Transdisciplinary E-journal (TEJ)

The Inaugural edition
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Editorial policy

Transdisciplinary E-Journal (TEJ) is peer-reviewed and refereed multidisciplinary journal devoted to publishing across disciplines. The primary aim is to provide an intellectual platform for graduate students and the research community. The journal is devoted to building publishing capacity to academics and postgraduate students including postdoctoral researchers and community partners. The journal publishes papers in four broad areas namely research, practice-based initiatives and snapshots which should showcase the rich variety of knowledge, experience and impressions by all stakeholders in community-university collaborations.

TEJ is published bi-annually by the University of Venda. The views expressed by the contributors are not necessarily those of the editorial team. Transdisciplinary journal accepts no responsibility or liability for any plagiarism committed.

Transdisciplinary journal subscribes to the policy of open access.

Editorial requirements

a) Submitted articles may not be under consideration elsewhere and should not have been previously published. Copyright for articles published in the E-Journal will be retained by the authors, with first publication rights granted to the journal.

b) Articles should not exceed 7000 words in length including references and should use the Harvard style of referencing as outlined below.

c) Articles should be in South African English. Consideration will also be made for articles written in African language. To maximize the readership, articles originally written in African languages should be translated to English.

d) Accepted articles will be edited to journal style. All articles must be accompanied by an abstract of up to 300 words and a list of up to six key words.

e) After an assessment of the paper’s suitability for publication in the E-Journal, the editors will send research articles electronically to three referees, who will decide whether to recommend rejection or publication with or without changes.

  i. Authors and reviewers remain anonymous.
ii. Accepted articles, when in final form, are assigned to an issue of the proposed E-copy edited and formatted for publication.

f) On the date of publication, the issue will be announced and subscribers notified.

**Submission Format**

a) Please use the typeface ‘Arial’ throughout your article.

b) The main text of submissions should be typed in 1.5 spacing in a font size of 12pt.

c) The text should be justified on the left margin only (not justified on the right).

d) Use a double space after full stops and other punctuation.

e) Do not put a space in front of a question mark, or in front of any other closing quotation mark. The beginning of a new paragraph should be indicated by a space made by a double carriage return (not an indent).

f) Insert page numbers on the bottom right hand corner of each page. Limit headings to three levels.

g) The first level (for the title of the paper) should be 12pt bold. The second level (for subheadings) should be 12pt bold, and if a third level is necessary use 12pt underlined text. Capitalize the first letters of words in titles and headings. Subheadings should be separated from the preceding paragraph by a space, but do not put a space before the paragraph immediately following the subheading.

h) Footnotes, endnotes and appendices are to be avoided.

i) Please do NOT submit compressed files. Do not use any word processing options/tools, such as strike through, hidden text, comments and merges.

**Tables:** All tables must be embedded in the manuscript near the first reference to the corresponding table. Tables MUST be no wider than 13.5 cm.

**Multimedia files:** Any graphics that go in the paper must be submitted as separate files. The highest quality master (for example, TIFF) is preferred. Additionally, the graphics must also be embedded in the correct locations within the document. Please note that any graphics created in Microsoft Word must also be submitted as separate files. Filenames for figures must be clearly labelled as Figure 1, Figure 2,
etc., at the bottom of the figure, left justified, numbered in sequence, and must be referenced within the text of the article. ALT tags will be applied to all graphics. The default tag will be the figure caption supplied by the author. Authors should provide tag text for any graphics used as links to audio or videos.

**Referencing**

All reference must be done according to Harvard method. Please check the following before submitting the manuscript:

Ensure that:

- all the references in the reference list are cited in the text
- all citations in the text appear in reference list
- the dates in the text and reference list correspond
- the spelling of authors’ names in the text and reference list correspond and that all authors have the correct initials
Foreword

Peter Mbati
Vice Chancellor and Principal of the University of Venda

The publication of the Transdisciplinary E-Journal (TEJ), a peer-reviewed and refereed multidisciplinary journal, heralds the establishment of an institutional platform for academics and graduate students to publish and share their research findings with their peers and interested stakeholders such as donors and government. The Transdisciplinary E-Journal becomes one of the levers for driving the University of Venda’s strategic vision to be ‘globally aware but remaining locally relevant to the advantage of communities it serves, locally, regionally and nationally’. It further responds to a growing need of university communities to improve on academic writing, an important ingredient in our drive in the renewal of the academic career in South Africa. The extent to which South Africans enjoy the benefits of higher education as part of the fruits of freedom has been prescribed by historical and structural inequalities in the distribution of resources and capabilities. The launch of the TEJ addresses the need to create a balance in the making of a strong academic cadre with the intellectual capabilities to make the university relevant and competitive.

The capacity of our universities to be significant players in the transition from a resource-based economy to a knowledge-based economy has become a determining factor of its position among other knowledge generating institutions globally. It is also clear that the ability of the university to generate knowledge is influenced by an enabling environment characterised by easy access knowledge infrastructure platforms and networks. The TEJ is one of the knowledge platforms that provide an avenue for the university to enhance its ability to disseminate high quality knowledge products and train highly skilled and competent graduates that meet the needs of a developmental state. A developmental state within the knowledge-based economies should be characterized by presence of critical mass of knowledge workers and experts who are highly productive and have the ability to leverage on their skills and scientific knowledge in developing appropriate tools and interventions to significantly reduce and ultimately eradicate poverty, particularly in the rural communities of our country. Institutions of higher learning, such as the
University of Venda have an obligation to produce the desired competencies and to lead this crusade of improving the socio-economic status of our people.

A dynamic environment for knowledge generation and human capital development is likely to contribute to the creation of a vibrant culture and democracy. By creating an E-Journal the University of Venda is providing easy and free access to diverse transdisciplinary knowledge sources to layers of society. Through the use of digital technology, the TEJ will be accessible to all students, to the public at large and to the communities. It will be an equalizer, empowering and inspiring our students and communities to read and later on publish their own articles, projects or research reports.

The Structure of the TEJ allows for a variety of publications. The research section is essential for scholars working in multi-disciplinary and transdisciplinary research and community engagement fields who want their work to be recognized by peers locally and internationally. The research will promote works based on substantiated scholarship deemed to contribute to new knowledge in the field. The Practice-based section of the journal presents opportunities for excellence in the reporting and reflection on engagement in practice. The articles chosen for this section demonstrate rigorous and reflective analysis of professional practice-based experience in several fields. The third section, Snapshots, showcases the rich variety of knowledge, experience and impressions by all stakeholders in community-university collaborations. Focus in this section will be on reflections of day-to-day practice and experience, and will in future publications include portraits, impressions and analyses, collaborative essays, edited interviews, oral histories and profiles.

TEJ opens up new trajectories for discursive engagement in the university. It will provide space for the full freedom of expression by scholars, civil society through community engagement reporting and snapshots that promote dialogue between a variety of stakeholders including policy makers and academics and the private sector. Consequently, the exercise of the freedom of expression will enhance tolerance of opposing academic, social, political views and values. It is envisaged that the TEJ will open the floodgates for active policy dialogues between different
interest groups associated with university education. The TEJ is thus positioned to promote the free exchange of scholarly, community based practices and personal and often subjective views. This is transformative and aspires to change the nature of the discourses into multifaceted directions, where the university is not the only site of knowledge production, where the university professors are not the only knowledge generators, but will share the platform with barefoot professors from the communities and their students. The TEJ will lead to the creation of easily and freely accessed social networks. It will contribute to a new democratic ethos within knowledge generation in the University. The TEJ aspires to contribute to the making of the University of Venda as a knowledge hub bringing academia, the civil society, government and the private sector in dialogue on the relevance of the university to the community.

An essential role of the TEJ is in capacity building across the ranks of the university and communities especially in research and writing. By providing a platform to mentor, coach and support young and rising stars the TEJ will be a catalyst in improving the quality of work at postgraduate level and help increase outputs of honours graduates, research masters graduates, doctoral graduates and postdoctoral fellows. The TEJ should thus contribute to making the University of Venda transformative in its teaching and learning, ensure relevance to communities and become competitive in knowledge generation. It must ensure that it produces graduates who possess the intellectual and academic capabilities related to teaching and learning, research and community engagement that are fundamental for developing South Africa’s universities.
Editorial

Vhonani Netshandama

It gives me a great pleasure to extend a word of welcome to the readers of the new transdisciplinary E-Journal. We begin with this open issue to embody the intentions of the transdisciplinary E-Journal to cut across disciplines and to mirror UNIVEN’s endeavour to be globally aware whilst remaining locally relevant – a university embedded in its communities. The key indicators of relevance of UNIVEN could easily be traced in the discussions in this issue which cover Education, Water and Health as well as Indigenous Knowledge Systems. In all these areas, the authors argue a consciousness on issues of inequality and the redress thereof, the quality, quantity and the graduated-ness of the students we produce. In all these, the interacting principle advocated is one of collaboration and working together to ensure that Univen promotes the principle of substantive ‘justice’.

The graduation rate in higher education institutions continues to be low despite the many strategies that have been tried to date. There is often dart throwing between the agents of change starting from basic education to the higher education sector. Articles in this issue acknowledge that there is a need to work together in a collaborative manner. Kaburise tackles the issues departing from experience in extended degree programmes (ED) and argues that the programme approach tended to be reductionist dealing with one or other aspect in isolation. The negative effects of low SES on literacy can be ameliorated by a more holistic, systematic and longitudinal interaction between HEIs and the pre-tertiary levels of the education system.

As the 2015 Education for All and Millennium Development Goals deadline approaches, the issue of equity funding has increased in importance. There is a wealth of literature that correlates funding with the quality of education. It is also argued that poverty and inequality will not be reduced if the quality of education is low. Mashau and Tshivhase-Phendla raised the question whether the equity funding mechanism for quality basic education is feasible, given the history of inequalities.
It is in the nature of being locally relevant that ‘we hear the community out’ about issues that matter the most to them. We have in this issue an article encouraging community participatory methodologies in researching about water and health. On one hand, Samie, Meliko and Siaruli outline how a photo-voice participative methodology was employed to generate discussions between the community and ‘scientists’ from the point of view of community members. On the other hand, Mashau, Mudau and Netshandama present the qualitative findings regarding how community stakeholders regard the role of home-based caregivers in their municipality. The burden of overcrowded hospital facilities and the associated less than quality care is felt throughout the country, particularly in rural areas. Community perspectives are crucial in this, given the promotion of Primary Health Care programmes and the need for collaboration with home based care programmes.

From problems to offering alternatives, Mulaudzi and Gumbo report on the effectiveness of ceramic filters in reducing microcystins in raw surface. The majority of rural communities rely on the freshwater bodies for their water consumption without any form of water treatment. Research conducted form rural households indicates that point of use water treatment is probably the most feasible in rural communities. The ceramic water filter is composed of local raw materials, clay and sawdust. There is a wealth of indigenous knowledge amongst local clay crafters who made various forms and shapes of clay pots in the traditional way. This provides an exciting opportunity for exchange between ‘scientists’ and local knowledge holders.

In communicating the value of IKS, Seleti is critical in the way universities have positioned themselves to be leaders in advancing the IKS agenda in the country. He argues that universities have not yet sufficiently engaged the IKS agenda as a transformative tool for higher education. Borrowing from Visvanathan’s concept of cognitive justice, Seleti argues that the university’s role in driving the IKS agenda is synonymous with redress and justice. The concept of cognitive justice is based on the recognition of the plurality of knowledge and expresses the right of the different forms of knowledge to co-exist. Visvanathan argues that different knowledge is
connected with different livelihoods and lifestyles and should therefore be treated equally.

