bring, and which ultimately adjust or reconstruct knowledge content (Van Wyk, 2002). Thus, the application of the Indigenous theoretical standpoint makes education and schooling more responsive to social change, indigenous epistemologies as well as people's lived experiences. This encourages the cross-fertilising perspectives in

science and technology production in local contexts considering how the setting allows the teaching and learning process to rely on what the students already know (Roth, 1998).

METHODOLOGY

This study adopted a mixed methods approach which used both the qualitative and quantitative approaches. The qualitative approach was used to get an in-depth understanding of the respondents' perceptions on how indigenous SeSotho knowledge could be used in the teaching of science. The information generated was the verbatim expressions of the respondents (Monton, 2001). The approach helped the researcher to make an exploration of the respondents' attitude and motives (Welman et al, 2005).

Gwanda South District has 40 primary schools with 35 of them expected to teach SeSotho. However, in reality only 22 primary schools actually taught SeSotho. The study used a systematic random selection of 15 out of a total of the 22 primary schools that taught Sotho language in Gwanda South district. These 15 schools were selected because of easy access and adequate staffing. The participants involved 15 school-heads, 15 teachers, 1 district schools' inspector, 1 chief and 3 councilors. In qualitative research, purposive sampling is used because it focuses on rich sources of information on the phenomenon being studied (Chisaka 2014). To come up with the sample the researcher used personal judgement and expertise about the Sotho language and culture. Purposive sampling which is sometimes called judgmental sampling was used (Hagan, 2006) quoted in Berg (2009).

Semi-structured interviews and group discussions were used to generate and collect data. The researcher personally administered the interviews and moderated the group discussions. There were three group discussions of 4 participants per category. These were for the councilors, heads, teachers and learners. Systematic random sampling was used to select the four participants for each group of learners from grade 1 to 3 at the same school. The interviews and focus group discussions were used to generate and collect data from the same respondents. Each interviews took thirty minutes and the group discussions took forty minutes each. The interviews and focus group discussions were conducted at the selected schools during working hours. Semi structured interviews produced quantitative data while the focus group discussions generated qualitative data. The different instruments were used to collect data, for purposes of triangulation. Triangulation of methods involves the use of different data collection instruments with the same subjects. This has the merits of strengthening the weaknesses found in one method (Elaine, 2002). To ensure consistency and leading to trustworthiness of the study, it was important to spend the same amount of interview time with each interviewee (Thomas and Nelson 2001). During the interviews and focus group discussions, the researcher made detailed notes on the respondents' views and perceptions including the information they conveyed through body language. The transcriptions and the observer notes provided a complete picture of the discussions that took place (Berg, 2009).

Data were collected in the form of thick descriptions of the respondents for both the interviews and focus group discussions. The qualitative data were subjected to content analysis which involved considering consistency of comments and responses to probes and questions by respondents across interviews and focus group discussions (Berg, 2009). The purpose of such an analysis was to identify trends and patterns that reappear during the course of interviews or focus group discussions. Qualitative data were presented in verbatim excerpts of the respondents to capture their lived experiences. The quantitative data were processed using the Statistical Package for Social Sciences (SPSS). Presentation was in the form of frequency tables and charts.

FINDINGS AND DISCUSSIONS

The study sought to find the place of Sotho IKS in the teaching of science subjects in the primary school. A case study using mixed methods approach was used. Data gathering involved the use of questionnaires and group discussions administered by the researcher. Qualitative and quantitative data was collected. This study found that even though Sotho was spoken in the areas identified for the study it still faced competition with other dominant languages like Ndebele and also to a certain extent, Shona. Such a scenario greatly determined

the extent to which Sotho was spoken as a language of transaction and whether it should be taught in schools in the Sotho speaking communities. The following sections give an outline and discussion of the collected data.

Figure 1 below confirms the above assertion.

