Chapter 10

Indigenous Knowledge

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Chapter 10

Indigenous Knowledge

> *"We need to return to our roots – to cultivate the land – everything comes from the earth*."
>
> (Elder: September 2002, C30c)

Introduction

South Africa's Curriculum 2005 prescribes Indigenous Knowledge (IK) for inclusion in schools. It also allows for the development of localised content and accommodation of different ways of learning (Revised National Curriculum Statement, 2003). It is not at all clear what this might mean for teachers, teacher trainers and communities (Chisholm, 2000). Dekkers (2005) poses these questions about Indigenous Knowledge and Technology (IKT): "Where can teachers find this IKT-for-learners? How does school science relate to it? What does integration of both (as opposed to teaching first one, then the other) look like?" The National Research Foundation has formed a focus group on Indigenous Knowledge Systems and has earmarked funding for IKS projects. Calls for the development and inclusion of Indigenous Knowledge come also from academics: "Education must not be simply an assimilation of Western values, but must also be directed towards the strengthening of indigenous culture." (Mboya, 1999:ix). (See also Brown & Miller, 2001; Odora Hoppers, 2001; 2002; Brock-Utne, 2002.) Furthermore, drawing on Indigenous Knowledge could lead to solving practical problems especially in relation to the environment (Ortiz, 1999).

Our focus on relevant science includes this practical aspect – and extends this to 'practical' in the sense of enhancing self-esteem and social identity. My concern here is two-fold:

- What indigenous knowledge could be incorporated into school curriculum?

- What understandings of worldview need to contribute to and inform our teaching and curriculum design?

In relation to the first aspect, searching for traditional 'bits that fit' into the science syllabus is a gross simplification of Indigenous Knowledge preservation and a result of our Western science hubris. Indigenous Knowledge is not just about 'woven baskets' and 'traditional dances *per se"* (Dah-Lokonon, 1997 in Odora Hoppers, 2002:9). However, this is not to say that local examples are not fitting (see for example, Manzini, 2000b). Malcolm (2002b:26) points out that even within a social-constructivist framework "these approaches are designed to lead students to particular (predetermined) explanations." While there may be some merit in using examples of traditional technology in teaching science concepts (Dekkers, 2005), the inquiry into Indigenous Knowledge in science education needs to go deeper than this.

Why focus on Indigenous Knowledge and worldview?

There are sound pedagogical reasons for considering the role of IK in the science curriculum (Aikenhead, 1996; 2002a; Jegede, 1995; Cameron, 2005; Ogunniyi, 2000). "Student learning depends on community beliefs, acceptable identities, and the consequences for a student's life outside the classroom (and inside it) …" (Lemke, 2001:301). (I take up the issue of identity later in this chapter.) The difficulties of learning within the foreign, and often hostile culture of science have been researched by Ogunniyi, (1995); Cobern, (1996); and Fleer, (1997), among others. Jegede's (1998) claim that students' cultural beliefs and practices affect how and what they learn has been corroborated by Ogunniyi, (2003). On the level of knowledge creation, the worldview of a community causes them to validate and value some knowledge above others (Cobern,1996). Aikenhead (2001b) points out that Aboriginal children should be advantaged by their cultural identity and language and not disadvantaged by them.

In the larger context of the type of community-based curriculum that I am advocating, the development aspects too, need to be embedded in cultural practices. Easton et al. (2002, quoted in Higgs, Higgs & Venter, 2003:41) recommend an IKS approach to development and criticise current methodologies of development for ignoring cultural heritage.

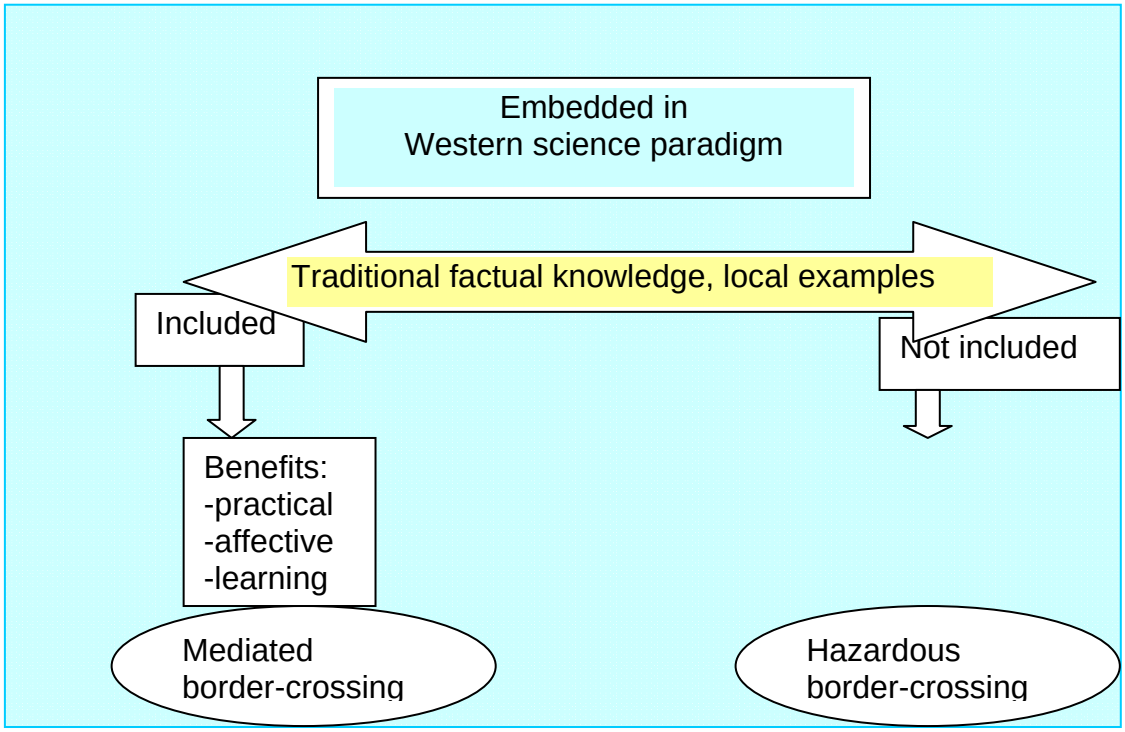
Learning creates change. Educators need to be aware of the impacts of this change, which may not always be positive. "Changing your mind is not always a matter of rational

decision-making. It is a social process with social consequences." (Lemke, 2001:301). Students may become alienated from their communities, from their belief systems and from themselves by being inducted forcefully into a foreign knowledge paradigm.

I attempt to illustrate these two aspects of incorporating Indigenous Knowledge into science curriculum. In Figure 10.1, the examples of relevant context, localised STS (Science Technology and Society) and Indigenous Technologies are being used to illustrate or explore science concepts. I accept from a learner-centred perspective (Taylor, 1999; Fensham, 2000; Keane & Malcolm 2002) as well as from multicultural drives for 'the inclusion of all' (Fensham, 1985; Atwater, 1994) that such inclusion and relevance is valuable. If the conception of Indigenous Knowledge inclusion stops at this level it places this knowledge as a subset of Western science. It would be more accurate to acknowledge that Western Science itself is an Indigenous Knowledge system, based in its own culture and philosophy (Kyle, 1999). In this case 'border-crossing' would be necessary for everyone learning science irrespective of their culture.

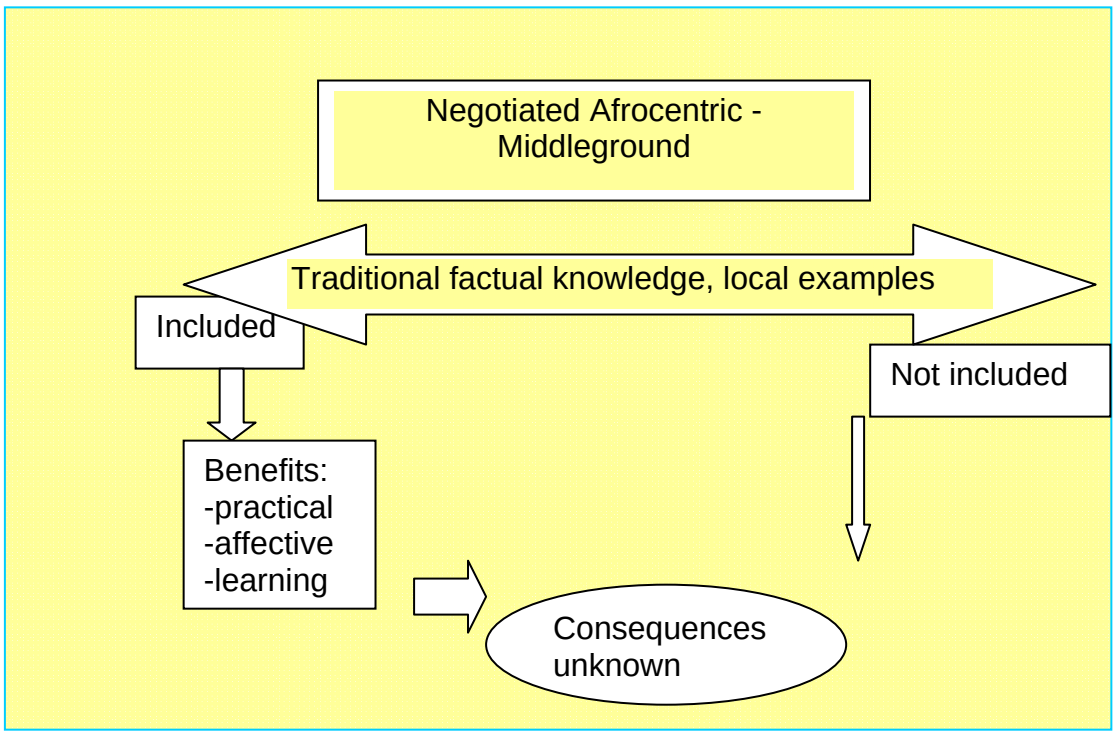
Discovering the first type of 'illustrative' aspects of relevance formed part of my research focus. However, my contention is that this usually occurs within the overall, and often tacit, Western science paradigm (Figure 10.1). By not acknowledging this stand-point or by presenting Western science as a superior epistemology, students are left feeling bewildered or patronised (Aikenhead 1996, Ogunniyi, 2003). Figure 10.1 shows that whether IK examples are included *or* excluded, these take place within a Western science paradigm.