This, the inaugural issue, outlines the complexities of the context within which the post graduate students and researchers participate in the knowledge production space and the unanswered questions providing opportunities for further research in varying fields. The University, through this initiative, continues to supplement existing strategies and vehicles for quality academic writing and responsible - respectful research.

The realisation that academic writing as an art of organising thoughts cannot simply develop in isolation prompted the idea of this publication. Providing space for post graduate students to write and publish their work is an act of capacity building that should enable them to analyse, assess, and improve thinking. It is a space where they should develop the ‘intellectual virtues of intellectual integrity, intellectual humility, intellectual civility, intellectual empathy, intellectual sense of justice and confidence in reason’.

The journal is devoted to building publishing capacity to academics and postgraduate students including postdoctoral researchers and community partners. The journal publishes papers in broad areas of research, teaching and learning, community engagement and other forms of practice base initiatives. Through collaborative portraits, the E-Journal also aims to display the bridges between academics and policymakers more fully thereby articulating creative tensions between theory and practice. In future issues, we have a line-up of exciting portraits and research articles from graduate students in various fields.


Academic and socio-economic variables in tertiary success

Kaburise P

Abstract
Various support strategies are available to lessen tertiary under-preparedness, and the extended degree (ED) is one such strategy. The expected educational gains from ED have not been as dramatic as was hoped. It is the contention of this paper that the graduation rate in higher education institutions (HEIs) continue to be unsatisfactory in areas like Limpopo Province, because EDs address, mainly, one contributor to literacy challenges, academic factors, without a corresponding attention to challenges arising from the socio-economic status (SES) of students. It is acknowledged that variables comprising the SES of students are not, relatively, so easily addressed as academic lacks, but in not according much attention to SES the impression created is that attending to literacy needs only should ensure tertiary success. This is a fallacy which has been proven by the continuing poor throughput rates in HEIs. This paper argues that some of the negative effects of low SES on literacy can be ameliorated by a more holistic, systematic and longitudinal interaction between HEIs and the pre-tertiary levels of the education system.

Key words: Literacy, academic, socio-economic, variables, success, Limpopo province, interaction

Introduction
All levels of South African education system are under scrutiny because of their failure to give corresponding yield on the high investment made in them. Reasons given for this, usually, are the non-graduating students’ inability to make the transition from secondary to tertiary levels of literacy arising from a gap between the demands of secondary and tertiary levels of education. Research has shown that contributors to tertiary - level literacy are from factors inherent to the students such

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as content knowledge and their SESs, and others from the teaching and learning culture of the South African’s HEIs (Calderon 1997, Fraser and Killen 2003).

Tertiary institutions in rural provinces can be classified as historically disadvantaged institution (HDI). HDIs are typically marked by limited resources, certain kinds of curricula and approaches to teaching and learning and tend to be educationally and socially benevolent and accessible to the average student. Universities like University of Venda (Univen) and University of Limpopo predominately have student recruitment among “areas of structured and entrenched disadvantage” (Mda 2010).

Post 1994, the call for redress, the renewed wave of social consciousness, the freedom of movement and the rise in the upward mobility of the urban blacks in the early 90s have seen more diversity in the student populations in HEIs. This massification of tertiary life has also seen greater diversity in the performance of students establishing a correlation between social diversity, literacy levels and success rates (Bhorat et al, in Mda 2010). This is a reflective paper which examines the correlation between these factors and academic performance.

Of the nine provinces in South Africa, Limpopo is the fifth largest, with the highest population of young people in the country. In 2001, children under the age of 15 accounted for approximately 39.4% of the Province’s population, the highest in the country (Statistics South Africa 2004). There are multiple implications of this, one of which is the Province’s high expenditure on all levels of education, particularly pre-tertiary education. Provincial authorities’ responsibilities usually start at the formal education stage, from Grade R, leaving pre-primary schooling at the discretion of the parents.

Most of the population of Limpopo resides in non-urbanised areas; 13.1% of the total population lives in urban areas as compared to 55% for the rest of the country and although Limpopo has demonstrated amplification in urbanisation of 2.1%, most people still stay in non-urban environment (Statistics South Africa, 2004). Socio-economic indicators measure, among others, income and literacy and skills levels of a population on the Human Development Index. The socio-economic status of a country is measured on a scale of 0 to 1 where an index close to 0 indicates low
levels of income and literacy. The index for Limpopo is 0.5, which although medium, is lower than that of the general population of South African; in addition, 81% of the economically active population earns less than R3200 per month. What this means is that the student population of Univen comes from low literacy, low income families who therefore have challenges meeting their basic amenities and making personal investment in the education of their children apart from what is provided by provincial and national authorities.

The Limpopo province is also characterised by under-resourced rural schools. A study by Phurutse (2005) showed that there are major variations in resources available to public schools in South Africa. While rich provinces like Western Cape, Gauteng and the Northern Cape can afford to subsidise teaching and learning with high school fees of up to R11000 per annum, for example, in certain schools in Pretoria, parents and guardians of poorer provinces like Limpopo and Mpumalanga have challenges with fees of R40 – R100 per annum (Bot et al. 2001; Phurutse 2005). A healthy school budget means sufficient educators, market-related wages for experienced teachers and a conducive working environment for everybody. The National Poverty Distribution Table which measures the levels of poverty of schools classifies 27% of all schools in Limpopo as ‘very poor’ lower only to schools in Eastern Cape where 34% of schools are designated as ‘the poorest’. Rich provinces such as Gauteng and Western Cape have low percentages of poor schools – 7% and 4% respectively (Phurutse 2005).

Naturally, inadequate funds means learners in rural schools show high learner-teacher ratios. In 1996 DoE introduced the policy of rationalisation and redeployment of teachers with the aim of creating a learner-teacher ratio of 40:1 in primary schools and 35:1 in the high schools (Crouch and Perry 2003). National studies have however discovered that schools in Limpopo, Eastern Cape and rural KwaZulu Natal have the largest number of learners in their schools (Gordon, 1997; Bot et al 2001) and in some extreme cases there were 65 learners in a class (Kanjee et al. 2003). Educators in schools with low annual fees and large classes also have longer formal contact hours. In the poorer areas, 60% of educators report having formal contact hours of between 30-35 hours a week. The implication of many contact hours is that the quality of teaching is affected as the work of the educator is
spread across grades; the workload demands on educators are greater, resulting in educator ineffectiveness and stress (Phurutse 2005; Milner et al. 2008).

Under-resourced rural schools with high learner-teacher ratios usually mean questionable teaching and learning which translate into under-prepared tertiary students who either drop out or do not find their tertiary experience rewarding and who need some kind of support. Academic intervention comes in various forms arising from the non-uniform literacy requirements of the disciplines and cultures in HEIs. Support models which gained prominence in the 1980s have evolved from the remedial, bridging, foundation, autonomous, stand-alone approaches to the integrated, holistic conception of support, all based on what is seen to be the cause and an appropriate remedy for students' below-average performance (Street 1984, 2003)

A state-funded intervention in South African universities is the extending of degrees by one year with the aim that this extra period will strengthen students discipline-specific content and inculcate in them necessary tertiary cognitive behaviour. The ED has a history not only as a reaction to the articulation gap but also as a means of redressing the social, economic and political inequalities of the past. It was seen as not only offering a once-off access but ensuing continuous support throughout a student’s stay at the institution hence predisposing the student to academic success. The developmental nature of academic literacy is the justification for offering this concept of support.

The desired transformation in tertiary success rate from the extended degrees, however, has not been as remarkable as expected. Scott (2011) deliberating on EDs acknowledges that they have improved equity of access; have, despite the still high attrition rates, had some success in increasing the number of black graduates. However he continues to admit that there are visible limitations to EDs as a general panacea to tertiary education’s woe and calls for a rethink of the concept of EDs. A sentiment I share. It is the contention of this paper that EDs address mainly the content lacks of literacy while other equally significant factors like, socio-economic contributors, which are not focused upon, explain the un-dramatic gains in success rates at tertiary level.
Theoretical background

Transition into tertiary work is a complex process and a number of factors contribute to the successful progression of these processes. These factors have come to be broadly categorised as levels of students’ content knowledge and SES.

Literacy is a multifaceted term and its presence and development are dependent on a multiplicity of contributors delineated by the particular students under discussion (ICAS 2002; Cliff 2003; Yeld 2003; Foxcroft 2004). Being academically literate is ‘a way of being’, a way of fitting into the environment; it is developmental and on a continuum. Literacy is like climbing a ladder; the student commences at the bottom of the ladder and progresses to the top. Certain hurdles have to be surmounted along the way and as these occur, the individual’s literacy skills are refined, moving from the concrete to the abstract or progresses from functional to critical literacy.

Literature has also shown that differential literacy levels are just as determined by socio-economic factors as they are by academic variables (Barry 2006). The immediate reasons for lack of academic success is usually seen as content challenges however impact studies have established that other contributors also ensure success (Fraser and Killen 2003). These non-content contributors are usually broadly grouped under demographic, social, psychological and the teaching and learning milieu of HEIs (Eiselen and Geyser 2003; Cheesman et al. 2004). All these variables therefore, must be taken into consideration in any discussions about low success rates and intervention strategies in South African universities.

Discussing the demographic details of students entails examining variables such as age, gender, language, population group, type of pre-primary and pre-tertiary schools attended and literacy and financial status of the family (Cheesman et al. 2005). An age variable included in most studies of this kind, suggest maturity as a factor in student success (McClelland and Kruger 1993). Studies have also shown success can be related to gender, for example, in the Caribbean, male academic underperformance can arise from factors such as socialisation practices (Evans1997; Cheesman et al. 2005; Bhorat et al in Mda 2011). Furthermore,
statistics on the performance of the different population groups show a greater percentage of degree non-completers among African males followed by the coloured community (Letseka and Maile 2008; Bhorat et al in Mda 2011).

The home language of the student seems to have minimum impact on success although proficiency in the language of instruction has been identified as a determinant of success (Kaburise 2011). The language of instruction is the vehicle, the medium for the concretisation of cognitive activities and proficiency and is an indication that a student can handle the demands of tertiary studies (Boughey 2002). Critical interrogation of an issue, convincing portrayal of self, problem-solving skills and a reduction of powerlessness, hinge strongly on language competence. Those of you familiar with the works of Cummins (1979, 1984, 2000) know that it is a distinct type of language, cognitive academic language proficiency (CALP) which accesses tertiary studies, hence it is not language per se which is under discussion here. Cummins’ distinction explains the higher level linguistic demands made in a context-reduced and cognitively more challenging discourse- creating contexts of HEIs. Research has shown that there is a linguistic threshold in the language of instruction below which academic success is at risk (Leibowitz 2004; Elder 1993, 2007).

Intergenerational literacy levels have received attention in discussions of SES influence on success rates. Education is a cooperative endeavour, with the home complementing the different levels in education. This is seen in the students being able to discuss issues, academic or otherwise, comprehensively and cognitively with somebody outside their immediate learning environment who would appreciate their frustrations and triumphs (Fraser & Killen 2003). Lack of emotional support experienced particularly by first generation scholars, increases their feeling of isolation and bewilderment in not belonging to either world and reduces their motivation levels (Simmons et al, 2005 in Cheesman et al, 2008). Some literacy in the home and society creates a certain ambience forging a tie between students’ background and the educational institution.