Primary schools that offer Sotho in Matabeleland South Province

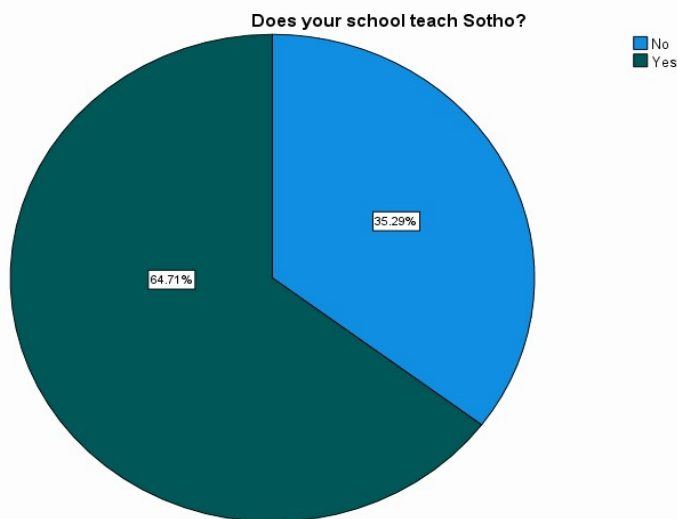


Figure 1. Primary schools supposed to teach Sotho in Matabeleland South (n=35)

According to the Ministry of Primary and Secondary Education data there are 40 primary schools in Gwanda South district 35 of which should teach Sotho. According to the findings of the study, Figure 1 indicates that 64.71% (n=22) schools taught Sotho while 35.29% (n=13) did not teach the language although they were in a Sotho speaking community. The data solicited indicated that Ndebele was taught instead of Sotho. The participants indicated lack of competence in Sotho, lack of interest in the language and non-availability of resource materials such as text books. The situation indicated a policy gap regarding the implementation of the Sotho language. The overarching implication was that the Sotho IKS integration in science subjects was negatively affected. Such a practice works against the Indigenous Standpoint Theory (IST) which advocates for a need to respect and uphold the local community cultures and ethos. The practice further contravenes the provisions of the 2013 Zimbabwean constitution and the Ministry of Primary and Secondary circular number 1 of 2002 which provide for the teaching of Sotho as a language of instruction at infant level in Sotho speaking communities.

The above findings made it necessary to seek personal information about the teachers deployed in the schools selected for this study, hence the information in Table 1 below.

Table 1. Biographic variables for Primary School Teachers in Sotho speaking communities (n=31)

Biographic Variable	Variable Description	Frequency	Percentage
Gender	Male	10	32.3
	Female	21	67.7
Age	40-44	3	9.7
	45-49	6	19.4

	50-54	9	29.0
	55-59	11	35.5
	60-65	2	6.45
Highest Professional Qualification	PhD	0	0
	Masters	0	0
	Honours	0	0
	Bachelor's degree	16	51.6
	Diploma in Education	15	48.4
	Other	0	0
Job Title	District Schools Inspector (DSI)	1	3.2
	Heads of Schools	15	48.4
	Teacher	15	48.4
Teaching Experience	5-10 years	5	16.1
	11-15 years	8	25.8
	16-20 years	6	19.4
	21-25 years	5	16.1
	26-30 years	4	12.9
	31-35 years	3	9.7
	36-40 years	0	0
Level Taught	ECD A	6	20
	ECD B	6	20
	Grade 1	6	20
	Grade 2	6	20
	Grade 3	6	20
	DSI	N/A	N/A

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Table 1 indicates that the lowest qualification of the teachers in the schools selected for the study is the Diploma in Education with the Bachelor's degree being the highest. Furthermore, the data indicates that the participants were mature people with vast teaching experience. According to table I, the participants teaching experience ranges from 5 to 35 years. The lowest experience is 5to 10 years with 6.1% (n=5) while those with 11to 15 years are the majority with 25.8 % (n=8). According to the solicited data all the participants except the DSI were suitably qualified to teach infant classes according to the Ministry's standards. The findings imply adherence to set criteria for selecting teachers as well as when promoting them. The researcher also observed that the teachers selected to teach infant classes were quite mature with their age ranging from 40 to 65 years. Such data is testimony that deployment of teachers to take infants classes was a deliberate exercise to using set criteria thought to benefit such classes. This implies that the Ministry of Primary and Secondary Education had mandate to implement government policy the way they saw fit, hence the need to seek personal details about teachers meant to teach Sotho. The expectation is that the same principle of selection is used for selecting teachers who take Sotho classes.