Figure 10.1 Indigenous Knowledge models embedded in Western science paradigm



Alternative frameworks have gained ground, especially in America. These include Afrocentrism or Middle-ground positions (Wilson & Padron, 1995), Figure 10.2.

Figure 10.2 Indigenous Knowledge models embedded in African worldviews



To engage the challenge of bringing Indigenous Knowledge into the science curriculum means that underlying-pervasive and often non-explicit ontologies need to be explored and accorded due respect (Obenga, 2004; Odora-Hoppers, 2002). Odora Hoppers advocates a "new synthesis that incorporates the existing diversity." (Odora Hoppers, 2002: xiv). In our exploration of relevance, aspects of Afrocentric worldviews emerged. These views are not only perspectives formed from a set of beliefs but an expression of profound knowledge systems and ontologies, that shape and guide perception and thinking. It is also knowledge at this level that needs to be researched.

South Africa and other African countries differ significantly from Europe and America where emphasis on 'multiculturalism' often includes an amorphous club of 'minorities': 'people of colour', the physically or academically challenged and gay-headed families. This is the broad inclusive multiculturalism spoken of by, for example, Atwater (1995). In South Africa, the great majority of students are Black Africans and different ethnic groups tend to live in different parts of the country. On a national scale, South Africa is a 'rainbow nation', but, except in major cities, this is not the case in communities. The community we are working in is not 'multicultural'. It is strongly homogenous: Zulu and Christian-traditional. Our primary interest here is not in 'accommodating' or 'including' difference within the school, but "to substitute a more pluralistic view of the world in place of the prevalent Eurocentric view" (Wilson & Padron, 1995:39). At the same time students need to appreciate and participate in the larger family of the 'rainbow nation'. Towards the end of our project, students commented: "We enjoyed talking to Whites" (SS 11b). But that 'talk' needs to build on a more established African identity, rather than the historical hegemony of Euro-centrism.

Lemke challenges science educationists to consider: "what kinds of personal identity and cultural values our science teaching accepts, respects, or is compatible with." (Lemke, 2001:300). This requires reflection at personal, curriculum, institutional, societal and policy levels. Without reflection, tacit axioms and attitudes can go unnoticed. For all its cleverness, science can be myopic. Song writers have long known:

> *"Everybody knows that the dice are loaded… Everybody knows that the fight was fixed, the poor stay poor, the rich get rich. That's how it goes. Everybody knows."*
>
> (Cohen & Robinson, 1988)

An example of knowledge embedded in a Western worldview is our common acceptance that knowledge is *'acquired' or 'gained' (often competitively) for the purpose of progress.* The concept of 'progress' needs to be examined (for example, whether new technologies constitute progress), and so does the suggestion that knowledge and knowledge 'acquisition' should be defined in relation to progress. Hountondji (2002) criticises colonisers as pretending to have sole right to define knowledge.

What is Indigenous Knowledge?

I use the terms Indigenous Knowledge and traditional knowledge synonymously. Definitions are numerous: Indigenous Knowledge Systems are described in the South African Revised Curriculum Statements as "a body of knowledge embedded in African philosophical thinking and social practices that have evolved over thousands of years" (DOE, 2002:9). It is also a way for people to "understand themselves" (Semali & Kincheloe, 1999:3). Nakashima and Roue, 2002) describe it as:

> " ... *sophisticated arrays of information, understandings and interpretations that guide human societies … in their innumerable interactions with the natural milieu* …"

Odora Hoppers (2000) broadens the definition to include economic, legal and governance systems. Of course IK is not one concept, and neither is IK always public, to be teased into categories and definitions: some is hidden away, known only to shamans, elders or gender groups. I will follow neither the broad definition of Odora Hoppers nor specific esoteric aspects, but focus on the general ways of knowing – in line with Nakashima and Roue. I also will show how the claim of Horsthemke (2004) that "Indigenous Knowledge is a misnomer" in that "there is only knowledge" is unhelpful in its ignoring different ways of seeing, valuing, relating and expressing knowledge.

There is wide agreement that Indigenous Knowledge is dynamic and evolving (for example, Higgs, Higgs and Venter, 2003; Seepe, 2004). Lewis-Williams expresses this in a broad context:

> *"We should think of changing society as a braided river course, streams parting and then joining again. Those streams are technology, social relations and consciousness,"* (Lewis Williams 2004:26).

Mphahlele (2002) points to the adaptability and continual reshaping of African culture and its potency in effecting change:

> *"African culture is not a museum piece. It is a dynamic feature of our lives. By 'dynamic' we mean not static, having motive force, being active, potent, energetic, having influence. …we have to keep redefining it…"* (Mphahlele, 2002:96)

But 'culture' exists at various levels, some of which are much more open to change than others. Methods of cooking, dressing, working and use of technology can perhaps change fluidly, but deep beliefs and ways of thinking might change much less. So too, the changes need not be in the style of assimilation, but can mean that African beliefs and ways of thinking are strongly shaping the national culture: 'modernisation' need not mean 'Westernisation'. Ogunniyi (2002) argues that, as part of change, redefinition in underlying world-view does occur, that a worldview is a "dynamic thought system" which determines to a large extent the habitual way in which an individual copes with experience (Ogunniyi, 2002). I have come to know this experientially. When I find myself in new situations, my current worldview is often shown up through the disequilibrium I experience in having no protocols, frameworks or evaluation criteria to draw on. Thus the exploration of worldview has, for me, been enlightening and freeing.

Ramose (2002) warns any white person to be circumspect in entering the realm of African thought. Sogolo (2002b) too cautions that a little knowledge is dangerous. Further, IK is traditionally learnt through imitation and transmission, and codifying it is likely to lead to distortions (Ellen & Harris, 1996, in Higgs, et al. 2003). With those cautions in view, I offer three types of knowledge that the community expressed, lamented as lacking, or that I deduced from the data in our project:

- factual knowledge
- 'talents'; or performative knowledge and values
- deep ontology/philosophy; representational knowledge

Students found it difficult to give examples of factual knowledge about the environment. I discuss this in 'knowledge lost'. Parents and community members were able to give students knowledge of myths, cultural practices, politics and history, but the students had limited factual knowledge of Nature and their environment.

Performative knowledge is embedded in community and in this sense is ‘spatial’ (Turnbull, 1997). It includes skills and technologies, which may be considered ‘objective and universal’ but it also includes ceremonies and rituals of dance and story. All participants were able to give us long lists of skills and behaviours that students had mastered.

The third aspect, ontology and philosophy, emerged through ways of expressing ideas and of acting that are different from Western This corresponds with ‘representational knowledge’ categorised by Turnbull (1997, in Malcolm, 2003) - with the exception that I placed ‘concepts and facts separately. This was mainly because I thought these aspects would be easiest to find. According to Malcolm (2003:6) representational knowledge “…consists of concepts, metaphors and conceptual schemes (and their underlying worldviews, assumptions and processes of legitimisation) used to explain the world.” It is likely that this knowledge is less well acknowledged than performative knowledge. No one came out and said: “Look: here we have a cyclical understanding of time.” Rather, on a number of occasions we were asked to be “patient”, that “good things take time”; that “We live one day at a time” and that “ancestors play an important role in community life”. For me this points to a different perception of time but does not explicitly show up an alternative. Some essence of understanding ‘the fourth state’ of African time (discussed under ‘time’) may have been lost as overt community knowledge. Without appreciating a difference in worldview, when behaviours are judged from an alternative view the conclusion is often distorted. For example, the principal joked that the community worked with ‘African time’. In common usage, ‘African time’ means simply lack of punctuality, but it is more than this. The principal, who is Zulu, was prepared to be critical of local culture: “The problem with rural people is that they think that nature is natural: period. Therefore it cannot be controlled by human beings.” (P29b, 2003). These examples illustrate the complexity of understanding Indigenous Knowledge in South Africa and the problematic nature of multiculturalism (that I touched on in comparing Africa’s position to ‘inclusion of all’ drives in America).

Importance of Indigenous Knowledge

One of the first questions a student asked in an early meeting was: “What are we going to learn about beliefs, are we going to learn about our beliefs or the beliefs of other races?” (Girl student. SS3, 2002). At the first community meeting, parents and elders expressed a wish that students learn cultural practices and values (C30b, 2002). Sihle said after the science festival that he now sees the importance of traditional leaders and his cultural

heritage. I earlier discussed reasons that academics put forward for the promotion of Indigenous Knowledge, but the most important reason in our project was that the rural community assigns strong value to traditional knowledge.

There are examples from various countries where schools have taken responsibility for teaching Indigenous Knowledge – for example: Allsop, Freeman & Ingle (1971); Morgan (1971) in Tanzania; Nichols & Tippins (2003) in the Philippines; Onwu & Mosimege (2004) in South Africa. Documentation of these Indigenous Knowledge examples might in time lead to their being part of the science curriculum. However, efforts to bring such knowledge into the science curriculum in South Africa have barely begun.