Students’ psychological details also have a direct bearing on success. Psychological factors is a collective list of attributes such as cognitive ability, self-efficacy and
levels of learning anxiety, learning strategies, beliefs about knowledge and learning and motivation levels. According to Piaget, cognition is the result of a complex interplay between genetic, psychological and environmental factors (Low and Edward, 1993). Development in cognitive functions is a result of assimilation and accommodation of the daily experiences that one undergoes. These new experiences are internalised or assimilated because they are compatible with ones existing experiences or they ‘negotiate’ with existing conflicting experience until a common ground is found (accommodation) (Piaget 1978). Cognition is in a constant state of flux enriched by the experiences one already has and new insights arising from different exposures. For tertiary students who are exposed to a multiplicity of experiences, the ability to interact with these stimuli is vital. Such ability is enhanced from the diverse stimuli, usually available from environments associated with non-low SES.

Self efficacy is a belief in oneself, despite the alien and daunting environment of academia. It is students’ self-knowledge that they can succeed in their articulated goals if they persist and are committed to their studies. The cultural trauma from academic and social articulation gaps results in low levels of learning anxiety if a student has a positive self efficacy and although some stress is necessary to galvanise one to greater academic heights, over- anxiety results in negative self efficacy and can be debilitating; can result in discordant cognitive processes, low task motivation, low performance and may even affect students’ physical wellness. Self-image is also linked to motivation levels which develop even more when a student has been well advised about his/her choice of careers and the student is aware that there is a high possibility that he/she will make it in the chosen career.

Learning strategies categorised as surface, deep and strategic is knowing how to accomplish a task in the most effective and efficient manner (Entwistle 2000). A study at Rand Afrikaans University as to why some students are ‘at risk’ of failure isolated, among others, study habits or level of diligence, language proficiency and cognitive status as reasons for failure or success (Eiselen and Geyser 2003).

Closely related to learning styles is students’ conception of what knowledge is and its creation. An acceptance that knowledge is dynamic and is fore-grounded in our
relatively static cultural heritage and the ever-changing information world enable students to recognise their role as challengers of the world status, creators of knowledge themselves and this fosters independence of thought and reduces student hopelessness and anxiety. Knowledge creation is an on-going process affected mainly by the empirical evidence on which it is based. Knowledge does not reside solely in an individual (lecturer or student, or authors) or in environments (higher education institutions, countries) but is creatable by ordinary people. Students’ understanding of epistemology improves their critical literacy, making them partners with the lecturers, their peers, researchers and writers and making learning, stimulating and interactive.

Institutional cultural milieu cannot be ignored in a discussion of this nature. The elitism of tertiary life is daunting for students whose way of life has been a small rural school in villages. The greater the distance between these two worlds, the longer and more traumatic the transition period is. Such students are suddenly confronted by some students who take notes on laptops in classes, by lecturers presenting information on overhead projectors and power points and who communicate for the whole duration of the lecture in English. After that they are expected to do research by either accessing information through the internet or through stacks of books electronically.

**Discussions**

Students who have had pre-tertiary schooling in wealthy provinces, dissimilar to the Limpopo province and have undergone the additional vetting to their matric examinations through placement tests (for example, universities of Witwatersrand, cape Town, Pretoria and Stellenbosch) seem to benefit substantially from the notion of EDs. In other words, students from poor socio-economic background, with moderated matric results and minimum non-academic support may not show similar substantial gains. This is because, I believe, ED seems to address mainly one dimension of literacy, academic, while ignoring the others. Any attempt to narrow the concept of literacy and hence make content knowledge the sole determinant of academic success is overly simplistic and is ignoring the fact that literacy development involves a comprehensive transformation of the whole person. This
point is seen when one examines the academic implications of some of the characteristics of the Limpopo province.

The fact that the province has a relatively younger population means a greater burden on the population for the provision of pre-primary education. The positive impact of pre-primary schooling on later academic success has been established in a series of reports entitled ‘PISA in Focus’. The reports note that school systems that perform best are also those with more inclusive access to pre-primary education. In fact, the length of time children attend pre-primary had measurable effect before age 15. The report concludes by noting “widening access to pre-primary education can improve both overall performance and equity by reducing socio-economic disparities among students…” (Ward 2011). Hence a situation where parents are unable to give their children such initial benefits has significant negative impact on development of tertiary literacy. Studies on early childhood education (ECE) in South Africa indicate that while over one third of urban children had access to some kind of pre-primary activities readying them for formal schooling, only 6% of rural child had similar opportunities (Padayachee et al 1994). This of course will have an effect on the academic performance of students coming from areas like Limpopo province.

Living in a non-urban setting with the level of human development index of Limpopo province has both socio-economic and educational repercussions. In such an environment, literacy-enhancing resources, activities, and opportunities are limited. Rural communities are characterised by basic facilities and extras which promote overall academic sophistication are usually lacking; there are no libraries, cinemas or community educational events all aimed at the overall academic grooming of learners. The importance of such resources cannot be over-emphasised; in psycholinguistic literature, the impact of the social and home environment on cognitive development has been well documented. Cognition and language development do not take place in a vacuum, there is a dire need for comprehensible input not only in the classroom but also from the home. The educational role of television programmes, availability of different forms of print media, debating and discussion sessions with parents and siblings, conducive learning space in homes
and the availability of a certain literacy-promoting ambience are some of the basic ingredients of an academically supportive environment (Krashen 1998, 2003).

Rural schools with limited resources are also characterised by certain teaching and learning practices. Urban provinces with higher pay structures for teachers are able to attract more experienced teachers who can apply innovative, stimulating teaching strategies which cognitively challenge the learners and which move them from functional literacy to tertiary-like critical engagement with knowledge. Inappropriate, non-challenging, non-stimulating learning practices like memorising and rote learning, uncritical acceptance of facts, wholesale copying of facts, non-processing, non-analysing and non-evaluation of texts and non-creation and non-ownership of discourse are the order of the day. This point is also articulated by Cohen, et al. (2003) when they note the profound effect of quality instruction in the class. Large classes, long contact hours, teaching subjects for which one is not a specialist, volumes of DoE-required assessment reports and administrative work, inadequate salaries, negative working atmosphere and conditions are just a few of the stressors identified as having an impact on the performance of rural teachers and students, in a study by Milner and Khoza (2008).

Recent evidence shows that on the average, 70% of the families of the tertiary dropouts surveyed are in the category of low socio-economic background (Maile and Letseka 2008). The social and economic impact of funding challenges for tertiary students is well documented. For students coming from rural backgrounds the effects of stress from lack of money is equally felt on social and academic wellness; HEIs are both social and academic entities and students need to fit into both.

The deliberations above clearly apportion considerable significance to both SES and academic variables in tertiary success. In other words high SES and literacy levels create an enabling setting for success. Of course, one may argue that for pragmatic reasons SES influences have been de-focused for the relatively more remediable academic consideration. In the mid-80s institutions obvious inability to impact on SES factors saw a shift to examining HEIs as rather the barriers to student success (Boughey and Volbrecht, in Griesel 2004). But de-focusing SES’ negative impact on literacy and success rates does not make them less influential or make them
disappear, hence because of the academic, social, economic, political and even moral implications of leaving the situation un-rectified, a comprehensive solution needs to be put in place.

Although some solutions to under-preparedness are relatively easy to find and implement, for example, distribution of funds and upgrading of pre-tertiary schooling (resources and teacher qualification) others call for more innovative practices. The dichotomy between rural students’ background and the elitism of tertiary culture can be bridged by more conscious effort on the part of tertiary institutions to forge closer ties with rural schools particularly at Grades 10-12. By this I do not mean the usual highly published practice of ‘adopt a school’ where HEIs take a rural school under its wing, build a state of the art science and computer laboratories and visit these schools, maybe once a year, to see the condition of these donations, or the universities’ recruitment drives or open days for learners to hear about the various careers on offer and to see the layout of an HEI.

Rather what is called for here is for HEIs to interact very closely with rural schools to ascertain the exact nature of the transition gap and come up with strategies even if it means actually teaching to assist teachers to structure cognitively challenging tasks; tasks which will extend learners’ interaction with texts from the functional to the critical levels of literacy (Kaburise 2011). During such interactions, inappropriate or non-tertiary-preparing teaching and learning styles would be exposed and discouraged to be replaced by the modelling of practices which will ease the transition trauma and the articulation gap. Such lecturers can infuse rudimentary tertiary practices like, e-learning, researching topics, presentation of information in lecturing mode, speaking for a full period in English, practice in challenging authorial power and helping learners create their own discourse based on empirical evidence and experience, will all be of assistance to Grades 10 - 12.

The inadequacy of pre-service training for teachers has been the focus of numerous discussions and hence will not be belaboured here. Suffice to say that rural teachers are particularly ill-prepared for pre-tertiary teaching with poor content knowledge and poor mastery of the language of instruction. This of course has a profound ill-effect on the students’ ability to achieve the required sophistication in English, the
language of instruction. The presence of these lecturers and their interaction with the learners in English would serve as examples and motivation for rural teachers. This calls for an investment by HEIs in high schools, in having a hand in closing the transition gap for their potential students, in ensuring that high school teaching and learning mirror the culture of the HEIs.

Although it can be argued that this recommendation is exactly what EDs are aimed at, my point of departure is that this method of interaction is over a period of three years (Grade 10 – 12) hence it allows for deep-level internalisation of these skills as well as serving as a boost to learners self efficacy. It is one thing to offer support to high school learners in their own environment in their normal mainstream activities and another situation altogether to offer support to under-prepared students outside of mainstream. Where the former enhances learners’ confidence, improves their grades and readies them for tertiary work, the latter is remedial in nature, hence may foster marginalisation and psychologically not boost the student. In addition, the numbers of students benefiting from EDs in the various HEIs are few whereas this approach will be beneficial to all learners progressing to the final phases in high schools. Opposition to the previously stand-alone one year tertiary remedial support was because this type of support only guaranteed access but failed in providing sustained long term support for students and this served as the rationale for EDs. Hence providing support for teachers and learners for three years (Grades 10-12) should provide the longitudinal, developmental orientation necessary to facilitate lasting internalisation of practices.

Although this level of collaboration can negatively impact on lecturers’ primary duties, this would have to be balanced by the improved calibre of the next generation of students. Furthermore, community engagement, the third leg of lecturers’ responsibilities would have laid the grounds for involvement with partners external to the universities.

**Conclusion**

Determinants of unsuccessful tertiary performance are both academic and socio-economic. Academic challenges because of their very nature are visible and measurable, hence tend to be subject of support initiatives like EDs. Socio-
economic variables are diverse and some are clearly not addressable by schools or the government, however, they cannot be wished away but must also be addressed. One way of doing this is for HEIs to interact very closely with schools to identify and remove the articulation gap.

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Equity funding for quality education in the South African basic education system

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Abstract

This conceptual reflective paper focuses on South Africa’s provision of democratic and equitable funding of education in her effort to provide equality and equity to address the past inequalities. Before 1994 funding of the education system was based along racial and ethnic lines. This situation was as a result of the larger apartheid ideology which leaned on the philosophy of divide and rule. With the dawn of a democratic government in 1994, the new government amalgamated all education departments into one department. Thus, several White Papers in education were promulgated by parliament from 1995 which culminated in the National Education Policy Act 27 of 1996 and the South African Schools Act 76 of 1996. The Constitution of the Republic of South Africa Act 108 of 1996 preamble says that, “… united in our diversity and we want to heal the divisions of the past and establish a society based on democratic values, social justice and fundamental human rights”. After 1994 when democracy was ushered in South Africa, there were changes in funding education in South Africa, the question which this conceptual reflective paper raises is, “Is equity funding for quality basic education in RSA feasible, given the history of inequalities?”