Use of mother tongue

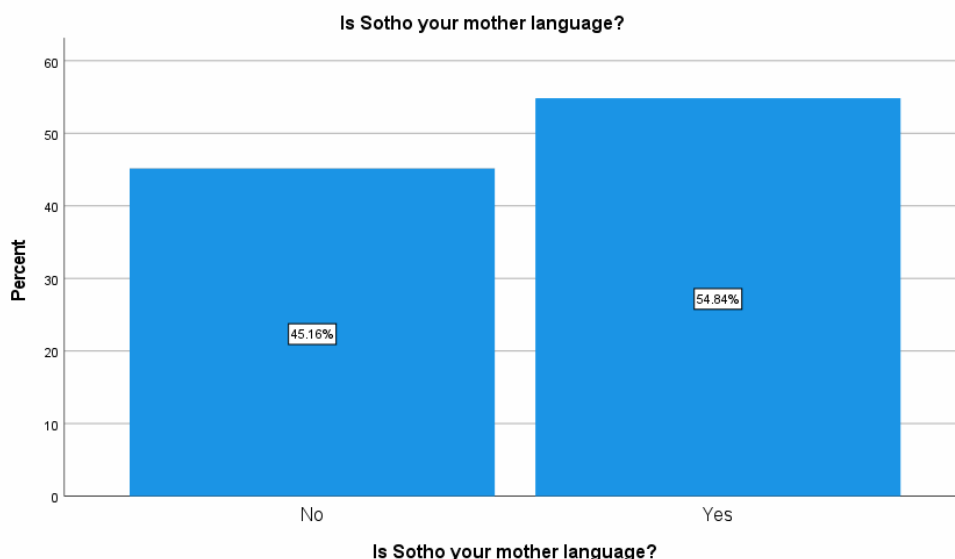
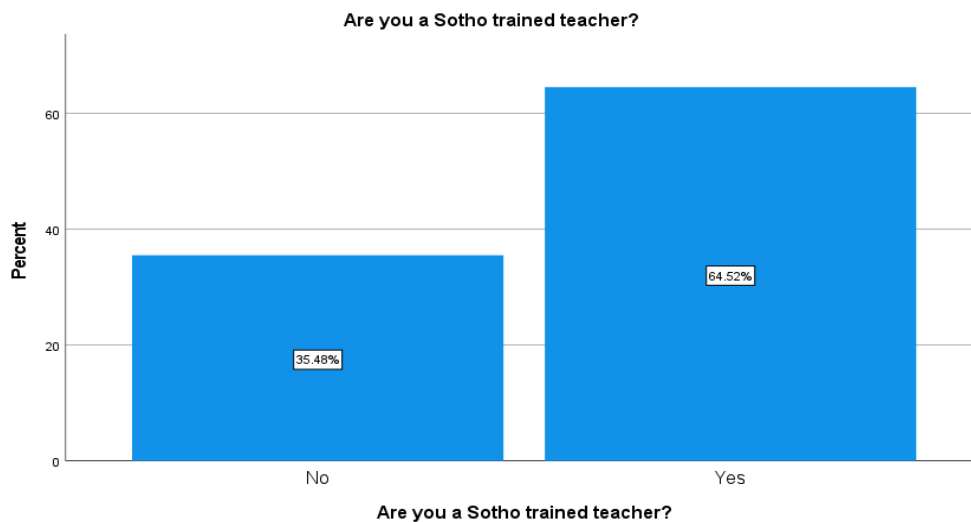


Figure 2. Teachers whose mother language is Sotho (n=31)

Figure 2 above indicates the language competencies of teachers assigned to teach the Sotho language. According to the data given above 54.84% (n=17) speak Sotho as their mother language. The other 45.16% (n=14) speak Sotho as their second language. This may imply that the teachers may have different levels of language and cultural content that may shape attitudes and behavior towards the Sotho language. It further implies that the indigenous Sotho speaking teachers are better placed to implement the teaching of the Sotho language than their counterparts who use Sotho as a second language. With such background information it became necessary to find out if the teachers were trained to teach Sotho or not.



Sotho trained teachers (n=31)

According to given statistics, 64.52% (n=20) are Sotho trained teachers and 35.48% (n=11) are not qualified to teach the Sotho language. This revelation has a negative effect on the attempts to mainstream the teaching of the Sotho language. The implication is that the untrained teachers rely on the language skills they gather from their communities which are currently a hybrid of Sotho, Tswana, Ndebele and Shona languages. Such a scenario does not auger well for the vulnerable infant classes and the Sotho mainstreaming programme.