In our partnership research site in the Western Cape, where inventory questionnaires of interests were given to township students, the lowest ranked item was 'mathematics linked to decorations such as the house decorations made by Ndebele women'. Julie (2004) concludes that "approaches underlying the mathematical analysis of cultural artefacts and indigenous mathematical knowledge systems do not appear to carry high currency." (Julie, 2004, in Malcolm, 2004) This may well be a result of the perceived low status of African knowledge for township youth, or it may be that the students perceived that such mathematical analysis bore little relationship to the processes actually used in designing the artefacts. Both aspects can be taken up in the curriculum.

Knowledge lost

At first in discussion and through other data we found no obvious practice or enunciation of Indigenous Knowledge. Neither the *Induna* nor the *Sangoma* gave us any examples of traditional knowledge. Then, in an impromptu lesson with the Grade 7s, I gave out big sheets of blank paper for small groups to make lists of: 'Wild animals near my home'; 'Plants we know' and offer explanations of 'Where does rain come from?' etc. Children drew a monkey; buck in the forest, baboon, but also giraffe and zebra which certainly do not live anywhere near the village. The plant drawings were mostly stylised drawings of avocado, various vegetables, peach, lemon, banana and *grape trees.* In answer to where rain comes from, answers were monosyllabic and included: ''clouds, scia, (sky), smoking" (SL 15). My journal entry read: "I walked around encouraging but it was painful. No questions, no talking – just trying to get this unfamiliar activity 'right'." (Journal 1, 2003)

On another occasion the primary students presented stylised drawings of cows. Most of cows had many many teats!!! Is this lack of observation or maybe just symbolic? Is the skill of accurate 'scientific' observation, quantitative detail and careful recording needed? Understanding this helps curriculum design. Our community researcher, Sihle, dismissed my concern by saying: "They just like drawing teats!" Data interpretation is tricky.

In walks through the village our young companions could not name trees nor say what they were used for: not only did they not know, they seemed surprised at the question. This may be because Indigenous Knowledge is "tacit" (Higgs, Higgs & Venter, 2003), or because the life of the community has been disrupted over the years. Odora Hoppers warns that "The erosion of a people's knowledge associated with natural resources is under greater threat than the erosion of the natural resources themselves." (Odora Hoppers, 2002:7)

It may also be that I did not ask the right questions (and I will later discuss how my understanding of this developed). Horton presented a plausible explanation (using a different example) of how the researcher

> *"…usually comes to Africa with ideas about the wonderful 'creation myths' to be found there". When people, through lack of interest in the question shrug off the enquiry, the researcher, in turn, misses "an elaborate body of indigenous explanatory theory covering some area of experience his own lack of interest prevented him from enquiring about."* (Horton, 1967:967: 249).

I cannot think that in any way I was not curious, but I did discover that knowledge is more hidden and subtle than I had imagined. I missed much from not looking in the right place or in the right way. The other contributing problem of discovering factual traditional knowledge of the environment may be the obvious issue of language and my inability to speak Zulu.

In reference to George's (1999) four categories of cultural knowledge, (see Chapter 3, p.83), I found little knowledge that could be classified that way. The main finding emerging about knowledge is a broader conception of Indigenous Knowledge, not predicated on Western scientific comparisons.

I had hoped that our curriculum interventions would enable students to explore the aspect of 'factual' Indigenous Knowledge. This could then be incorporated in the curriculum as

has been achieved in other projects in Africa (Allsop, Freeman & Ingle, 1971), or local knowledge could have been documented as in the memory banking done by Nichols and Tippins (2003) in the Philippines. I was also inspired by the work of Thomson and Chepyator-Thomson (2002) in Kenya, where they documented elders' knowledge on cattle-raiding, mathematics and problem solving as well as other work on Indigenous Knowledge (for example narratives about snakes in Kenya (Thomson, 2003). I had in mind the type of curriculum promoted by AFCLIST (for example units based on ancient iron-ore smelting and contemporary blacksmiths). This may still be an area to explore, but in two years in the village there was practically no evidence of this type of indigenous scientific knowledge. Even this 'discovery' may be important for recommending curriculum development for schooling: if such knowledge is not available to children in the community it could be researched and included in school learning.

Over 20 years ago the attrition of knowledge was already felt:

> *"Today, my own children can neither identify the antelope and the waterbuck nor name them in their own language. They cannot identify a single indigenous tree or shrub with its uses and values to humans. … Africa has changed…"*
>
> (Chief Minister, Enos Mabuza -Wilderness spokesman- 1982:43)

Beyond broad references to cultural values, social structures, customs and ceremonies, no-one in Ixopo offered specific examples of traditional knowledge. Whereas in our second research site, Ndwedwe, the Sangoma (who is also on the School Governing Body) said that children should learn about traditional medicine at school. When I asked him if he would be willing to talk at the school, he readily agreed. (Interestingly the Biology teacher voiced reservations. She emphasised that he should only mention the 'good things and not the bad'!) (O40a, 8/8/2004). Having elders and leaders come into the classroom is one of the recommendations of Thomson (2003:90), who has done extensive work in science education in Kenya: "… elders need to be invited into classroom learning as knowledgeable teachers." He goes on to show that this focus has this added advantage: "…. It was Indigenous Knowledge and values that allowed me to have my teaching resources located just outside my classroom door." Kaomea (2003), who has been studying programmes that promote cultural practices in Hawaiian schools, cautions that when traditional elders, *kupuna,* are bought in to teach, they need to be accorded real authority and autonomy. In current programme they are treated as little more than hired hands. Virtually homeless in the schools …" (Kaomea, 2003:23).

At the Ixopo site, practical, everyday knowledge and skills in farming were also weak, (according to community members), and I discussed this in the theme 'Relevant Science' in Chapter 8. The requests from all for the learning of agriculture surprised me. I assumed this would be well developed knowledge. This erosion perhaps results from labour practices imposed on many Black South Africans over decades and still the case in Ixopo. Marx asserted that in capitalism the labourer is severed from his knowledge, will and judgement: a body part of a distant brain (in Kaomea, 2003).

Knowledge found

> *"The great strength of the cultural approach to issues of science and technology is in challenging people to consider how other cultures and groups may have new and different ways of defining the true and the useful."*
>
> (Hess, 1995:ix)

Knowledge that emerged through this project could be more readily categorised in the second two categories of performative knowledge and ontology. I first discuss performative knowledge. This includes history, medicine, health and food.

History

I had not anticipated the importance of this aspect of knowledge in my consideration of relevant science. It is also quite out of my area of training. Tasks relating to this I had intended to be for 'community mapping' and simply to have more teachers and students involved than would have been the case if I had focussed more strictly on science. One of Africa's foremost intellectuals, Obenga (2004), emphasises the importance of history:

> *"…history is the salt and leaven of human life. History is the repository whence we fetch our reason for living …".* He also reminds Africa of the ancient tradition that *…"the exultation of the intellectual life was nothing short of a national obsession. To live the life of the mind was to participate fully in the cosmic order …"*
>
> (Obenga, 2004:606).

I suspect that there is already a rich intellectual heritage to be rediscovered through looking backwards in rural communities. Respect for things past is also an aspect of

worldview that emerged through community participation. In *Time*, "…'before' is usually valued positively …and never negatively." (Horton, 1967:253). This leads to the commonly held belief that if it was done that way in the past it is good. Linear time is eradicated by symbolically re-enacting a past event. The day may be seen as recreating archetypal events. The daily cultivation of the fields is symbolic of the creation of the world (Horton, 1971).

It was important for me to discover this in the interpretation of data when I gave primary students an assignment on 'Farming long ago'; 'Stories my grandmother/father told me' and Grade 11 students' family histories which they worked on with their families. So many students brought stories of how things were better long ago. Is this *measurable on my scale?* Or is it axiomatic of the past?

Ironically, the Relevant Science recommendations in this study, innovative as they may be, are a 'going back' to a more traditional learning and as such have a chance of success where school-based modernisation may be difficult. I imagined I was at the 'cutting edge' of curriculum development! In fact the community was looking back towards past traditional learning structures, processes and content. This may be a distinction between Western scientists who have 'the future in their bones' (Snow 1959:10 quoted in Horton, 1967:254), and traditional societies who have a natural reverence for past wisdom (Easton, Nikiema & Essama, 2002, in Higgs et al, 2003). The concept of Indigenous Knowledge being 'dynamic' is also evident: ideas of, and striving for, 'progress' were easily accepted.

Students illustrated the appreciation of historical practices in the posters they displayed at the science festival, which contained praise and appreciation of farming, water, environment and *ubuntu*. They presented the importance of cows, goats, chickens, and forests, as well as the importance of cultural beliefs. Changing beliefs were also communicated. There was frank and informed information on HIV/AIDS (SS11, 12/2003).

For primary school students, grandparents had offered careful input to the children's assignments of 'Stories my 'Grandmother' (or Grandfather) told me'. Although most students managed only 6-8 lines, these were completed with care. Many were true stories with Zulu words untranslatable in English: e.g. *ingqwele; iphaphu; isidwaba, ukuhlalu, inxashu*. Many spoke about clothing, food and cultural practices (SL 20, 10/2003), but with

no mention of values, beliefs, Christianity or AIDS. Descriptions of 'Life long ago' and cultural practices include two main perceptions:

- Life was good: tradition was strong; people were healthy, ate traditional food, elders remembered cultural games and activities.
- Violence dominated life: apartheid caused oppression, there was tribal fighting and burning of huts.

Negative aspects of the past were connected with displacements and abuse through the apartheid regime, and of the political wars in Kwa-Zulu Natal (through the 1980s and early 1990s). In other interviews positive aspects of the past came out more strongly. This was particularly true from the leaders. Almost all stories spoke of daily activities. In describing daily life, community members listed simple activities (omitting relationships, interactions, feelings, etc). A typical description of the day was: "Wake up, wash, plant, do washing, supper, sleep" (C38h, 2003 - Chicken farmer).