Key words: Quality basic education, equity funding, inequalities

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Introduction

The salient feature of education in South Africa was the differential pattern of education development for different groups along the lines of colour, race, class, and ethnicity. While whites received a very high level of education, which was comparable with the best in the industrialized world, nevertheless, black education was characterized largely by an inequitable allocation of resources, overcrowded classrooms, high dropout rates, and insufficient numbers of and poorly qualified teachers (Tshivhase-Phendla & Mashau 2010). Against the background of apartheid, the education system was divided into four main systems for four groups that is education for Whites, Indian, Coloureds, and Africans. For the white community, there was a system of free, and compulsory education, and for the black groups, that is, Africans, Indians, and Coloureds, education was neither free nor compulsory (Tshivhase-Phendla & Mashau 2010; Christie 1986; Enslin 1986).

Apartheid education was generally considered by blacks to be inferior and designed to confine them to lower class occupations. There were differences even within black education, that is, Indian and Coloured education systems were more privileged to a higher degree than African education. These divisions served to entrench separate development in all aspects of life in South Africa. Consequently, it could be safely predicted that separate education could never have resulted in equal development of all South Africans.

Administration and control of African education passed from provincial administration in Natal, Transvaal, Orange Free State and the Cape Province, and from mission churches, to separate Bantu Education Section in the Department of Native Affairs of the Central Government. The results of the Bantu Education Act were profound and subsequently endorsed racial differences in education (Hartshorne, in Lewis and Lemmer 2004, p. 69). It is understandable that Bantu Education reinforced the apartheid ideology of the past regime and was enshrined in the basic and essential human right, that is, education. There is probability that education continues to create disparities given the historical and deep rooted divisions in South African over the past 200 years.
While the new government has demonstrated its commitment to provide equitable education and redress the past inequalities through a myriad of legislations and Acts, albeit, researchers question the current National Norms and Standards for School funding education and its capacity to improve the quality of education for all South Africans. The question we raise in this paper is, “Is equity funding for quality basic education in RSA feasible, given the history of inequalities?”

**Funding of basic education: a historical background**

**State of Affairs Prior 1994**

In the foregoing paragraphs we have provided a brief insight into the historical divisions and fragmentations in the provision of education in South Africa. In addition, prior to 1994 two departments of education fell under the jurisdiction of the national parliament of the day; four fell under the governments of the so called self-governing territories; and four of which had four provincial components, fell under the jurisdiction of racially composed administrations answerable through a variety of structures of their own elected assemblies (Davies 2005, p. 123).

African education was further fragmented into seven departments of education in the self-governing territories or the so-called homelands, Kwa-Ndebele, Ka-Ngwane, Lebowa, Kangwane, Qwa-qwa, Kwa-Zulu, and Gazankulu, and four departments in the previously nominal states which were Transkei, Bophuthatswana, Venda and Ciskei. Subsequently, educational control and administration in the pre-democratic era was a curious mixture of varying degrees of decentralization and centralization (Classen 1995, p.470).

In apartheid South Africa, those self-governing territories were located according to ethnicity. The White race benefitted more than African (Black) race. Schools were also divided in terms of city, township and rural. For instance, children from city areas had very different experiences from children in the rural areas. Furthermore,
there were also vast differences between rural and farm schools, and further immense disparities between township and squatter camps.

At the time, the duplicating education bureaucracy was mainly a result of the 1983 Tri-Cameral Constitution, which made provision for both ‘general affairs’, and ‘own affairs’ were defined as those matters which specifically or differentially affected a population group in relation to the maintenance of its identity and the upholding and furtherance of its way of life, culture, traditions and customs in state administration (Booyse 2011, p. 230). Thus, we perceive the administration of education at ‘own affairs’ level, through three councils of ministers administering the education of Whites, Coloureds and Indians. At ‘general affairs’ level two departments operated in the following two ways:

First, the national education which was seen as an umbrella department was responsible for determining general policy in the following areas:
- norms and standards for the financing of education for all population groups;
- salaries and conditions of employment for educators;
- professional registration of educators; and
- norms and standards for syllabi and examination and certifications of qualifications.

Second, the education and training was responsible for African education outside the national states. Thus, the peculiarity existed that while education for other racial groups was ‘own affairs’, it was a general affair in the case of education for Africans.

According to Chisholm (2005, p. 204) inequalities were apparent in differential spending which had an impact on access to, and the quantity and quality of education offered to Africans and Whites. Typical indicators were literacy levels, school completion rates, learner-educator ratios, number, quality and qualifications of educators and availability of different types of resources. Of all indicators, the poorest people were Africans living in the previous homelands, on farms, in townships and squatter camps without basic facilities for education to take place.
Nonetheless, we have witnessed major and dramatic changes in education in RSA since 1994. We believe South Africa has undertaken the major task of transforming the inequitable political, economic and social system that characterized the past apartheid era into a democratic society which aims to provide equal opportunities for all its citizens. While Motala, Porteus and Tshoane (2002, p. 2) assert that central to this transformation is the establishment of a quality, equitable and democratic system of education. We, however, believe that translation into real transformation is still amiss; it still lies on paper in the policies and legislations, but short on implementation.

**State of Affairs Since 1994**

According to the Constitution of South Africa (Act 108 of 1996), as well as a White Paper on Education and Training (RSA, 1995:40) (a policy document that preceded the promulgation of the National Education Policy Act of 1996), education and training are basic human rights. The National Education Policy Act (Act 27 of 1996) states that the Minister of Education may determine national policy for education, including policy for the provision of support services in areas such as health, welfare, career and vocational development, and counselling and guidance. The different provincial departments of education should provide these services to learners and educators in order to ensure effective education and training as fulfilment of the basic human rights requirement (Mashau et al. 2008, p. 146).

We infer that the new government has been engaged in the ambitious task of transforming the rigid political, economic and social system that characterised the apartheid era into a democratic society that offers all racial groups the opportunity to participate fully as citizens, workers, and fulfilled individuals. But what we also suggest is that this transformation should construct an equitable and democratic education system which provides quality education for all.

According to Fiske and Ladd (2002, p. 12) central to the design of the new system of co-operative government was the view that each province should receive an equitable share of the national revenue for the purposes of providing the public
services for which it was responsible. Since 1997, the national government has transferred an annual single unconditional grant to each province to be spent on education, health, welfare and other miscellaneous services. These equitable shares are based on a weighted average of demographically driven formulas that apply to each major functional area, where the weights reflect the proportions of spending allocated grant to each expenditure category (Fiske and Ladd 2002, p. 12).

We assume that the funding goal for education is embedded in the calculation of the equitable shares with the endeavour to guarantee distributional equity across the provinces, where equity is defined in terms of the opportunity for each province, regardless of its wealth, to spend the same amount on education per learner as any other province. The funding goal in our opinion is problematic and as a consequence may fail to provide equitable educational outcomes for all South Africans. Unless we ignore the gross disparities in the provincial contribution to national GDP amongst the nine provinces in RSA, where Gauteng and the Western Cape provinces are on top of the list with 33.3% and 14.4% respectively, whereas, Eastern Cape and Limpopo provinces are at the bottom with 8.1% and 6.7% respectively (www.southafrica.info/about/geography/provinces.htm, viewed 3 May 2011). Thus, in South African provinces, a state of equitable shares will remain elusive and a faraway dream.

Fiske and Ladd (2002, p. 15) state that an adequacy approach to equity would have required the national government to provide each province with sufficient revenue for the province to meet the basic educational needs both of its typical learners and the high cost to educate learners. Instead, the amount distributed to each province was determined primarily by the total funds available at the national level, with the distribution among provinces determined by the number of learners, age, and school population in each province.

While there are major and esteemed changes in the state of South African schools, regardless of these changes, there are also deep continuities with the past. In our opinion, it is not surprising that the poorest provinces such as Eastern Cape, Limpopo, Kwazulu-Natal and Mpumalanga with the poorest schools and largest
unemployment ratios are those that incorporate former homelands which were also divided in terms of ethnic groupings. Probably, the realities of public schools in these former homeland based provinces are founded on the divisive history of the past apartheid regime. Thus, shaking the past off would require unconditional commitment from policy makers, politicians, intellectuals, academics and every citizen, given the history of more than two centuries which gave South Africa a unique identity of divide and rule oppressive hegemony.

We perceive these dynamic dichotomies with awe, in that, while discrimination in state resources allocation has been removed, inequalities persist for a number of reasons. First, by virtue of the locality of schools in different and poor provinces, access and provision is already defined and marginalized. Second, the ability or inability of parents to pay for fees which contribute to the greater availability of additional qualified educators in some schools is a major factor, and unfavourable learner-education ratios in schools that cannot afford to employ additional educators (Chisholm 2005; Motala 2002). There are more and substantive reasons that we may put forward to support these dichotomies.

**On the road to equity and redress**

The Constitution of the Republic of South Africa Act 108 of 1996 which is the supreme law of the country together with several legislations was embraced to unify all races and ethnic groups to become one South Africa. The Constitution of the Republic of South Africa Act 108 of 1996 preamble says that, “We people of South Africa believe that South Africa belongs to all who live in it, united in our diversity and we want to heal the divisions of the past and establish a society based on democratic values, social justice and fundamental human rights”. Therefore, a single unifying education system was irrefutable to move the government towards equity and redress. As a result, the South African Schools Act, 84 of 1996 (SASA) and the National Norms and Standard for School Funding were promulgated.
South African Schools Act, 84 of 1996 (SASA)

South African Schools Act came into being in 1996. The Act provides for a uniform system for the organization, governance and funding of schools to amend and repeal certain laws relating to schools and to provide for matters connected therewith. It also entails the way in which parents should help schools in terms of bringing their children to school and funding of their children’s education. It also gives guidance on how the state should fund schools.

The Preamble to the South African Schools Act of 1996 (SASA) states that, “This country requires a new national system for schools which will redress past injustices in educational provision, provide an education of progressively high quality for all learners and in so doing lay a strong foundation for the development of all our people’s talents and capabilities.”

According to Fiske and Ladd (2002:159) the main legislation related to schools is the South African Schools Act of 1996 (SASA). The Act provides for a national system of schools that includes both public schools and privately financed independent schools which makes education compulsory for learners from the age of seven to fifteen, or through Grade 9 and prohibits schools from discriminating among learners based on race or their inability to pay school fees. In accordance with the Constitution of the Republic of South Africa of 1996, Section 29 (1) (a-b), this says that ‘everyone has the right- to a basic education, including adult basic education and to further education, which the state, through reasonable measures, must make progressively available and accessible’.

The South African Schools Act of 1996 calls for all schools to be governed by elected governing bodies made up of all the school’s stakeholders, including parents who comprise the majority. Each governing body makes recommendations regarding the appointment of all educators, including the principal and is mandated to take all reasonable measures within its means to supplement the resources provided by the state (Fiske and Ladd 2002, p. 159).
The National Education Policy Act of 1996 calls on the Minister of Education to set norms and minimum standards for the funding of public schools after consultation with the Minister of Finance. Subsequently, the Council of Education Ministers from the nine provinces and the Fiscal Commission is an advisory group set up to provide advice on issues of inter-governmental relations. Thus, the National Norms and Standards for School Funding were conceived. As well, we recognize these National Norms and Standards for School Funding as notable and significant implementation strategic tools to redress the inequalities and assist with a provision of quality education for all South Africans.

National Norms and Standards for School Funding

The National Norms and Standards for School Funding set out the national norms and minimum standards for school funding in terms of South African Schools Act No. 84 of 1996. It also deals with the procedures to be adopted by provincial education departments in determining resource allocation to their schools. These norms and minimum standards deal with the public funding of public schools amongst others.