Interviews and group discussions indicated that the use of the mother language especially for infants was a welcome move in schools. This further supports the need to have Sotho trained teachers to run the Sotho mainstreaming programme. A female teacher had this to say;

“At infant level the children learn better in their mother tongue. This reduces the burden of learning different languages at the same time.”

The above given sentiments are in line with the Education Act 1987 which was amended in 2020, which emphasises the use of mother tongue in schools. In the formative years of education, it is important that education should be in indigenous languages and Sesotho is one of them. Article 27 of the UNDHR (1948) states that minorities shall not be denied the right to --- enjoy their culture--- religion and language. In the context of Zimbabwe, Sesotho speakers have a right to speak their languages and develop their culture.

The use of mother tongue has the support of the 2013 Zimbabwe Constitution. Section 6 of the constitution provides for the teaching of indigenous languages in a bid to democratise the school curriculum and increase tolerance and diversity in terms of thinking. However, such declarations should be translated into tangible efforts to develop the indigenous languages so as to redress their current status (Maseko and Dhlamini, 2013). The study further sought to establish the extent to which teachers were able to integrate Sotho IKS in science subjects.

IKS in science teaching

The study found that there was a certain level of Sotho IKS integration in science teaching at primary school level, hence the information displayed in Table 2 below.

Table 2. Teacher Participants' Perceptions About Sotho IKS (n=31)

Variable Description	Yes	%	No	%	No Response	%
1. Do you think the IKS is an important part of Sotho culture?	20	64.5	3	9.7	8	25.8
2. Do you think the Sotho IKS should be preserved as intellectual property?	16	51.6	5	16.1	10	32.3
3. Is the Sotho IKS integrated in the teaching of science subjects?	18	58.1	7	22.6	6	19.4
4. Does your community use some traditional methods of food preservation?	22	71	0	0	9	29
5. Does your community use some traditional methods of treatment?	26	83.9	0	0	5	16.1

Table 2 shows that 65.5% (n=20) agree that Sotho IKS are an important aspect of Sotho culture. On the other hand, 9.7% (n=3) feel that Sotho IKS are not an important aspect of culture. While 25.8% gave no response. On the need to preserve Sotho IKS as intellectual property, 51.6% (n=16) agreed while 16.1% (n=5) did not agree. The remainder 32.3% (n=10) did not give responses. Regarding the integrating of Sotho IKS in the teaching of science subjects, 58.1% (n=18) agreed that there was such an integration, while 22.6% (n=7) felt that there was no integration. The rest, 19.4% did not respond to the question. On the communities' use of traditional ways of preserving food, 71% (n=22) agreed that their communities had traditional knowledge of preserving food. There was no negative response. The remaining 29% (n=9) did not respond to the question. Concerning the use of traditional medicine for some ailments, 83.9% (n=26) were positive that their communities had knowledge of medicine. There was no negative response. There was no response from 16.1% (n=5).

The responses given above indicated that although the respondents were Sotho speaking they did not have a sound knowledge of what Sotho IKS are and this was confirmed by a substantial number of no responses. This may further imply that there were no clear systems or structure in the communities to pass such information from generation to generation. This places emphasis on relying on the education system to play the role. In spite of the fore mentioned, there was evidence that there was integration of Sotho IKS in the teaching of science subjects at primary school level.

Language is the vehicle of culture. It is through language that traditions are passed on from generation to generation.

A school head said;

"Children should be taught from the known to the unknown. Teachers should identify topics which can be illustrated by activities such as brewing beer, making morula/marula wine or sour milk. The children are familiar with such activities from their homes and learning can be made easier".

The activities mentioned above such as brewing *maheu/mahewu* (a fermented corn and malt non-alcoholic beverage), opaque beer, *morula/umkumbi* (marula wine) and sour milk are truly traditional ideas which are scientific. The three processes stated above use the process of fermentation to produce alcohol and sour milk

(*mankhatha/amasi*). The alcohol is popular for religious-social purposes in the traditional sense and sour milk is for nutrition.