History here moves slowly. The lack of modernity in the community is a striking feature for an outsider. Many aspects of daily life mentioned about the past are still prevalent: herding cows, collecting water, bathing in the river, cooking over fire. Although the *izInduna* mentioned the increase in villagers wanting to shop rather than being self-sufficient, other obvious changes were not identified. The changes that have come about since the change of government in 1994 were not mentioned. These include the new free and democratic country, with freedoms of movement, association and expression (surely a most significant change), availability of a social worker and the distribution of child grants, to name a few. Increased information through television was not mentioned. (Very few people have TV access unless they view it at a shop or the very few wealthier neighbours.)

In the same assignment of 'life long ago' in the secondary school, students' work showed great care and also family co-operation – mostly from grandmothers. Similar stories emerged about life being better in the past. Life is now harder because family land is smaller, the sun is hotter and there is less rain; people are now sick. **'**In olden days we had everything we wanted: cows, goats, sheep and many foods. In old days people were strong.' (SS4e, 2003.)

In the 'Writing my own history' assignment, Grade 11 students were given the options of writing personal, family, community histories or the history of a famous person, area or

event. Most chose to write personal stories and a few wrote stories of the community. This exercise was a struggle for the students (who seemed so unused to writing), and for me – I had not imagined the difficulty they had writing and had limited time to work with them. They were shy and did not know what to do. Also my collecting-data pressure got in the way. The repetition of some of the stories and obvious copying of statements shows the difficulty students had writing in English. However: there was evidence of assistance from parents and grandparents in giving information, which suggests that students took this task seriously. Many students say they are proud of their stories and hope many read them. There is also a sense of interest from the students in the gathering of the information. I wondered if this is new information for many of them too. For example one boy said he was so sad to hear how his grandfather had died of a heart attack during fighting in the area in the 1980s. His Grandfather had heard the gun shot that killed the boy's father.

There was a general sense of valuing the stories, appreciating family, happiness at being in the rural community but concern for increasing poverty and illness. All students used Zulu names. All expressed gratitude to parents for sending them to school. I give some extracts from the stories: A Girl, age 21 wrote: "I came to Chibini 1983. After Grade 9 I had a 4 year break (*unexplained*) before I came back to Sinevuso."

Another girl age 18: "I came to Chibini in 1985. I like to be here…In Grade 9 I changed schools and in Grade 10 I came back to Sinevuso. I'm happy to talk to family about this, family are very important."

A boy age 17 who wrote a community story said he got information from different people. "The past community was rich, had many cattle and horses. People wore cow skins and were healthy. There was no road, no public school, no public phone and no taxis. "

Figures 10.3a, b Student model of traditional life; Carrying wood

A 21 year old girl wrote: “The past community was rich, happy and healthy and ate African food, *isijingi* and *isigwamba.* They had many horses, goats and cows. I like the past community.” (SS 7b, 2003)

Along with the histories students took photographs to illustrate their stories. These were beautiful, original photos of friends playing soccer; collecting water from the pump; parents at home; father drinking beer from a clay pot; mother carrying wood on her head; small boys herding cows at dawn; pictures of nature. Clearly there had been lots of help from family and most were group efforts, although handed in individually. I feel sad that I was not able to follow this up: at the time I thought the project was a bit of a flop. I was expecting so much. Now I see how hard the students tried and the richness of their pictures and stories too (SS 7a, 2003).

For these students, discovering and owning their histories helped them gain a sense of identity. This is clear from their photographs which show family, friends, homesteads and cultural activities (SS7a, 2003). It is also clear that their identities are closely connected to the community, its history, and to others. The pedagogy of community-based curriculum includes aspects of situated cognition. Brickhouse and Potter (2001) in their gender study found that situated cognition promotes this critical aspect of identity formation.

Figure 10.4 ‘Personal history’ photo

Medicine

Very little factual knowledge about medicine emerged either from *sangomas* or community members. A neighbouring principal and friend confirmed that the whole community certainly used traditional healing, “even the principal here”, he laughed, as the three of us chatted in the principal’s office. The principal conceded it was so. The Sangoma said that community members used both Western and traditional medicine depending on the complaint.

Few students mentioned medicine. In the Grade 10 photo assignments a student wrote about his photo on maize: “…the maize is like science because when you plant maize we use science and use your brain … and maize is important for Zulu medicine.’ Another student wrote: “…wild flowers has a nature to make medicine.” (SS5, 2003). On the inventory of interest questionnaires, ‘Herbs for medicine’ was relatively popular in Grade 10 (SS4, 2002). The primary school teachers, when asked what their students should learn, mentioned training to be traditional doctors (T22, 2002).

Food

Not surprisingly food is an all-pervasive preoccupation for students and community. In students’ stories of their lives in Ndwedwe, food featured in every story (N1). When we

asked Induna Chiya how many people grow their own food he replied: “Very few. The majority buy from the shop: they are lazy.” (C36, 2002)

Mr Hadebe, the primary school principal, spoke often about his concern for promoting healthy eating. In his class was a display of a poster lesson based on what Grade 7 students had found out about beliefs about food. These are some of the statements from various people students interviewed:
Parents: coffee is for babies, we don’t drink coffee.
Red Meat is healthier than chicken.
Milk is for babies: we don’t drink milk.
You must eat lots of white bread because bread gives us carbohydrates.
Meat gives me proteins and energy.
Grandparents:
Old people must drink lots of tea because their bodies are cold.
Sweets and tea and coffee give me energy.
I don’t need to eat vegetables – they are for babies.
Teenagers:
I don’t eat the meat of chicken because chicken is not for females.
Cabbage and eggs give me vitamins. (SL21a, 2003)

There was no discussion of these findings in class. Again, as with the lesson of ‘I am an African’ – there is opportunity here to discuss beliefs, ideas and different knowledges. In the ‘Science in my life’ photo stories, 21/50 stories mentioned food. Food is central on account of pervasive poverty but also increasingly because of the focus on health care. The Induna told us that health in the community has deteriorated and people have a lot of diseases, possibly because of not knowing about healthy food – for example, the new habit of cooking with oil (which people had not used in the past) (C36, 2003). Also, in the old days people had grown more of their own food (C38d, 2003).

Sharing food is also a manifestation of *ubuntu*. Learning to share food is one of the socialising trainings in a culture where social responsibility and nurturing are more important than autonomy (Nsamenang, 1999). Primary school teachers identified learning about healthy food as an important outcome of the science festival (TL 28, 2004).

As with ‘medicine’ and ‘history’, knowledge about ‘food’ sits somewhere between ‘knowledge lost’ and ‘knowledge found’. What is unequivocally clear is food cultivation and

marketing, and nutritional information are important for survival, improved health and income generation. There is great potential and scope for investigating and developing cultivation and use of indigenous plants, and all of this readily fits with the science curriculum.

Worldview concepts

> *"In the Case of Blacks in South Africa, the school curriculum should reflect the philosophy of Blacks and not that of any other group*." (Lutuli, in Morris, 1984)

Cobern (1996) defines worldview as a person's fundamental collection of beliefs about the world. However Nisbett (2003) claims that worldview is more than a collection of values and beliefs: it is the way one views and experiences life. It has ramifications for ways of perceiving and thinking, social structures, identity and education. Recognising the importance of ontological systems and understanding their contribution to human understanding is at the core of 'relevance' of science in Africa. African metaphysics has suffered subjugation if not derision since the invasion by missionary education, and even factual indigenous scientific knowledge has been excluded (Thomson, 2003).

The interesting aspect of this for me is the general unconscious acceptance of underlying beliefs and how these shape our perception of the world. Having trained in a Western scientific paradigm, I have noticed this tendency to imagine myself 'objective' and 'open-minded'. It has been enlightening to discover, in the interaction with other worldviews, the distortion and fixedness in my views that I tacitly assume to be 'basic axioms' of existence and more or less universal. These views are also embedded in social relationships, cultural practices and even conceptions of consciousness (Obenga, 2004; Horton, 1967). An unexamined acceptance of a particular worldview can extend to repressing or ridiculing alternative views (Moodie & Thomas, 2003).

Distinguishing between different worldviews, Lewis-Williams in '*San philosophy*' lays out a spectrum of human consciousness along an axis from 'alert' to 'autistic'. "At one end are those states that Western scientists most value: alert thinking and a rational response to the environment… the 'consciousness of rationality'" (Lewis-Williams, 2002:31). This continuum branches into a 'normal trajectory' through dreaming to unconscious on the

one hand (which is also familiar to us), and an 'intensified trajectory' branch on the other. This is usually the excluded aspect of Western investigation into knowledge creation. Nonetheless, it is characterised by neurologically-based and measurable experiences. These include experiences of entoptic phenomena through to hallucinations. This latter trajectory provides modes of access to different kinds of knowledge that are excluded from the Western scientific paradigm. Such knowledge is often secret. Lewis-Williams is, of course, writing in relation to the San. My point is that there are realms of knowledge that may be hidden in other cultures, and judging the presence or absence of knowledge by the response to questions from an outsider is clearly problematic. Nsamenang (1999) cites a number of researchers who point to the misfit of Western paradigms in trying to understand African culture: Jahoda & Lewis (1988); Macgaffey (1981); and Nsamenang (1992).

With this in mind, I merely touch on clues that a richness of traditional ways of knowing is still present in the Chibini community. These aspects deserve deeper exploration. Themes that recurred are: nature; interconnection; water; time; ubuntu – humanism; interdependence; self concept/identity; taboo; culture. These are not discrete frameworks but I discuss them separately.

Nature

Ogawa (1998) explains how in traditional Japanese culture to study nature means more than objective observation: it includes communion. Science is not only valuable in its power to predict and explain but in enriching appreciation of nature. This sense of communion was also evident in students' writing about their photographs on nature.