The National Norms and Standards for School Funding was gazetted in October 1998 and became a national policy on 1 April 1999 while its implementation started in 2000 (Nicolaou 2001, p. 95; Karlsson et al. 2002, p. 159). The National Norms and Standards for funding policy established funding procedures which promote equity and redress within a context of inadequate government spending and increasing parental financial support for education. The document sets out the minimum standards associated with the public funding of public schools, and exempts parents who are unable to pay school fees.

The National Norms and Standards for School Funding’s purpose are to effect redress and equity in school funding with a view of progressively improving the quality of school education, within a framework of greater efficiency in organizing and providing education services. The norms and standards indicate the method of distribution of funds according to certain categories. The funding norms recognizes that SASA imposes a responsibility on all public school governing bodies to do their
utmost to improve the quality of education in their schools by raising additional resources to supplement those which the state provides (Patel 2002, p. 176).

The National Norms and Standards for School Funding requires provincial education departments to prioritise the neediest schools when making decisions about capital expenditure and to provide higher levels of recurrent non-personnel, non-capital funding for schools in poorer communities. Moreover, National Norms and Standards for School Funding provide for governing bodies to give fee exemptions to poorer learners. Nonetheless, it does not address educator salaries or provincial education department’s school level expenditure (Pampallis 2002, p. 107; Karlsson et al. 2002, p. 159).

According to Karlsson, et al. (2002, p. 159) to bring about redress among existing schools, provincial education departments are required to direct 60% of the non-personnel and non-capital expenditure towards 40% of the poorest schools in their provinces. In order to implement this strategy, provinces are required to compile a list of schools based on their socio-economic levels of development and physical resources. The ‘resource targeting list’ will be used to divide schools into five categories based on needs.

According to Norms and Standards for school funding of 1998, first, the poorest 20% of schools receives 35% of resources, while the next poorest 20% receive 25%. Second, the next two categories receive 20% and 15% respectively. The last 20% of schools, which are largely former Model C and former House of Delegates schools, receives 5% of resources. The above recurrent cost allocation is used to fund water and electricity bills, maintenance of buildings and the purchase of learning materials which is equivalent to at least R100 per learner. The policy states that if provinces lack sufficient funds, priority will be given to the poorest schools. It also deals with the procedures to be adopted by provincial education departments in determining resource allocation to their schools.
Table 1: Resource Targeting Table Based on Condition of Schools and Poverty of Communities

<table>
<thead>
<tr>
<th>School quintiles from poorest to least</th>
<th>Expenditure allocation (percentage of resources)</th>
<th>Cumulative percentage of schools</th>
<th>Cumulative percentage of non-personnel and non-capital recurrent expenditure</th>
<th>Per learner expenditure indexed to an average of R100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest 20%</td>
<td>35</td>
<td>20</td>
<td>35</td>
<td>175</td>
</tr>
<tr>
<td>Next 20%</td>
<td>25</td>
<td>40</td>
<td>60</td>
<td>125</td>
</tr>
<tr>
<td>Next 20%</td>
<td>20</td>
<td>60</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Next 20%</td>
<td>15</td>
<td>80</td>
<td>95</td>
<td>75</td>
</tr>
<tr>
<td>Least 20%</td>
<td>5</td>
<td>100</td>
<td>100</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Government Gazette No. 19347, October 1998:27

To simplify the above diagram:

<table>
<thead>
<tr>
<th>SCHOOL QUINTILES</th>
<th>EXPENDITURE ALLOCATION %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quintile 1 (poorest)</td>
<td>35</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>25</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>20</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>15</td>
</tr>
<tr>
<td>Quintile 5 (least poor)</td>
<td>5</td>
</tr>
</tbody>
</table>

The new democratic order

Although the current form of funding has created platforms for redress of the past inequalities, it is still short of the translation to free education given that students are still expected to provide their own school uniforms, and these do not come cheap. School uniforms are compulsory and they cost a fortune to the majority of poor and unemployed African parents in the townships, rural and informal settlement areas in the South Africa (Tshivhase-Phendla and Mashau 2010).

On the other hand, white schools are still well resourced since they inherited the resources from the former regime. While the state subsidized them with a percentage aligned to the schools’ category, this seems not to dent the financial capacity of many of these “former white only” schools since they still receive support in forms of sponsorship and donations from the private sector, which are still in the
hands of a few white people. These white parents are able to donate money from their businesses and in turn get it back from the government in form of tax rebates.

Many of these schools demand high tuition fees where parents pay R 63 780-R66 090 per annum in one of the schools in Gauteng (Beaulieu College) to cite one example which the majority of African parents cannot afford. As a result, access to these schools is limited to those who can afford these exorbitant fees. To have access to these schools of high quality means African parents have to part with large sums of money because these “former whites only” schools are found in the remote and exclusively white urban areas which demands that African students need special forms of transport to travel from their township residences to these urban schools. With a small wage or salary, these African parents have to make ends meet. They have to dig deep into their already semi-empty pockets. White schools still carry the token of quality due to their exclusive physical infrastructure, buildings, security and these schools enjoy continuous teaching, while black school continue to exist in unsafe environments, schools without fences, where drug dealers have free reign.

What is interesting with National Norms and Standards for School Funding policy is that, it also wants to address the construction of new infrastructure and maintenance of the current infrastructure. The planning for new school construction includes provision of water, electricity, sewage and telephone services on site, and connections to main services where these are provided to the school site. The construction of new schools or additional classrooms and learning facilities should be targeted to the neediest population. On the other hand, construction of new schools is within provincial governments’ budgets, the provincial governments unfortunately have limited budget to can start new construction for schools.

Many of the poorest schools in South Africa were based in the former homelands or what was referred to as self-governing states. We are not surprised to note that African (Blacks) learners from poor provinces such as Limpopo, Eastern, Cape, Mpumalanga and Kwa-Zulu-Natal still walk more than 20 km to go to the centre of learning. This is very unfortunate for Africans who suffered for a long period and better life is seen nowhere in sight. South Africa has not yet reached a point of
addressing the inequity, unfairness and inequality of the past due to backlog which was found since the inception of democracy in 1994. Though policy to redress the inequality of the past is there, it is a little bit difficult to realize the dream due to the huge demand and minimal resources.

Conclusion
Whereas the democratic government is trying to address the imbalances of the past through legislations that are relevant to address the needs of the poor, the problem that arises is that many children from former homeland states are still experiencing the poverty that was there before 1994. On the one hand, debates and discourses around funding of national education are particularly entangled in the dynamic and dichotomous challenges between redress of the past discrimination to remove inequalities and the inefficient implementation of the National Norms and Standards for School Funding policy strategy. On the other hand, the most heated and debated issue around funding tends to overlap substantially across income levels as well as socio-economic formations.

In our modest contribution to the debate on the National Norms and Standards for School Funding strategy and our efforts to address the main question of this paper, that is “Is equity funding for quality basic education in RSA feasible, given the history of inequalities?” Our noble response is that the past historical inequalities and disparities are exceptional and notable. Nevertheless, we reiterate that while the norms and standards’ purpose are to effect redress and equity in school funding with a view of progressively improving the quality of school education, we have not yet moved remarkably far from Verwoerd’s’ philosophy of divide and rule if we still find children taught under trees and in mud huts in the so called new South Africa especially in parts of Eastern Cape, Kwazulu-Natal and Limpopo Provinces (Tshivhase-Phendla and Mashau 2010).

Consequently, African students and educators are still subjected to unequal provision of education inadvertently, racial and class segregation remains central to
this condition. Given the foregoing realities, questions that sprung to our minds are: “Besides the National Norms and Standards of School Funding what other measures and strategies are pivotal to the provision of quality education to all learners in South Africa? We continue to ask few questions we rose in Tshivhase-Phendla and Mashau, 2010 and explore the possibilities of the provision of quality education. We ask, “If education is a fundamental democratic right in a democratic society, then how democratic is this democratic right in such a democratic society? Simply put, where do we place young African students in this democracy? Are they in the centre of the picture or on the periphery? How far can education under a tree provide equality for all citizens? This democratic right is enshrined in the Bill of Rights, in terms of Section 29 of the Constitution of the Republic of South Africa (Tshivhase-Phendla and Mashau 2010, p. 121).

While we do not claim to provide authoritative answers to the questions raised in this reflective conversation, nor, in truth would we be able to, our position is that it is a basic role of the national government, policy makers and politicians, to provide access, equity, equality in South Africa, the legacy of differences continues to characterize provision of our education.

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Photovoice as a participative method in the understanding of community issues related to water

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Abstract
Water is one of the most precious resources for the day-to-day survival of humans. It is a scarce resource whose quality and quantity for the various uses (agricultural, domestic, industrial as well as to cover environmental needs) inevitably lead to increased competition for the limited available water. Its decreased availability in terms of quality and quantity can be a major public health concern. Research in water generally involves scientists who go to different communities and collect data with little consideration to the opinion and feelings of the local population about certain issues being investigated. The objective of the present study was to evaluate the applicability of the photovoice in the interaction between scientists and community members as well as to understand the issues related to water from the community members point of view. One community was selected for the photovoice project. Following several meetings with representatives of this community, a group of twelve people that included males and females of all ages who volunteered to participate were trained on how to use a camera to take pictures. They were then given cameras and were requested to take pictures of significance to them. All the photographs were developed and each participant chose one that was more significant to them and their feelings about that picture was recorded and reported. The photovoice has demonstrated to be an effective method of communicating the perceptions of the community about water issues. Issues raised by the participants included the shortage of water, dirty water, long queues, government involvement in water supply and the ever present risk of being infected from contaminated water. The photovoice approach is useful in encouraging participatory engagement between the researchers and the community.

Key words: Photovoice, participative method, community

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Introduction
The photo voice concept was originally developed by Wang and Burris in 1995. It is a process by which people can identify, represent, and enhance their community through a specific photographic technique (Wang, et al., 1996). It entrusts cameras to the hands of people to enable them to act as recorders, and potential catalysts for social action and change, in their own communities. It uses the immediacy of the visual image and accompanying stories to furnish evidence and to promote an effective, participatory means of sharing expertise to create healthful public policy. Photovoice has three goals. It enables people to record and reflect on their community's strengths and problems. It promotes dialogue about important issues through group discussion and photographs. Finally, it engages policymakers. It follows the premise that, as Wang (1996) explains, "What experts think is important may not match what people at the grassroots think is important." In the present study the photovoice concept was used to understand people’s perceptions of water quality and its impact on human life and vice versa.

The photovoice method has been used in several circumstances including HIV and AIDS, Cancer, education, water and sanitation (Lopez et al. 2005; Hergenrather et al. 2006; Scott 2007). In a project in Northern California, photovoice was used as an innovative and action oriented qualitative method of participatory action research, to uncover the realities of indigent persons living with HIV/AIDS (PLWHA) through photographic documentation and Paolo Freirean-based critical dialogue, and share their new understanding with local community members and leaders, policy makers, and advocates to develop plans to effect change (Scott 2007). Community-based participatory research is an approach that allows the community, which is recognized as an equitable partner in the research process, to identify a research topic that is relevant to it (Wallerstein and Duran 2006). With this approach, research questions are guided by the concerns of the targeted community. This is important because community members are the experts on the environmental problems they face, and most cases of widespread environmental contamination are initially revealed by them (Brown 2003).
South Africa is a water scarce country. Most of the rural areas in South Africa are facing water problems. Tshiombo is a village in the Mutale District Municipality where the population is experiencing water problems and most people are still using untreated water from the sources for their daily activities. The villagers are using water from the nearby river as well as the springs and wells, water that in many cases is not clean, and might be contaminated. The Photovoice project was conducted in this village to find out more on how the community feels about their water access and health.