At lower levels, the Grade 1 to 3 syllabus has topics on health and food. Such topics as making sour milk and brewing can be introduced. The concept of fermentation could be discussed in simple terms, using indigenous languages so that it does not sound like a new or foreign idea when it is discussed in Chemistry and Biology lessons at secondary level. Such an approach in teaching is very important in helping the learners as it demystifies scientific concepts. It makes the young learners feel at home in the science classroom as the concepts would continually make recourse to their lived experiences. However, this requires commitment and critical thinking on the part of the teachers as they rethink of how they can strategically construct opportunities and spaces in which they will be able to build on the learners' knowledge and experience (Harlen and Elstgeest, 1992), in the process, enabling learners to position themselves in a democratised curriculum.

Discussions with learners revealed that they had knowledge about food preservation as well as indigenous ways of treating ailments when they said,

Yes, at school we are taught about how to preserve meat and vegetables. Also at home our grandmothers teach us these methods. We have even seen how they brew beer which they sell to pay our school fees.

In African communities, food preservation through dehydration is common practice. One councilor said;

“As traditional leaders we would be happy if teachers could transmit our culture to the children. Most of us in rural areas, do not have refrigerators. In most cases we use drying to keep our food for a long time eg. meat, fish and vegetables”.

Traditionally Africans had and still have ways of preparing and preserving food. The focus group discussion with teachers - in - charge of infant classes revealed that in the SeSotho tradition, dried meat *mekhoapa/chimukuyul/imihwabha* (biltong) and *mfushoa/umfushwa* (dried vegetables) are still some of the most common food items produced through drying. This is because there are seasons of the year when vegetables would be in abundance then followed by the cold dry season when there are hardly any fresh vegetables from the fields.

Through the discussion they explained that meat was cut into long stripes before sprinkling with salt or the ash of certain plants that could be used instead of salt. The meat was then hung to dry without boiling it. Such practice was common during hunting expeditions/ safari or *ijumo* in Ndebele. Vegetables are cut and dried or boiled before drying. The teachers explained that mushrooms (*maboa/howa/amakhowa*) were first boiled and then dried. Fish were smoked while birds, hare and rock rabbits were boiled then dried on the fire or smoked. Whilst drying using wood fire the meat would acquire an aroma that is appealing to consumers.

The method of dehydration was and is still meant to drive out moisture from the food so as to limit bacterial activity from decomposing it. During drying, most nutrients in the food are retained whilst some are destroyed. The process of drying could be taught in the primary school through outsourcing facilitators from the community. This could bring parents into active participation in curriculum implementation. Among the Sotho people selected varieties of maize cobs, *ntse* (sweet reed) and sorghum were hung inside the traditional kitchens, so the teachers explained. Soot from the hearth was used to coat the grain. The seed attained a bitter taste that protected it from the stock borers and rodents or rats. The seed could last for at least two or three seasons. When this method is compared with the one used by current seed houses, it is found to be better because today's seeds preserved using modern methods do not last for more than one season. In this way ethno-science seems to have an advantage over conventional methods of preservation.

On the medical front one teacher said,

“The aloe ichena in Ndebele is used to treat some stomach ailments in humans and can also be used as preventive medicine for the new castle disease in chickens”.

The above given information is evidence enough that IKS can be used alongside conventional science in the medical field. Although the respondents had knowledge about the plants to be used for treating different ailments, they could not give the scientific principle involved. This is often the reason why Western pharmaceutical companies often tap the medical knowledge of Africa's traditional pharmacologists (Emeagwali www.africahistory.net).

Medically, it was interesting to note that even Early Childhood Development (ECD) learners are aware of the conditions that can be treated using indigenous knowledge. A learner from one of the schools explained that a scorpion bite can be treated or using ashes made from roasted and ground scorpion tails. The ash is then rubbed on the spot of the bite and some is eaten. The school head further explained that the ashes neutralises the poison in the body and the pain subsides. Similarly, one could eat the ash even when they have not been beaten by a scorpion. He explained that the process had the effect of a preventive vaccine. When one is beaten after the process, the poison is neutralised and the effect becomes mild. Such traditional knowledge needs to be infused into the science curriculum so that IKS become part of conventional knowledge.

When interviewing the chief the following sentiments came out.