The photographs that students took of 'Science in my life' provided the deepest insights into the role of nature in the life of the community. In spite of being a first attempt at using a camera, most of the pictures are careful and well-considered expressions of students' concepts of science in their lives. "Although pictures through their form can visualise certain conceptual referents, they cannot, generally speaking, visualise reasonings." (Peters, 1977:53). In order to draw more on students' ideas and to provide more opportunities for them to express their ideas, students also wrote two stories about their pictures. One was a 'literal' description: what the picture represents, the second a 'story' about the picture. A few examples illustrate concepts of nature.

Figure 10.5 My donkey

Grade 10 child's story:

> *A donkey is a quiet animal. It is beautiful and has long ears and a long face. I like donkey but people are cruel to donkey and make it slave to carry heavy goods. Other people make donkey their horse. People abuse the donkey and make it do the job they can't do themselves. But I love my donkey. Donkey eat grass and mielies. Long time ago I saw this donkey lies on the road. It was very injured and I took it home and nursed it. And my parents asked me what's his name and I said his name is Lorry. I always wake in the morning and give him food to eat, in the middle of the day I thought that I have to build house - small house for him then I showed him to sleep there. I was very happy for my donkey. I love my donkey.*

Affection for animals was a recurring theme, especially when the animals are clever! All animals have names. Students tell a number of stories of caring for animals, (SS6a; SS6b, 2003.). Similarly a chicken farmer said about the project: "It is good but the cages are too small – chickens are not comfortable." (C38g, 2003)

Figure 10.6 “The name of my pig is Gontshigontshi…”

It is interesting that in presenting a concept of ‘science’ many students chose aesthetic qualities of nature. There is a strong emphasis on the positive: no students chose pollution, erosion, exotic plant invaders, crop pests or drought. This struck me as contrary to our tendency in science education to focus on ‘problems and issues’ in the environment.

Figure 10.7 “Nature is beautiful”

“Trees give us foods and some give us to make clothes and books.
Trees are very important because we make the house…”

Figure 10.8 Student photo: “Cabbages are beautiful”

Concepts of beauty extend to an appreciation of interconnection: hence vegetables are ‘beautiful’. Similar data is found in the HSRC report, Emerging Voices. A grade 6 student wrote: “I want flowers in school because I like it to be beautiful.” (HSRC, 2005:21)

There is increasing awareness that this capacity for aesthetic appreciation in science is lost to many of us. Fox (1983) in Reason & Bradbury, (2001:11) argues that through beauty we feel a sense of belonging; awe connects us to the cosmos: “Through beauty we can feel our sense of belonging”. In answer to the question of “’What is the warrant of your knowing?’ Reason proposes “one sound answer - It is beautiful.” (Reason, 1993:8).

Interconnection

African philosophy is holistic and anthropomorphic (Ogunniyi, 2002). Aspects of the photo stories of the students reveal both these orientations. Obenga (2004) criticises the “hypertrophied technological modernity” for losing sight of “social community and

psychological transcendence" (Obenga, 2004:609/610). Concepts of social community are akin to both *ubuntu* and identity: I discuss these separately. By interconnection I mean the specific view that one action or being affects others, is dependent on others, and hence the proper attitude is one of gratitude and mutual care. Students explained the interconnection reaching to plants, animals, people, soil, trees, air, life, beauty and happiness.

As touched on in the discussions of Self and *ubuntu*, the individual as conceived of in Western thought does not exist in African culture.

An 18 year old girl in her photo story of a garden explains: "I'm not hungry if my mother plant mielies and animals are not hungry if the grass must be made to grow."
Another young woman, Nosipho Mngeni, wrote:
"If you don't like plant flowers at your home your home it is not good.
You cannot survive without plants, and plants need the care of people.
Plants even make clothes…and wood makes homes…"

"And maize is important thing because we could make mielie-meal, and plants I learn about in my science I find that it is important because if the land can't have plants land can't be there. I think the plants make the land beautiful and if there is no plants animals can die. I suppose that if trees aren't there we cannot live, we can die as we know that in trees we find fresh air and it make land be not erosion… I saw is nice for everything to make its own thing."
(SS6a; SS6b, 2003.)

It is ironical that the one aspect of community life that is not 'interconnected' is the education process.

The practical aspects of understanding interconnection may be eroded. The principal, Mr Hadebe criticised bark collecting techniques that damaged trees and hunting practices that did not consider breeding seasons of the wild buck. He said:

> *". I remember in our first meeting, the superintendent of education (SEM) was there, it even came to a point where the whole community had a say about what they wanted their children to be taught at school. I distinctly remember, there were sangomas, inyangas (traditional healers) and all relevant stakeholders in the*

community because some of them affect science but they are not aware of the science in their environment and the interconnection between the two."

Water

Water has a primal place in ancient African cosmology. Whereas everything in existence: "-goddesses, gods and stars, sky and earth, the world of the living and the abode of the dead…" has a genesis, "*Nwn,* the absolute reality of the primal waters" does not (Obenga, 2004:46). Also, the name for water and '*Nommo'* are interchangeable. *Nommo* is the (female) 'watcher of the universe' (Obenga, 2004:360). I am not asserting that this worldview emerged as a conscious ontology in our project. However, there are hints of the primal place of water in people's thinking. One student simply states: "There is nothing more important than water." (SS11, 2003.) In his photo story another boy wrote:

> "Water is important in our lives, we can't live without water
> We drink water, wash, cook with water.
> If we don't use water nothing is going to be right.
> Water changes human beings' lives. Water makes plants grow, animals are all living with water.
> If there is no water people can die and animals, flowers can contract… we are all clean just because of water.
> Many things are here: it is water's business. The earth is beautiful because of water, trees are growing with water. We build houses with water and mud. So many things are used with water…" (SS6a, 2003)

Figure 10.8 "There is nothing more important than water"

On two occasions the *Induna* said: “The first need is water” (C36, 2003; C38e 2003).
In Kalabari life there are three kinds of forces which can account for almost every occurrence: ancestors, heroes and water spirits (Horton 1967). Lewis-Williams and Pearce (2004:123) explain that: “In addition to being a cosmological mediator, water has restorative, or healing powers.” Further, the connection between this world and the spiritual world is via water. It links upper realms of sky and underground. The above realms are mediated through rain and the underground through the waterhole.

I am not asserting that stories and conversations with students and community reflect the ancient cosmology of primal water. However, the focus of water approaches an appreciation beyond the utilitarian. Water was the chosen subject in three photo-assignments. Students wrote about its role in growing plants, cooking, health, helping people by getting water for them, care of water, its beauty and interconnection of water with nature. Evidence of this deep knowledge of cosmology is not explicit in the data. Whether it is tacitly understood is not clear. However, at least intuitive remnants emerge through recurring themes. It would be valuable for educators to understand these concepts more fully.

Time

Time, as a concept, was not a focus of investigation, neither was talked about explicitly, but the relaxed attitude to time, free from clocks and calendars, struck me as a very different framework from that of urban life. As mentioned, Induna Chiya told us that “things take time”, and “be patient”. There were a few exhortations to be patient! Mrs Makhubela of Sinevuso said: “This project makes sense: we are designing together. I like this I am learning a lot. Thank you. Please be patient with us.” (Journal 02-August 2003.) This immunity from rushing towards the future allows an ease for being in the moment – as supported in the research framework of mindful inquiry.

Horton (1967:252) explains that in Africa different time scales are used in different contexts. For example, there is a scale correlating events with ancestors, one with the seasonal cycles and one with the daily cycle. Alternative notions of time are interesting, of course, from a scientific perspective. Godel claimed that time does not exist. Einstein stated that: “People like us who believe in physics, know that the distinction between past, present and future is only a stubborn, persistent illusion.” (Einstein, in McFarlane, 2004:126). Feynman says matter-of-factly: “…the temporal order of events…is irrelevant.”

(Mlodinow, 2003:28). The African cyclical non-linear conception of time needs also to be brought into awareness in decision-making (Davis & Reid, 1999). The African concept of the 'fourth state' (Armah, 2005) – a combination of past, present and future all together - perhaps comes closer to Einstein's understanding of time than it does to ours.

An elder in the community was also surprised at seeing how we view time differently. He explained:

> "I have gained much to know different people…if a person is using educational knowledge, he looks at things from a different perspective and range. He looks at the past, present, future and even the possible outcomes of what one is thinking. We just look at what is happening here. We are not looking at the distant future. This has disadvantages: for example the chicken farming and 'passing on the gift' – farmers just think of right now. They do not plan for the future." (O40a TT, 2004)

This non-materialistic view of time is also prevalent in Asian culture. Suzuki in comparing Western and Eastern worldview explains:

> *"Western people often wonder why the Chinese people have not developed many more sciences and mechanical contrivances. This is strange, they say, when the Chinese are noted for their discoveries and inventions such as the magnet, gunpowder, the wheel, paper, and other things. The principal reason is that the Chinese and other Asian peoples love life as it is lived and do not wish to turn it into a means of accomplishing something else… They like to work for its own sake … and are not in a hurry to finish it. …(with machines) labour is of no value except as a means…"* (Suzuki, 1986:9)