**Methodology**

The photovoice process include several steps which include the preliminary meetings, training of the participants on the use of the cameras, picture development, individual interview, group interview and transcription.

**Preliminary meetings**

A preliminary visit was organized with the Village Chief to introduce him to the project’s objectives and the procedures that will be used. This meeting also served as a request for the project acceptance by the chief in order to increase acceptability by the population as well. Once the chief gave the go ahead to the project, a follow-up meeting organised by the chief was held to explain the objectives of the study to the villagers and to select willing and able participants.

**Training process**

For this part of the project, 12 participants of varying ages and both sexes were selected from the meeting. Their functions were clearly explained to them. Cameras were distributed to the individual participants, who were shown how to take pictures. Sample pictures were taken and examined. After the training team was certain of the ability of the participants to take quality pictures, they were then given 7 days to
take photos on their own that were related to the water and health of their community.

**Camera collection and pictures development process**

After the agreed period, the cameras were collected from participants. The films were identified, recorded according to participants and then taken to a photo shop for picture development.

**Individual interview**

After the films were developed, individual participant interviews were scheduled at the participants' convenience. Each participant was asked to pick his/her favourite picture and to tell the story behind it. All interviews were audio recorded after requesting participants' permission. The audio recording was to facilitate the capture of accurate information. From the individual meetings, all participants were asked to choose a convenient day group symposium.

**Group interview**

The participants and the research team met in a classroom in Tshibvumo’s Mmboneni primary school. In this meeting each participant was asked to explain his/her favourite picture to the group. Later, participants were divided according to sex and similar age group to get the perception acquired in terms of these groupings. All discussions were audio recorded for accurate information.

**Transcriptions**

The information brought by the participants from both interviews was transcribed by at least two individuals and the consensus was considered. The idea of all the transcriptions was to find out the most common issues that are of concern to the participants.
Results and discussions
From the transcriptions it was found that Tshiombo is a water scarce community where the community is desperate for any means to get good quality water. From the group discussions, suggestions were made by the participants for the drilling of Boreholes in order to improve the availability and the quantity of water. Others suggested securing tanks for storage, while others asked for any implementation that can provide water to the whole community. There was a lot of talk about the well, rivers and irrigation canals that could provide water for washing, drinking and cooking, and how they result in the poor health of the dwellers. Participants stated that the community drinks from contaminated source where they bath and wash their clothes. In fact ground water constitutes an important source of water in the Limpopo Province but also in the whole country. The Limpopo Province of South Africa is known as one of the poorest provinces in the country, but also one of the areas in South Africa where groundwater is most widely used as the only domestic water supply. In Limpopo alone some 30 boreholes are drilled per day although data from only a number of newly drilled boreholes are ever captured by the Department of Water Affairs and Forestry (DWAF, 2005).

Most of the participants are aware of the health risks such as Bilharzia infection which is very common among their kids. They stated concern on the risk of various diseases like cholera and swine flu. Water purification was not a strange subject as some elaborated that the boiling of water or the use of bleach (JIK) was the only means of being sure their drinking water is safe. They expressed their distress at seeing other villages having good clean water every day while they are getting water from the wells and irrigations that are supposed to provide water to their fields.

The following represent the views of the participants through their most significant pictures. The photos convey the messages and feelings that they desire everyone else to know about the water situation in their Village.
Figure 1: Picture and citation from participant No 1 on their feelings about water and health in Tshiombo Village.

“When taking this picture, I was from collecting water from the well using this basket. I wanted to show that the water looks dirty.”

Figure 2: Picture and citation from participant No2 on water and health issues in the Village.
“I took this picture to show people that where we collect water is not safe. The well is called Tshithomola. This shows that there is no good health because the water is not safe at all.”

Figure 3: Picture and citation from participant No 3 on issues related to water and health in Tshiombo Village.

“In this photo I see a shortage of water because in this well water gets finished sometimes and we have to wait for the water and I found that people of this community use this well”
Figure 4: Picture and citation from participant No 4 on their feelings about issues related to water and health in Tshiombo Village.

“I wanted to show how hard the water situation is in Tshiombo if you can take look carefully here where people are collecting water is not a good place at all. This results in bad health to people because people get to the place where they collect water with their shoes.”

Figure 5: Picture and citation from participant No 5 about their feelings about issues related to water and health in Tshiombo Village.
“This is the place where we get water if there is no water from other sources like wells. This water is not good for people’s health, because some wash their clothes and bath. Recently we heard about cholera then you find person collecting water from the dam and use with no boiling and end up affected by cholera or bilharziasis.”

Figure 6: Picture and citation from participant No 6 about their feelings about issues related to water and health in Tshiombo Village.

“This picture I took it because this place does not have enough water and is dirty. This small basket is 1L and was coming out not full from the well what hurt me is that this water is not clean. Two of these people were supposed to collect water but only one was collecting to avoid dirtiness and 1L should be full of water”
Figure 7: Picture and citation from participant No 7 about their feelings about issues related to water and health in Tshiombo Village.

“I took this photo because I was looking at the difficulties when it comes to water here at Tshiombo. The water was brought to us by a tractor this show that water is scares in our village. The water situation in our village is not very good because the water that we are getting now is not clean even the water that we are getting we are not sure of its quality.”
Figure 8: Picture and citation from participant No 8 about their feelings about issues related to water and health in Tshiombo Village.

“This picture was taken from the little dam. In this little dam people come and fetch water to drink. People from Zion church come and soak the cow’s skin for a week to make their drums. Other animals also come to drink in the same water and this can cause diseases. Besides there are people who swim and there is a possibility of people to get affected by bilharzias. People from church also do the baptism in the same water after that someone has to come and collect water. This water also contains algae. The same water is also used for irrigation.”
Figure 9: Picture and citation from participant No 9 about their feelings about issues related to water and health in Tshiombo Village.

“I took the picture to show the difficulties of water, because it can 2 month without water, only 4 taps are working in the whole village and are overpopulated with people coming to collect the water which might get contaminated, but we are forced to drink because we run out of options. Some people come from a long distance to collect the water; you find that there is a long queue and people start to fight.”
“This is a dead spring. You can see the banana trees, but because there is no water anymore the plants are drying out. This is a symbol of showing that even in people are in the same situation. Because the plants are drying it shows that the world is getting tired.”
Figure 11: Picture and citation from participant No11 about their feelings about issues related to water and health in Tshiombo Village.

“The water situation is not good at all, water is very scarce and if you look at it, the way we are using little water to bath and you might find five people using same water. It is very dangerous because you can different diseases. It is so simple to be affected by cholera and also bilharzias.”
Figure 12: Picture and citation from participant No12: about their feelings about issues related to water and health in Tshiombo Village.

“In this picture is a well that I also drink water from. Even now I am from drinking water from there. You can see that there are little living organisms and thing like worms, browns and black ones that shows that if is in the dark we drink those things. And in the well you also find crabs then you just drink since there is no choice.”

These figures and views represent the feelings of the participants concerning the water resources in the community. This information creates a primer for further discussion with local and international organisations such as Rand water, Water Institution of Southern Africa and other similar institutions, in order to address the problems related to water and health in the rural communities of the region.

A previous Photovoice study was conducted by students from University of Venda (South Africa) and University of Virginia (USA) covering other villages in the Mutale District Municipality (Cunningham et al., 2009). This study found that people were
sharing water sources with animals from the rivers. Surveys and focus group meetings have also been conducted to find out more about people's water usage. It was found that people use the same water sources without any treatment for activities such as clothes washing, bathing and drinking. The community indicated that they use the same water without choice and the government water supply (Pipe water) is scarce and only comes once a month. These people also walk long distances to fetch water which takes some of learner’s time to go to school. People were also afraid of getting affected by diseases like cholera, as previously their children suffered from bilharziasis. Previous studies in the region have shown that schistosomiasis is very common with up to 70% of patients visiting the hospitals with positive urinary tract infections for S. haematobium (Samie et al., 2010).

The issues identified in this community corroborates with those described in other communities in the region. Several studies conducted by researchers from the University of Venda have shown that water quality in the region was not acceptable and therefore water from the rivers and streams need to be treated before it is consumed. Obi et al. (2004) indicated that rural communities in the Venda region of South Africa are known to rely on river water sources, which are generally not treated for their domestic water needs (Obi et al. 2002). They also indicated that the majority of the river water sources harboured enteropathogens and were also reported to be of poor microbiological quality and unsafe for consumption. However, the physico-chemical quality of the water samples that they tested at that time, except for turbidity, of the various water sources examined was acceptable. Consequently, the river water sources examined may not at their opinion pose any health hazard to residents and consumers in terms of the physicochemical parameters studied, except for the turbidity index. The high turbidity values however precluded the rivers for direct domestic use and may also be problematic for flocculation and filtration purposes in the case of treatment. In some cases, diarrhoea outbreaks in the communities were linked to poor water quality. A study by Bessong, et al. (2009) showed a spatial clustering of diarrhoea cases which might have been influenced by the poor microbial quality of water used from a water tank and the Khandanama River in the Tshikuwi rural community. Indicator microbial counts for total coliforms, faecal coliforms, enterococci, and heterotrophic bacteria
exceeded the limit for no risk as stipulated by the South African water-quality guidelines for domestic use for the water extraction points in the community. They further indicated that their results highlighted the urgent need of water-treatment facilities and monitoring of water quality in rural communities of South Africa and particularly in the Limpopo Province.

**Issues identified for intervention**

The photovoice project identified the following issues in the community.

- Water resources available included only wells and rivers.
- Infrastructures available included: dams, municipal taps and irrigation canal.
- Health issues feared by the population: bilharziasis, cholera and diarrhoea.
- Farming is the most common activity in the village.
- Religious activities were also practiced in the rivers.
- Recreational activities were very limited.
- Water quality and quantity was poor and low respectively.
- Water safety – water source protection is almost non-existent.
- Water usage and users were too many for the limited resources and not satisfied.
- Government involvement is needed to provide sustainable solutions to water shortages and water quality.

**Challenges**

The challenges identified by the study participants included:

- Unsafe drinking water.
- Water scarcity.
- Long distance and time spent in collecting water from various sources.
- Poor service delivery by the municipality.
- Kids who are suffering from bilharziasis.
• Water is of poor quality which might increase the transmission of parasitic organisms in water sources.
• Water is scarce in rural communities and there is need to develop water infrastructure to improve water services in these communities.
• Any solutions that can be implemented for the said challenges?

Conclusion
This study has demonstrated that the photovoice is an appropriate method to use for community engagement, to identify the water related problems that are faced without coercion or fear of intimidation. Apart from identifying the challenges facing the community, the method was able to highlight the level of development and other cultural activities taking place in the village. This is a method which needs be exported to other fields of study. It is a fun method which helps researchers and policy makers get a pictorial view of the problems of a community from local perspectives. This research also empowers community members to discuss their attempts and ideas to improve their access to water as well as health related interactions in their community. It also provides researchers, Government organisations as well as non-governmental organisations, stakeholders and potential funders with information on entry points to address health concerns correlated to water access and quality.

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How community stakeholders regard the role of home-based caregivers in their municipality

Mashau NS*, Mudau MJ, Netshandama VO.