Our Sotho culture is very rich in ways of preserving food. The problem is that we now look down upon those methods in favour of methods brought about by the Whites. What we know is that meat and vegetables are dried to be used later instead of using refrigerators. Also instead of drinking bottled beer, we used to drink morola/umkumbi (marula wine) which is very nutritious. It is unfortunate that nowadays there are very few people who can pass this knowledge to our children. Culture is very important. I have noticed the development of cultural villages, I think that can help to revive and strengthen our culture.

One of the school heads said,

“Traditionally it is common knowledge that if one has a bout of “flue” a mixture of guava, lemon and eucalyptus leaves is boiled and the person is given to drink for a day or two and they get healed”.

When probed to give specific measurements, he just said that a ‘reasonable’ amount should be given.

Another area where traditional science knowledge could be tapped and used to educate children under the topic, health. However, it is acknowledged that the plants mentioned above are exotic although used in a traditional manner. The use of plants and animals in traditional medicine, could assist to help the children to see the need to conserve plants and other animal species in the environment. This could lead to stewardship of the environment and preservation of eco systems. It is here that culture through an indigenous language plays a role in science education and conservation of the environment. The conservation of plants is quite critical in greening the environment and so play a crucial role in mitigating climate change and global warming.

Successes

The chief who was interviewed was grateful that SeSotho was reintroduced in the education system. She seemed optimistic about cultural revival. Language is a cultural treasure (Chiwome and Gambahaya, 1998). The reintroduction of SeSotho in the school curriculum is in line with the Ministry of Primary and Secondary education secretary's circular Number 1 of 2002 which emphasises the teaching and learning of mother tongue. The policy pronouncement is complemented by the 2013 Zimbabwe constitution which recognises sixteen formerly marginalised indigenous languages. It is in line with these legislations that has made it possible for SeSotho to be reintroduced in primary schools in Gwanda South.

According to infant teachers interviewed, lobbying civic organisations like the Zimbabwe Indigenous Languages Promotion Association (ZILPA) played a significant role in influencing opinion on the inclusion of SeSotho as one of the recognised indigenous languages by the Zimbabwe Constitution. Furthermore, the

association sensitised the SeSotho community on the need to mainstream SeSotho in the primary school curriculum.

Challenges

During interviews heads of schools lamented lack of material and human resources in the implementation of SeSotho as a language. The dearth of Sotho skills among educators deserves urgent attention. The non-availability of SeSotho teachers implies that it could be difficult to use SeSotho in the teaching of Science at primary school level. This has the effect of negatively affecting IKS since the English language is used as the medium of instruction. Furthermore, the mainstreaming of the Sotho language in the education sector is largely rhetorical without adequate support to make it a reality.

CONCLUSION

It is possible to infuse IKS in the teaching of science through mainstreaming SeSotho as an indigenous language. To make this a reality, the teaching of SeSotho in primary schools needs to be well resourced. Curriculum reform needs to factor in SeSotho IKS so as to help develop the SeSotho language and culture and its use in science teaching thereby ending the dichotomy between traditional science and conventional science. There is need for a paradigm shift towards indigenising knowledge to help formerly marginalised cultures to develop.

RECOMMENDATIONS

From the findings in the study it is recommended that resources for the teaching of SeSotho in schools should be made available. A deliberate effort should be made by central government to facilitate teacher education colleges and national universities to train prospective Sotho teachers. This is because the needed resources are in the form of qualified SeSotho teachers and learning materials such as textbooks which are currently in short supply. While government is commended for recognising Sotho as an official language, there is need to step up efforts to monitor the implementation of the provisions of the Secretary's circular number 1 of 2002 which requires that infant classes should be taught using the mother language to enhance understanding of concepts.

In areas like Gwanda South where SeSotho is predominantly spoken, SeSotho trained teachers should be deployed to schools that offer the language. Currently there is no strong policy aimed at achieving this. It is not a surprise to find Ndebele or Shona speaking teachers teaching infant classes in a SeSotho speaking area. Such a scenario under develops the SeSotho language and culture as well as the influence of IKS in learning. The ongoing curriculum reform should factor in the use of IKS in the teaching of science. Science topics could be arranged so as to include IKS. Thus, the gap between viewing the curriculum as an aspiration could be narrowed through using the research and development approach to teaching (Stenhouse, 1995).

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