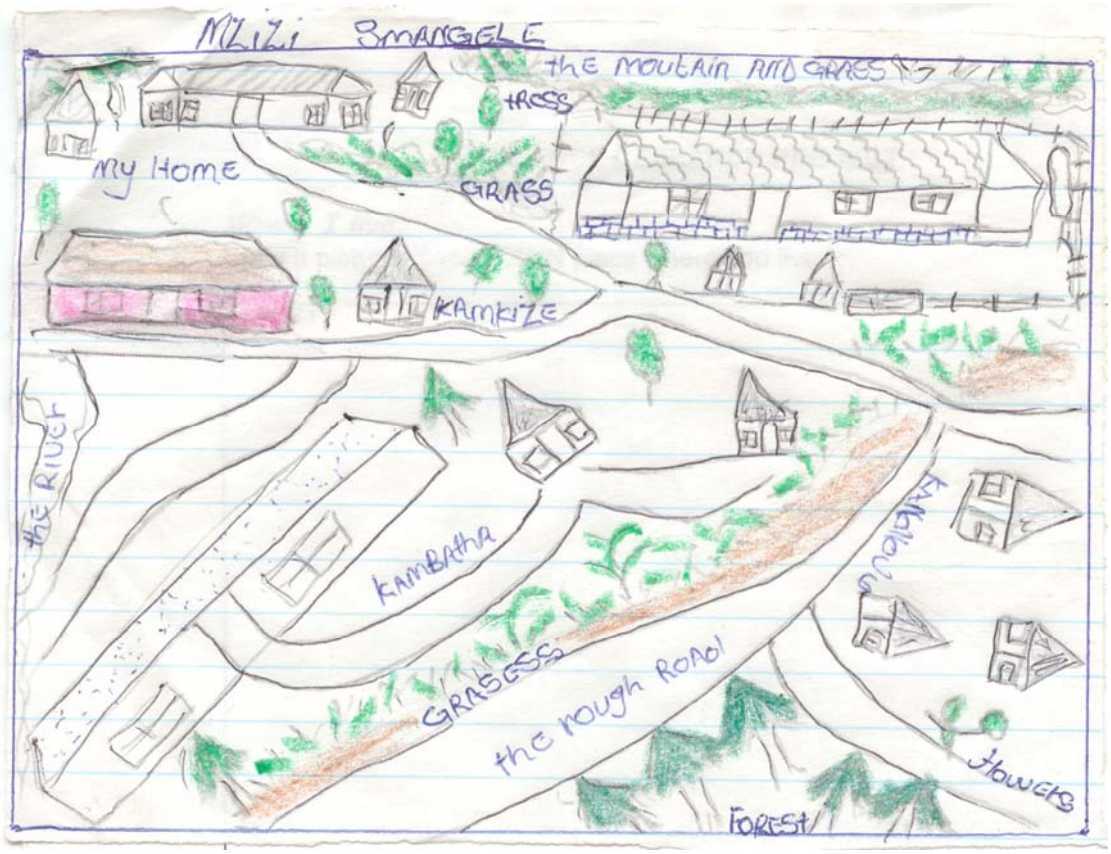
This focus on here-and-now is consonant with Asian metaphysics: "Great time, related to Great Space, does not 'pass', as it is not linear, sequential or punctuated, (Tulku, 1977, quoted in Kruger, 1995:180). There is clearly a syncretism in the understanding of time in Buddhist philosophy, physics and African understanding. This has potential for further exploration.

Ubuntu – Humanism

"I am a human being because I belong." (Desmond Tutu, 2003). Students described *ubuntu* in various ways. When I asked the Grade 7 students to draw their home many drew the whole village. In drawing their huts many drew their neighbours too. One boy wrote under his drawing: "A person without a neighbour is not a person" (SL17a, 2003). Another Grade 10 student said: "Ubuntu is to help people" (R45e 2004). There is an

African proverb: "One person's path will intersect with another's before long" (Wiredu, 2002b:290). This drawing illustrates that concept.

Figure: 10.9 "A person without a neighbour is not a person" (SL17a, 2003)



As with concepts of time, it is perhaps ironical that leaders in new physics have synthesised in lucid statements ideas that are quite contrary to the mechanistic science that we espouse in science education, and are more closely related to *ubuntu*:

> *"Human beings can attain a worthy and harmonious life only if they are able to rid themselves, within the limits of human nature, of striving to fulfil wishes of the material kind."* (Einstein, in McFarlane, 2004:24)

The concept of *ubuntu* centres on relationship and harmony (Boon, 1996). Wiredu explains that African humanism recognises our most important need as that of human relationship. It follows that the "ultimate moral inadequacy" consists of a lack of feeling for others and revealing deep selfishness (Wiredu, 2002b:291).

As an organising principle in understanding the world, *ubuntu* is consistent with the Asian view (described for example by Nisbett, 2003) and Buddhism. Striving to develop compassion and overcome selfishness is not only a moral imperative in Buddhism, it is focus of empirical enquiry and has a basis in underlying philosophical concepts. These are more radical than *ubuntu* in that community is considered part of a 'trinity' worthy of hospitality, respect, homage and offerings and the 'individual' is considered to be an illusion (Sucitto,1995). Nisbett (2003) contrasts Asian and Western as organising the conceptual world according to 'relationships' and 'categories', 'harmony' and 'contradiction' respectively. Sharing and reciprocity are norms throughout Africa (Nsamenang 1992). This is also more than a localised concept in Africa: it resonates with experiences of African Americans in the USA along with the ideology of sudicism – the integration of the personality through harmony (Asante, 1998; Malcolm, 2003).

Students presented the following examples of ubuntu:
"Once upon a time there is a car near my home. The owner of this car is Mr. Dlamini. One day when I came to the town I never had money (for transport). Mr Dlamini told me: "You can you get inside my car, my Neighbour." He took me to my home. I will never forget my neighbour. When you don't want your neighbour you are not a person. But now when I go to the town and I see some street kids I try to help them because many people want advice." (SS6b, 2003)

"Once upon a time I was see a old Grandmother whose name Florence Sosibo. She gave me a meal and then she was busy to plough. After she finish plough she pick spinach. My Granny is important in my life." (SS6b, 2003.)

In a class with Grade 9 students, we had a lesson specifically on *ubuntu*. Students presented the following:
"If a person has no food you give him some food."
"You should not look for something in return for helping someone."
"You can never lose your life helping someone"
"There is a thin man Xolani and a fat man Mthembu. Mthembu is handing a plate of food to Xolani. Although Mthembu is wealthy, he does not look down on Xolani who is his neighbour but rather offers him food."

There were drawings of an older person helping a younger person and a boy helping an old woman to carry wood. Students had no difficulty identifying instances of *ubuntu* in the

community. However, it would be wrong to say that the community lived in total harmony and a spirit of generosity. There has been more than one incident of a child hanging himself for feeling unwanted by family and neighbours. AIDS orphans have become victims of relatives greedy for the child grant. Abuse and neglect are not uncommon. Here too, traditional wisdom is in a precarious position.

The many duties that children have in rural communities are often cited as a feature of poverty (bordering on abuse) that interferes with schooling (Gordon et al., 2002; HSRC,2005; Paterson et al., 1995). It is certainly true that 'chores' make students late for school and prevent their completing homework – and even prevent their getting to school – but performing community duties is in itself a vital aspect of African education. These moral obligations express deeper metaphysical concepts (Gyekye, 2002). Initiatives striving to provide access need to take this into consideration. While in a democratic society there are individual rights needing protection, there is also the concept here that a human being is inescapably a cultural being (Gyekye, 2002).

My own experiences of *ubuntu* in the community were from the perspective of friendliness I encountered everywhere. This communitarian ethos was noted as a sympathy for outsiders adrift in kinship alienation (Gyekye, 2002; Wiredu 2002). This extended to strangers I had not met but who came to recognise my car passing through the valley, to small children who ran to open the gate for me, and to the *Inkosi* who was always so gracious and went out of her way to make me feel at ease and welcome.

Steve Biko's plea resonates with Einstein's observation, but, characteristically, exhorting people to action:

> "*We must seek to restore to the black man the great importance we used to give to human relations, the high regard for people and their property and for life in general; to reduce the triumph of technology over man and the materialistic element that is slowly creeping into our society."* (Biko, 1973, in Coetzee & Roux, 2002:84)

Self concept – identity

I use the term 'self-concept' here loosely as a subset of 'identity'. I take 'self concept' as a self-perceived notion of who I am. Self-concept relates to self-confidence, motivation, and the formation of ego identity. These are important aspects of growth especially for

teenagers. I draw on some studies of students' self-concepts in Africa and highlight observations of students in the rural community. In considering the concept of identity, I am interested mainly in the contrast between focus on independence, personal attributes and stability in Western identity theories compared to interdependence relationships and change in African identity.

Detailed analysis of literature on identity stretches beyond the scope of what may inform the data here. I present a summary of one model on identity, which illustrates some of the similarities and contrasts between African rural communities and urban individuals. In doing so, I am aware that I am using an essentially Western approach of attributing and categorising.

Table 10.2 'Four ways to view identity' – with examples (Adapted from Gee, 2001:100)

Identity	**Process**	**Source of power**	**Urban example**	**Rural example**
Nature	A state	Developed from forces in nature	'Multicultural' natures in many situations	'African' only
Institution	A position	Authorised by institutions	Teacher	Student
Discourse	An individual trait	Recognised in dialogue	Many allowed / variety	Zulu – (English), Poverty
Affinity	Experiences	Shared in practice	Many / divergent / different-discrete groups	Community/church /IFP / team / choir /same members in all

For an urban individual these various identities form a complex matrix. If I take myself as an example, I could have a 'Nature' identity of a White female 50-something. My Institution identity is that of a teacher, researcher (working with colleagues who are young Indian females and Muslim males from Ghana for example). My Discourse identity is one of English-speaking, monolingual, hiker, mother …. My Affinity identity is a member of Tai Chi group, Buddhist, Trustee … I can think of no one who corresponds with me on more than a few randomly chosen identity descriptors. For a rural student the identity options present far less choice and her experiences of others are limited to those with closely corresponding identities. In the community 'Nature identity' is identical in many respects for all males or females. 'Affinity identity' and 'Discourse identity' are also relatively

homogenous. The same group that plays netball sings in the choir, collects water from the well and attends the school and church. Further, individual interests are often surrendered to community interests and possibilities (Achebe, 1958). From an *ubuntu* perspective there is less emphasis on separate individuals.