Abstract

Community home-based care was developed as a solution to the increasing demand on health care services and in South Africa it was found to be of benefit to the community by responding to their needs. This article seeks to explore how community stakeholders regard the role of home-based care in their municipality. Since home-based care programmes are run by volunteers from the communities, it was necessary to explore how community stakeholders regard the role of home-based caregivers in their municipality. A qualitative approach was used to explore and describe how community stakeholders regard the role played by home-based caregivers in their community. Non-probability purposive sampling was used to select 23 community stakeholders in the Mutale municipality of Limpopo Province in South Africa. Data was collected through focus group discussions and in-depth individual interviews. An unstructured interview guide was used to collect data and data was analysed using Tesch’s technique of open-coding as adapted from Creswell (1994:154). The findings revealed that community stakeholders expressed their appreciation of the role played by home-based caregivers in their community which were viewed as an extension of the hospital in the community. Community stakeholders further expressed their wish to support community home-based caregivers. The study recommends that communities should be actively involved in the promotion of their own health through home-based care.

Key words: Community Home based care, community, stakeholders
Introduction and Background

Home-based care (HBC) is increasingly becoming a dominant alternative to institutional care worldwide (World Health Organization, 2002). HBC organizations were developed in the late 1980s and early 1990s in response to the HIV/AIDS crisis, as health care institutions could not cope with increasing numbers of patients (Department of Health 2001; Uys 2002). The great demands on health care services were accompanied by severe shortages of staff and resources, therefore patients were discharged early from the hospitals to be cared for at home (Akintola 2008; de Figueiredo and Turato, 2001).

In countries such as North America and Europe, home-based care programmes were found to be effective in supporting people who were suffering from chronic diseases and relieving them from the high costs of hospital care. The demand for care then shifted from hospitals to the households where individuals were provided with continuous care by community members (Uys 2003).

In South Africa, National policies and guidelines on home based care were developed in 2001 because home based care was found to be the only solution to the increasing demand on health care services (Department of Health 2001; WHO 2002). The South African National guidelines on home-based care stress the importance of community participation in caring for the sick in their home environment (Department of Health 2001). Civil society responded to the need for community-based care services through non-governmental organizations (NGOs), community-based organisations (CBOs) and faith-based organizations (FBO), which are collectively known as Home and Community-Based Care (HCBC) (Department of Social Development 2006).

Through home-based care, countries are implementing community participation which is one of the principles of primary health care as endorsed by the World Health Organisation (WHO) with people in the communities volunteering to participate in
home-based care (Mantzaris and Ngcobo 2007). Home-based care is an essential health care resource in rural areas where health care facilities are inadequate and people travel long distances to health care facilities. However, with home-based care, individuals can receive health care services from their own homes and therefore bridge the gap of inadequate health care services (Mutale Integrated Development Plan (IDP) 2009/2010).

Community volunteers, who are also known as home-based caregivers, are responsible for the home-based care activities such as caring for the needs of the sick, the elderly, and children in need of care such as orphans in their own families (Department of Social Development 2009). The extent to which community home-based caregivers render home-based care services needs to be explored. Hence, this study seeks to investigate how community stakeholders regard the role played by home-based caregivers in their municipality.

Home-based care was found to be of benefit to the community because it makes it possible for consumers to access health services nearest to their home. It encourages participation by community members and encourages traditional community life. It responds to the needs of people and creates responsibilities amongst community members (Department of Health 2001). Since home-based care programmes are run by home-based caregivers who volunteer to provide home-based care services to the local community, it was deemed necessary to find out, if indeed, the service was managing to close the gap of inadequate health care services in the rural areas.

**Research Methods**
A qualitative approach was used to explore and describe how community stakeholders regard the role of home-based caregivers in the Mutale municipality. The population consisted of community stakeholders in the Mutale municipality in Limpopo Province of South Africa. Mutale municipality is located in the far North Eastern part of Vhembe District in Limpopo Province of South Africa. According to
the Mutale Integrated Development Plan (IDP) 2009/2010 there were about 131 781 people spread in 150 villages. The municipality had a total 24 239 households, mostly rural. Because the Mutale local municipality has no hospital, the community depends on hospitals which are about 20-100km away from the communities. Within the Mutale local municipality there is one health centre and 17 health clinics which are not up to standard as reported in the Integrated Development Plan (IDP) (Mutale IDP 2009/2010). There were about 26 home-based care organisations registered with the Department of Health and Social Development and only four were not receiving funding from the Department of Health and Social Development (Department of Health and Social Development statistics 2010). However, the researcher found that there were other new organisations that were still developing in Mutale municipality. Therefore, there were no exact statistics of community home-based care in Mutale municipality and Vhembe as a whole.

A non-probability, purposive sampling method was used to select 23 community stakeholders who participated in the study. The inclusion criteria for sampling were: being a resident of the local community and being a member of different structures in the local community.

**Table 1. Characteristics of participants**

<table>
<thead>
<tr>
<th>Participants</th>
<th>Gender</th>
<th>Total number</th>
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<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>Traditional leaders</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Community representatives</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Traditional authority committee representatives</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Ward Committee representatives</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Religious leaders</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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An ethical clearance was obtained from the University of Venda’s Ethics Committee and permission was also obtained from the Limpopo Provincial Ethical Research Committee. The following ethical measures were ensured throughout the process of
the research to protect the rights of participants: informed consent, the right to withdraw from the study, privacy, confidentiality and anonymity. Data was collected through focus groups and in-depth individual interviews in order to allow community stakeholders to express their views on the role of home-based caregivers freely without restrictions. The researcher and the participants were involved in interviews as co-participants. The question asked to stimulate the discussion during the interviews was, “How do you regard the role of home-based caregivers in your community?” Follow-up questions were asked to allow for deeper and more thoughtful responses from the participants and rephrasing was used for clarity.

Permission was requested from the participants for a voice recorder to be used and data was later transcribed verbatim. Field notes were also used to record the non-verbal cues that were observed during the interview by the researcher. The language used during the interviews and focus groups was the local language, Tshivenda. Each transcript was read as the voice recorder was played and corrections were made to ensure that the voice recordings and the transcripts corresponded. Data was translated from Tshivenda to English before analysis. Data was analysed using Tesch’s (in Creswell 2009) eight steps of open coding in which raw data was organized into themes and sub-themes.

Lincoln and Guba’s model (in De Vos et al. 2007) was utilised to ensure that the findings are a true reflection of community stakeholders. Four criteria for establishing trustworthiness were used namely credibility, transferability, dependability and confirmability. The researcher was engaged in a prolonged interaction for about one hour with the community stakeholders to ensure credibility of the study. The participants were allowed to verbalise their feelings without being hurried or interrupted.

Field notes were written during data collection to ensure dependability. Tape recordings as well as written dialogues during the interviews increased confirmability and a detailed description of the research design and methodology ensured possible application of the study in other settings. Follow-up interviews were conducted with some participants for validation of data.
Results

Three focus groups and in-depth individual interviews were held with 23 community stakeholders. During the discussions with the stakeholders two trends emerged: the appreciation of community stakeholders regarding the role of home-based caregivers in the community and acknowledgement by community stakeholders of the need to support home-based caregivers.

Theme 1: The appreciation of community stakeholders regarding the role of home-based caregivers in the community

Data in this study showed that community stakeholders appreciated the role played by home-based caregivers in their communities. The following sub-themes emerged from the main theme:

- The claim that the home-based caregivers constitute the community’s ‘hospital’ and;
- Home-based care was curbing unemployment

The claim that home-based caregivers constitute the community’s ‘hospital’

Community stakeholders expressed their appreciation of the role of home-based caregivers to an extent that they compared it to a mobile hospital amongst the community. Since there is no primary health care facility in each village, community members in Mutale had to travel more than 10km to a clinic. Therefore, the role of home-based caregivers was viewed as beneficial to the community because people are referred from the clinic to home-based caregivers for continuous care such as wound dressing and treatment support. Community stakeholders explained that they greatly value the role of home-based caregivers because it relieves them of walking long distances to the clinic every day. A participant in one of the focus groups discussion said:
“It is difficult to go to the clinic every day for wound dressing, but these people come to our families assisting us. I once sustained some burns and got treated at the clinic. Since the wound needed to be cleaned every day, the clinic staff referred me to the community home-based caregivers who dressed my wound until I was completely healed. These people are our hospital!”

Another participant said:

“People in this community appreciate home-based care because they have suffered by travelling to the clinic before the development of home-based care. One must have R20.00 for transport to the clinic.”

Participants also indicated the issue of being rescued from the potential attacks by criminals because they would walk along the paths which pass through thick bushes as shortcuts to the clinic, but with the presence of home-based caregivers in the community, the situation has changed because they are referred from clinics to home-based caregivers for continuous daily care.

“You know! These people help us a lot..., sometimes without even getting any stipend, you know! Our village is very far from the clinic. To reach the clinic a person must walk around that mountain and through a dense bush.”

Community stakeholders appreciated the role of home-based caregivers in the community and indicated that they also assist the elderly people who are staying alone at home by doing activities such as house chores.

“They come across situations where a sick person is staying alone. They fetch water and cook for that person.”
Community stakeholders regarded home-based caregivers in their community as their ‘hospital’ because they were providing them with care in their homes. The findings showed that the community was benefiting a lot from the services provided by home-based caregivers.

**Home-based care curbing unemployment**

Discussions with community stakeholders in this study revealed that most of the people in the rural communities of Mutale municipality are unemployed and home-based care was regarded as a project which was curbing unemployment because of a stipend that they get. A participant said:

“Most of the people here are unemployed and this home-based care has helped people with employment. Education is also a matter of concern because we have many youth who have passed matric and are unemployed.”

Another participant added: “We were going to be very grateful if every time when the hospitals have a need to train nurses and can select from these people.”

The findings showed that community stakeholders regard home-based care as a tool for curbing unemployment.

**Theme 2: Acknowledgement by community stakeholders of the need to support home-based caregivers.**

Findings from this study revealed that community stakeholders have acknowledged the need to support home-based caregivers. Community stakeholders cited poverty as the reason for not offering full support to home-based caregivers as expected. This is how a participant expressed it:

“Support from the community is difficult because most of the people are unemployed and they do not have money.”
In this study community stakeholders explained that the community home-based caregivers need support in the form of finance, shelter and protection from physical harm. These sub-themes are discussed under the following headings:

**Financial support**

Findings in this study showed that community stakeholders were concerned about the poverty state of the home-based caregivers who are busy helping the community even though they are not getting a stipend regularly or not at all. Some of the community stakeholders explained that they encourage the home-based caregivers to try to cope with the challenges of not getting a stipend since they have nothing to offer them because of poverty. This is how a participant expressed it:

“You see, these people are not getting any salary. How will they pay for transport? They can also not be able to walk alone through such dense bush.”

Contrary to this finding, some community stakeholders in this study expressed that as much as they understand that there was a need for home-based caregivers to be supported in meeting their basic needs such as housing, they are excluded them getting Reconstruction Development Programme (RDP) houses. Community stakeholders in this study explained that home-based caregivers are regarded as people who are working for the government and therefore cannot benefit from the housing projects provided by the government for the poor. This is how a participant expressed it:

“A home-based caregiver gets something as well as a grant, and we feel that the person (home-based caregiver) will be taking the space of those who are poor because he or she is getting something.”
Findings in this study revealed that community stakeholders were aware of the financial needs of the home-based caregivers; however, they had no any other means of assisting them as they were also living in poverty.

Shelter

Some community stakeholders were concerned about the lack of proper structure for home-based caregivers. However, they expressed that the support that they could offer was only an empty piece of land, and because of poverty, home-based caregivers find it difficult to build a structure which will serve as an office where they can meet and keep their documents and equipment safe. A participant said:

“We are just struggling to support them because in this area we are suffering from poverty. Our traditional leader provided them with a stand where they had erected a one-room muddy office. However, with the construction of a new tarred road here we then requested for the assistance of the contractor. You see now, they have a one room office, even though it is small, at least it is safe.”