My point is that emphasis on Identity analysis using Western models (such as that adapted from Gee (2001), above) do not fit very well in an African rural community. This is not to assert that the concept of identity is a simple one in African culture. It is certainly too complex to be able to analyse in this brief reflection.

The complexity of identity in the village first struck me in my meetings with the *Inkosi.* Not only is she an unusual woman: a strong leader and respected traditionalist, she is warm, flexible and a feminist! Of course, being a female and a Chief is especially unusual. When I asked one of the principals about this he said enigmatically: "Yes, she is a woman, but, actually, she is really a man." I took this to mean that in her identity as the Chief she could not possibly be a 'woman'. My first meeting with her was extremely formal. On another occasion I was invited to phone her to set up an interview. She named a meeting place that was clearly chosen to make me feel at ease. During the meeting when I asked her how I could gain support for the project she replied: "You merely need to speak to the *Inkosi*." I experienced a wave of confusion: I thought I *was* speaking to the 'Inkosi'! Clearly there was more to this than I understood. On the next occasion at the science festival when she arrived with an entourage, I found an opportunity to apologise to her privately for my lack of knowledge of formal protocols. She put her arm around me and assured me that there are formal occasions and non-formal, and her relationship with me was not dependent on etiquette. Her position as a feminist became clear when, after an interview that Cliff and I conducted, I asked her if she needed 'Professor Malcolm's contact details'. I was assuming that he, being more senior, would be the appropriate contact. She asked for my phone number instead. Also after she had listened to our explanation of who was on the Mbumba management committee, she said simply and emphatically: "…you need someone from the church: a woman not a man. Also, there are too few women on the committee." (C34, 2003). Could this be an example of changing and complex identity as opposed to 'one true self'? (Nisbett, 2003.)

It could be helpful to have a deeper and more explicit understanding of what forms the basis of one's notions of identity. One day at Lusiba, by chance I found myself in a Grade 7 lesson on identity (SL21b, 2003). This would have been a challenge for any teacher.

How does one consider identity with a 40-member class with age ranges from 12 to 19 years? I made the following Journal entry:

> *"I went to Lusiba at 11:30am. Mr Hadebe was not there (for our meeting) so I visited Mrs Dlamini's class. She was happy to have me sit in and assist at times. She was doing Human and Social Sciences (a 1 hour lesson). Students are given the task of writing down a list of "How am I an African?" Children work quietly mostly on their own but now and then looking at their neighbour. Mrs Dlamini walks around giving 'ticks', correcting spelling. So I join in: kids are keen to have me look at their work. All work very quietly and very neatly in cursive. It's all a bit arbitrary: 'I'm an African because… (all identical sentences, rewritten & rewritten) …"*
>
> (And a later entry:) *"Funny – at the time – I thought this was a waste of time - could I have butted in more?"* I was suffering from my own identity confusion in the situation!

Students wrote:
"I am African because:

- I am Black
- I eat African food …
- I sleep on skins
- I speak 2 languages
- I cook with fire
- I live in a mud home
- Polish with cow dung
- I have Black hair
- Do Zulu drumming
- Pay lobola with cows
- Believe Zulu religion
- Do African culture
- Do African sport
- I speak Zulu
- …

The Journal continued:

"Then I wasn't sure (again!) how much to interfere. ……So I ticked a few lists too, made encouraging comments. Kids really try hard. Mrs Dlamini gives no feedback on what they have done. Then at the end she asked kids to count up ticks and 'Took in marks'. OUCH!! I felt so bad. Many kids were very embarrassed as they only got, say 5, others got 15!! (We hadn't realised it was a quantitative competition.) They were all so honest in calling out their marks in public. School is cruel and stupid!

I didn't know what to say to Mrs Dlamini: I wasn't there to evaluate her lesson. I said something like: 'This is an interesting subject: perhaps we could build on this sometime.' We never did."

In a workshop with the teachers at Lusiba, the teachers made lists of talents of the children. This is, in a sense, an aspect of identity through competence.

"What are the experiences and talents of the children?

- Look after stock (b&g: boys and girls)
- Fetch water (b&g)
- Look after children
- Cook
- Traditional dance
- Fetch and mix herbs
- Ploughing fields
- Building houses
- Fetching honey
- Bead work
- Wood work
- Clay pottery; weaving (b&g)
- Hunting
- Selling
- Cleaning
- Parenthood (some of them), security
- Playing soccer; netball"

(T22, 2002)

Role competencies that emerged strongly for Sinevuso students in their photo assignments were 'cleverness / percipience'. Interestingly these are qualities they praised

in animals too. Students told parables of animals helping each other and helping people; humorous tales of animals talking and demonstrating perceptive canniness. In stories of clever children, the focus was always on helping others and not on individual achievement. Here is an example from a girl writing about her photo of a goat (shortened story):

> "There is a poor family with no breadwinner they had one goat to give milk and got phutu (maize porridge) from neighbour. They decide to sell goat – they desperate for money. Small girl said 'no' must get baby goat and sell milk. They keep goat … today family is rich." (SS6b, 2003)

Not only does this demonstrate valued attributes, it is underpinned by commitments to community development, the attribute that guided our entire project. It links to the other strong role competency, 'Care': An example was a story of care of a baby calf …helping the baby get to its mother to drink and the sense of joy and achievement in this (SS6b, 2003).

In different cultures, self concept differentiates in its degree of independence and interdependence (Markus and Kitayama, 1991). In African culture interdependence takes a different form from the interdependence in Western individualistic, materialistic society where interdependence tends to be transactional and contractual. In African society interdependence is not simply a fact of expediency – it is an ontological reality: the collective is not a collection of interacting individuals, but a 'collective self' (Wiredu,2002).

Although there is a plethora of definitions of self (for example: Gee, 2001; Hjelle & Ziegler, 1981; Rogers, 1977), most psychological studies and theories are based on the Western view of an autonomous, independent individual. This is an important consideration in education studies as self-concept is closely tied with cognitive styles, which are, in turn, pertinent to curriculum design and pedagogy. Hjelle and Ziegler (1981) define cognitive style as: "A way of organising perceptions, including one's self-concept, mode and accuracy of perception, style of thinking, and goal-directed behaviour." (Hjelle & Ziegler, 1981:469)

Again, my main point is to highlight limitations of our assumptions with regard to understanding students in traditional rural cultures. Nsamenang (1999) describes the ontogenesis of the self in the African social context as cyclical and comprising of three components: experiential/social self; ancestral self and spiritual self. Only the first

component corresponds to the physical life-span. This is a stretch for Western scientific thinking!

The South African philosopher and theologian, Kruger, points out that the "notion of an 'individual' human being in the strict sense is an abstraction. A person comes into existence in a web of human social relationships, and never leaves it." (Kruger, 1995:35). One may add that attempts to 'leave' result in pathology. In spite of the rationality of this argument, for Westerners the focus on self is all-compelling. We have 'a self-made man', a glut of 'self-help' and 'self-development' books, as well as a commercial/personal obsession with 'self-image'. These follow the modernist focus on 'own-achieved' (individual trait) identities, (Gee, 2001). Gee went on to state that in modernism:

> "*The ideal of the self-fashioned "authentic" person tended to celebrate the individual and the accomplishments of the individual and background the workings of the dialogue with others that produced and reproduced these accomplishments as identities."* (Gee, 2001:114)

A lack of the perception of a self-contained 'self' was shown up in the difficulty Chibini students often had in defining personal goals or visioning a future apart from their community (SS11d, 2003). This is consistent with the notion that a person is not a person on their own (Ellis, 1978). Another example was what I first took to be a grammatical idiosyncrasy when a number of students spoke of wanting to 'become *a somebody'* (my italics). Nsamenang (1999) explains how new-born children are considered 'no-body', lacking 'self'. Through developing social intelligence and role competencies they gradually become 'a somebody'. These competencies are well laid out in developmental phases (Nsamenang, 1999). This reminded me of a conversation with a youth in the community. He lamented his grandfather's death saying: "He was the person who was going to make me a somebody." At the time I did not realise the deep sense of alienation that this caused him. Comparative studies of rural and urban youth have shown that rural youth have a stronger global, family and social self-concept than urban youth, - who score higher on physical self-concept (Mboya, 1999). Other common instances of connected self are: the practice of referring to someone as 'mother of…'; of introducing someone by placing them in their family structure and of enquiring after the whole family's health in greetings.

Nisbett (2003) clarifies how these different ways of thinking relate to different conceptions of self and human purpose. It is clear that there are implications in not harmonising the 'collective' self-concept with our educational strategies and assessments.

Table 10.2 Contrasting concepts of self (from Nisbett, 2003)

Self-concept	**Collective self**	**Autonomous self**
Personal Change	Changing, complex	Stable attributes, 'one true self'
Success	Harmony, humility	Singular achievement, self-aggrandisement
Relationships	Basic	Useful
Effective actions	Depend on context, complexity	Can be simplified to rules
Progress	Up and down, circular	Linear, continuing
Language focus	Verbs	Nouns
Freedom of action	Collective, freedom available through community	Individual, unconstrained by relationships
Freedom of location	Value place-based community	Expect to move often, as part of individual achievement
Hierarchy	Hierarchical	Egalitarian
Managing conflict	Collective decision-making, practical	Trading, arguing from principles
Causality	Complex 'resonances'	Deterministic forces
Seeking causes	Analyse the context and events etc leading up to the event of interest; empathise with relevant players.	Work back and forth between causes and effects, in scenario-writing and testing.

These examples I have given of qualities that shape identity in the village belong to the 'collective' self-concept of Nisbett in Table 10.1. They contrast with those evident in letters American students wrote to Sinevuso students. In describing themselves, the American students spoke mostly of their possessions and room décor, music and TV programmes (SS13, 2003). My clear bias here is that I believe that the qualities of a collective self have much to offer not only the community but humanity as a whole.

The concept of 'complex resonances' contrasts with the type of deterministic causes we expect in the science we teach. The education system draws more on the autonomous self-concept than the collective. This raises the potential for complex dissonances for rural students at crucial stages of identity formation.

Taboo

Taboo is a ban, restraint or exclusion of people or behaviours. Taboos are present in all cultures but differ in the specifics. Although one of the dictionary definitions of 'taboo' is a 'Polynesian practice of prohibition', and Horton (1967) lists it as a typical feature of traditional thinking, taboo is present in Western society and enforced by law in some

instances: for example incest. In a lesser way taboos are also enforced through social pressure: for example – in European culture - arriving uninvited at a stranger's house. A taboo is a phenomenon that does not fit established categories and is treated with aversion or horror. By definition such an event is 'bad' and needs to be isolated or expelled (Horton, 1967:251).

Some taboos no doubt serve to preserve well-being and ritualise wholesome restraint in a community. However, if we accept the premise that culture is dynamic, taboos need to be critically examined. "To focus only on the positive aspects of diversity biases educational research …" (Lubienski, 2003:30). This has significance for a number of practices. Two examples are taboos in relation to HIV/AIDS and unmarried mothers. One of our community researchers was widely ostracised because she was pregnant, and unmarried. Even one principal said he would not allow her into his home. In another incident a woman was driven out of her house because her brother discovered she was HIV positive. Achebe, when asked about the roots of culture stated emphatically: "If culture is harming someone it is not culture: it is abuse!" (Achebe, 2003a.) The Woza Moya volunteers deliver this message poignantly in their song: 'I am so ashamed': "I am so ashamed of my world, my church, my mosque, my family and my country for being ashamed of me. Ashamed of me being HIV positive." (43b, 2003)

Do we really know what it means: 'erosion of culture and values'?

Culture

> "!ke e:/xarra //ke" (Diverse people unite) is the motto on the South African Coat of Arms.
>
> *… "We make a commitment to value life, to respect all languages and cultures and to oppose racism, sexism, chauvinism and genocide … in this country that we have inherited together is found one of the birthplaces of humanity itself."* (Mbeki, Freedom day, April 27, 2000)

"A culture is essentially the society's composite answer to the varied problems of life." (Biko, 1973:84). This view accommodates the changing nature of culture: if circumstances and problems change, responses change.

Oruka offers a broad definition of culture:

> *"… culture demonstrates … celebrated achievements in thought, morals and material production. …knowledge, beliefs and values, behaviours, goals, social institutions, plus tools, techniques and material constructions."* (Oruka, 2002a:58.)

Cultural in this sense is conceived as an expression of indigenous knowledge and a formalisation of traditional practices. In the Chibini community expressions of dance, ceremonies, working together and traditional leadership are strong in spite of debilitating poverty, sickness, and disrupted social organisation.

Examples of tradition

In addition to the many instances of traditional activities already discussed I describe three. They show that despite many of the elders' concerns, youth still feel connected to tradition in a number of ways.

Sinevuso students in mid-2004 drew pictures of community activity. In one, men are sitting around drinking Zulu beer. During these sessions, the men, students explained, speak about their problems and deliberate solutions. Students feel that these sessions are useful and that problems are shared rather than individualised.

A second picture showed a man in traditional dress doing a Zulu dance. Students explained that it was good that the man practices and respects his culture and has not become Western and forgotten about his customs (R45d, 2004).

The young community researchers said that traditional education still takes place formally - for girls and boys. The elders and women run classes and initiate young people through the various levels.

Tensions between Traditional and Modern

The Induna was disappointed at the modern attitude of youth. (Is this not the case everywhere!) We asked: "Are there values and knowledge that young people should be learning?"

Induna Ngobo replied:

> *"These things happened before: for example boys carved wood, girls made mats, brooms and pots. Children don't value old things: they see it as poor and old fashioned. They need to learn crafts." (C36, 2003)*

Parents complained of moral degeneration (C30a, 2002).

From the perspective of a teacher of city youth I could not help thinking how lucky these parents are! The students I met were always motivated and polite. The teachers acknowledged that the students were mostly well-behaved and respectful. Nonetheless, there is an increase in the use of alcohol and marijuana among students – even at school (SS5, 2003).

Some elders expressed concern at their own lack of education compared to the current generation. Induna Chiya told me how he had never been to school as his family had been too poor. He said it was difficult for him to comment on specific educational issues although he believed that young people should go to school (C30b, 2002). The Chairman of the Mbumba committee explained the knowledge gap he experienced:

> *"Being uneducated is a problem – I am one of them… we deal with issues using our general knowledge, and others use school knowledge. These two types of knowledge are not the same. General knowledge has many shortcomings."* (O40a, TT, 2004)

Science curriculum and culture

For community members, 'school knowledge and literacy' are desired and respected. At the same time, they want cultural preservation, skills for survival, and training for jobs (C30a,b,c,d,e; C34-36, 2003). *My* concern was the perceived (and actual) worth of academic science courses versus agriculture projects. This tension between high and low status knowledge seemed not to concern the community (as discussed in 'Relevant Science'). If there was a dilemma here it was left for us and the school to sort out, essentially an issue of curriculum design. The same applied to incorporation of traditional culture and the use of computers and technologies. Unfortunately these tensions remain unresolved, with the school staying with the first and the community (and me) favouring the second.

The recommendation that Odora Hoppers (2001) makes in relation to the tensions between Western science and Indigenous Knowledge could also be applied to tensions between traditional and modern behaviour within a community. Her call for the need to foster respect and co-operation rather than competitive frameworks appears to present no problem for community elders who see this as something that simply needs to be done.

The tension between Western and African is exacerbated through school science structures and worldview. The committee chairman identified 'school knowledge' as 'different'. It is possible that he was aware that it is not only the 'knowledge' but its framing in a different paradigm. The Western science world-view, at least as presented in schools, is essentially mechanistic.. While it is true that new physics and chaos theory go beyond this mechanistic model, these philosophical shifts are yet to find their way into science learning at school level.

If school science curriculum were designed to ensure that socio-cultural influences were a resource rather than a hindrance, the tensions between traditional worldview and science could be largely resolved (Aikenhead, 2001b). Perhaps this is facilitated for the community in that learning co-operatively is part of *ubuntu*, and in African ontology there is no distinction between the sacred and the secular (Biakolo, (2002). This is both a rationale for, and consequence of, taking science learning out of the confines of the classroom. Moving from a learner-centred approach of teaching to a community-centred approach (as I described in 'Relevant Science') requires learning that draws on, and integrates cultural practices as well as practical and academic knowledge. The corollary of this is that different cultures and communities have a contribution to make to science (Taole, 1998).

Conclusions

> *"Science is generated by discussion and thrives on it. If we want science in Africa, we must create in the continent a human environment in which and by which the most diverse problems can be freely debated…"*
>
> (Hountondji, 2002:132)

South Africa has an important contribution to make in finding solutions for tensions between Indigenous Knowledge and science education in schools. Rural schools are in a particularly strong position for exploring Indigenous Knowledge and traditional culture. These communities have ways of knowing and being that could contribute to enriching both science and education (Keane & Malcolm, 2003; Malcolm, 2003; Odora-Hoppers, 2002; Thomson & Chepyator-Thomson, 2002). The climate for debate we found to be remarkably open.

The critical-reflective aspects of traditional culture are not always acknowledged. African academics recognise the importance of this. IKS is not a fundamentalist position:

> "*African culture has both critical elements, philosophers, poets, prophets and uncritical elements: religion, custom, myths. The critical also needs to be given attention"* (Oruka, 2002b:121)

The urgent need to focus on Indigenous Knowledge has been fuelled by its extreme denigration by some academics in the past and by the economic, political and educational systems.

In the light of the above discussions, Theron's assertion that there is only one philosophy: Western philosophy, is ludicrous:

> "*Africans should not pretend to set up some independent philosophical tree, as if truth were not one." "Escapist systems based on reincarnation are simply to be discarded…. African culture is simply not comparable."*
>
> (Theron,1983:157)

Theron, (writing from the Department of Philosophy at the University of the Witwatersrand), seems to equate non-rational with irrational. Godel, the world-renowned mathematician, on the other hand, sees the non-rational as a valid source of knowledge: and talks about the value of 'intuitive mathematics'. Theron also misses the point that Indigenous Knowledge includes empirically validated knowledge and logical reasoning. Non-western understandings, in all forms, have been repressed or ridiculed in main-stream academia. The rational and empirical way of knowing, situated within the framework of an observer-world dualism, has served as a tightly regulative filter in restricting what may be known and what may be regarded as knowledge. Epistemological dualism, materialism and mechanistic thought have been a source of repression of other cultures (Moodie, 2003). This repression of Indigenous Knowledge has contributed to its demise so that African academics and intellectuals are calling for the construction of authentic African knowledge paradigms (Armah, 2005; Nekwheva, 2000).

This is not to dismiss the value of Western science. Malcolm and Alant place different knowledge paradigms in perspective by asserting that while scientific knowledge is useful, it is also limited in its ignoring of spiritual forces, context and collectivity, (Malcolm & Alant, 2004). This perspective follows that of Hock:

> *"(Western science) …is a useful way of perceiving some aspects of reality and a practical aid in day-to-day activities. Difficulty begins when it is held forth as the best way of perceiving reality. Destruction begins when it is held forth as the only way. It is only one perspective; only one way of perceiving reality. And it is the best way only for narrow, limited, quantifiable purposes."*
>
> (Hock, 1999:288, Quoted in Breen, 2005)

It is likely that non-Western systems of thought and ways of being will become as globally important as the economic and political importance of China, Korea and Japan have become. African culture, knowledge and *ubuntu* need to be fostered in education so that this resource is available not only for Africa but more widely.