Some community stakeholders in this study explained the lack of shelter as a desperate situation. It was revealed in this study that some home-based caregivers hold their meetings under a tree.

Need for protection from physical harm

Findings from this study revealed that community home-based caregivers were sometimes called during the night when there was an emergency in the family. Participants explained that they felt it was not safe for the community home-based caregivers who were mostly females to work in the community during the night. This is how a participant expressed it:
“What is scary is that these people are called to assist families during the night, which we find it to be unsafe.”

Another one added, “We can assist by accompanying them when they are called for emergencies at night, we can give them our phone numbers to call us when they are going for emergencies at night. We also need to have the numbers of the police services which we can call in case we encounter something.”

In this study community stakeholders identified different forms of safety risks that home-based caregivers can come across whilst providing home-based care including the risk of physical harm from snakes bite or attacks by criminals. Community stakeholders stressed the fact that they were aware of the important role played by the home-based caregivers and that it was the responsibility of the community as a whole to see how to support them.

A participant said: “Our love is that home-based care should be well developed. As a community, we will see how we can support them. Our doors are open and they should come if they need assistance.”

Another participant commented: “During community meetings we are able to inform the people that these people are of high importance, support them.”

It was also explained by the community stakeholders that if the home-based caregivers are not bringing their problems to the attention of the stakeholders, it would appear as if everything was fine. Community stakeholders explained that they can make the community aware of the importance of community home-based caregivers during community meetings.
Discussion

Community stakeholders in this study explained that since the development of home-based care groups in their communities there were some improvements with regard to health care. Home-based caregivers were praised by the community stakeholders for contributing to the development of the rural communities through the provision of health care services in people`s homes. Some of the community stakeholders explained that the presence of the community home-based caregivers in the community has reduced the travelling costs of the people to the clinic. Participants in this study indicated that home-based caregivers are participating in the welfare of the people by collecting treatment for people who are too weak to travel to the clinic and help to supervise the treatment until a person gets healed. It was revealed in this study that community home-based caregivers were helping people in the community with access to health and social welfare services. In this study the presence of home-based caregivers in the villages of Mutale municipality was greatly appreciated by the stakeholders. A study conducted in Uganda reported that people in the community expressed their value of home-based caregivers because they felt that they were making a difference in their lives with regard to their health (Jack et al. 2011). It was further revealed in the same study that home-based caregivers were playing a major role in the community because they were able to reach people who were in the deep rural villages. They assisted sick people by collecting medication from the hospice and brought it to them in their villages and therefore were regarded as a bridge to the hospice (Jack et al. 2011).

Findings in this study revealed that besides the door to door health care services that were rendered by home-based caregivers, they were also invited to community meetings which were held every Sunday morning to give health education to the people. The importance of home-based caregivers was expressed by the community stakeholders who indicated that they saw home-based caregivers moving around the villages from house to house assisting people in their homes. Community stakeholders explained that home-based caregivers sometimes come across difficult situations in the community such as an elderly sick person who will be staying alone. In such cases they assisted by fetching water and preparing food for
that person even though such activities are not within their scope. They were assisting the community to that extent. A study conducted in the Western Cape Province of South Africa by Orner (2006) reported that home-based caregivers were valued because of the support that they offer to the families. In the same study it was reported that home-based caregivers provided support while visiting families by performing the following activities: counselling both clients and their families, cooking and cleaning the house. According to Orner (2006), home-based caregivers were valued by the community because they met the needs that the health services could not meet.

Participants in this study revealed that sometimes people who are sick in the community are hidden by their relatives. However, home-based caregivers are made aware of such situations by the local stakeholders to go and assist. The study revealed a good working relationship expressed by the stakeholders. The findings showed that the work that is performed by the home-based caregivers in the rural communities of Mutale had a great impact on the people of Mutale as expressed by community stakeholders.

Community stakeholders who participated in this study explained that most households in Mutale municipality rely only on cattle farming as a means to support their families and therefore since the land was dry with limited rain, it made farming difficult. It was further revealed that there were many youths who had passed grade 12 but are unemployed. Community stakeholders explained that in some villages of the Mutale municipality there was no any other means of survival except to get employment and therefore home-based care was their only hope of employment. It was believed that if home-based caregivers can be trained as nurses by hospitals, it means that there will be vacant positions in home-based care which will be automatically filled by those who have passed grade 12 and are unemployed. Community stakeholders further explained that they would be grateful if the hospitals can select from home-based caregivers whenever they needed candidates for training as nurses.
Some participants in this study viewed home-based care as a source of employment which was helping the community to fight poverty at the same time promoting the health of the people in the community. With the high rates of poverty and unemployment, it becomes clear why they have those expectations. Community stakeholders explained that home-based caregivers receive a stipend which assists them in buying food for their families, therefore home-based care was assisting in the fight against poverty. Community stakeholders in this study regarded home-based caregivers as people who are employed even though they know that they sometimes do not receive a stipend.

It was noted in this study that home-based caregivers were regarded as people who were contributing in rural development through the promotion of public health. Throughout the discussions with the community stakeholders it was clear that home-based care was seen as a form of employment. A study on voluntary home-based caregivers in Zimbabwe revealed that most of the volunteers anticipated that their activities would lead to full-time employment with full pay (Rödlach 2009). The findings of this study are further supported by Moetlo, Pengpid and Peltzer (2011) who recommended in their study that home-based caregivers should receive a nationally recognised training which will enable them to be certified and placed within the health care system. In this way it would mean that community home-based care can serve to curb unemployment in the poverty stricken rural communities. Similarly, in Zimbabwe it was reported the small remunerations given to voluntary caregivers contributed to the wellbeing of their families (Rödlach 2009) and therefore home-based care was viewed as a means to curb unemployment.

Community stakeholders felt it strongly that since home-based caregivers were getting a stipend from the government, they cannot benefit twice from the same government by getting free services such as housing from the government because it is believed they have a chance of future employment at clinics and hospitals. However, a study on home-based care services in the Vhembe district revealed that active involvement of community stakeholders’ results in the success of community home-based care programmes (Moetlo et al. 2011). Community home-based
caregivers are working in under-resourced communities and it becomes a challenge to them since they also are living in poverty. It is shown in various studies (Department of Social Development 2006; Mantzaris and Ngcobo 2007; Akintola2008) that voluntary home-based caregivers who themselves are unemployed were attracted to work for home-based care organizations or even forming their own Home-based Care (HBC) group for the sake of stipends. In this study it was observed that most of the home-based caregivers were working in rented shelters in the community such as church buildings, classrooms, backrooms from community members and unused rooms from some local shops. The findings of this study revealed that community stakeholders have no other means to assist except to give the community home-based caregivers a piece of land. Studies conducted by the World Health Organisation (WHO) (2002); Uys (2002) and Department of Social Development (2006) have shown that Home-based care programmes in South Africa are operating in resource-limited settings.

Some community stakeholders explained that they were aware that community home-based caregivers place their lives at risk, especially at night because they were sometimes called by community members during emergencies. The potential safety risk on home-based caregivers was seen by community stakeholders as a serious issue which needs community intervention. In other studies (Uys and Cameron 2003; Onyango 2009) it is shown that the common risks that home-based caregivers were faced with were infection which they may contract when bathing and changing of patients’ linen because there is too much contact with body fluids. However, in this study community stakeholders identified snake bite and attacks by criminals as possible safety risks for community home-based caregivers which need to be addressed.

Recommendations

Community stakeholders should actively participate in home-based care in order to promote community development through home-based care. The community members should be encouraged to be actively involved in the provision of home-
based care by showing support in the form of donations. Community policing forums should be developed and be actively involved in the protection of community home-based caregivers around the villages. Members of community policing forum (CPF) should accompany home-based caregivers during the night in cases of emergencies. Local business should donate lamps and torches which can be carried by home-based caregivers at night. Community home-based caregivers should be provided with telephone numbers of the local traditional leader and the local policing forum whom they can call if they feel threatened.

The Department of Health and Social Development should select the nurses for training from home-based caregivers who meet the requirements in order to contribute to increasing the employment in the rural communities. The government should support home-based care organizations by providing funding to promote the provision of quality home-based care by community caregivers.

**Conclusion**
The role of home-based caregivers was regarded as beneficial to the community which even regarded them as their ‘hospital’ because they were providing the community with basic care in their own homes. It was also acknowledged that even though home-based caregivers were passionately providing care to people in their homes, they also needed financial support and protection from physical harm.

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The reduction of microcystin congeners in raw water source with the use of ceramic water filters: A case study

Mulaudzi DA and Gumbo JR

Abstract
The majority of rural communities rely on the freshwater bodies for their water consumption without any form of water treatment. Here we report on the levels of microcystins in raw surface water source and in purified water after passing through a ceramic water filter. The raw water had a concentration of 155.92 ppb of microcystin LR and the final purified water had a concentration of 0 ppb with ceramic water filter #16 (100% reduction) and to 8.29 ppb with ceramic water filter # 2 (95% reduction). For microcystin YR, raw water had a concentration of 245.96 ppb of microcystin YR and the final water had a concentration of 18.44 ppb with ceramic water filter #16 (93% reduction) and to 4.79 ppb with ceramic water filter # 2 (98% reduction). For microcystin LY, raw water had a concentration of 369.63 ppb of microcystin LY and the final water had a concentration of 0 ppb with ceramic water filter #16 (100% reduction) and to 0 ppb with ceramic water filter # 2 (100% reduction).

The cyanobacteria that were identified as Oscillatoria ssp; Lyngbya ssp; Anabaena ssp; Microcystis ssp; Cylindrospermopsis ssp; Trichodesmium ssp; Phormidium ssp and green algae Scenedesmus ssp and Cladophora ssp. The microcystin congeners LR, YR and LY, were found in the pool by roadside were probably produced by the filamentous cyanobacteria, Oscillatoria and Anabaena spp. The ceramic water filters were able to reduce the microcystins in the final purified waters.

Key words: rural communities; ceramic water filters; microcystin contamination; activated carbon

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Introduction

Water is a sustenance element of life and other most activities of human society, economy and social civilization and maintenance of human health dependent on ready access adequate water supplies. Water is a vital resource to human survival and the planet. One-sixth of the World’s population, approximately 1.1 billion people, does not have access to safe, secure and ample water (WHO/UNICEF 2004). The cause to this is the increase in water pollution and recently, polluted drinking water was seen primarily as a threat to public health because of the transmission of bacterial waterborne disease (Jeffrey, et al. 1998).

As it has occurred in most countries in the world e.g., Australia, United States of America (USA), and China, the incidence of cyanobacteria blooms in South African water bodies has increased during recent years as a result of a progressive increase in the eutrophication of rivers and water storage reservoirs (Van Ginkel and Conradie 2001; Harding and Paxton 2001; Oberholster and Botha 2005). South Africa generates large quantities of sewage through industries and urban complexes and these industries release their effluent containing high concentration of dissolved salts and nutrients to freshwater bodies (Oberholster and Ashton 2008). Due to the fact that South Africa is classified as a water scarce country, the National Water Act (Act 36 of 1998) states that the industries are allowed to discharge treated effluent into river courses to contribute to water flows and increase existing water supplies and can be re-used by downstream communities. As a result, the effluent released back to river treated and untreated contain more than normal concentration of nutrients which exceeds the normal flow of water prior to effluent discharge. Thus many water storage reservoirs are now eutrophic or hypertrophic in South Africa (Van Ginkel, et al. 2000). Agriculture is accelerating eutrophication by its nutrients contained in irrigation return flows (Pitois, et al. 2001).

Cyanobacteria are found in a variety of environments ranging from arid to desert, freshwater to brackish and marine and even in the Polar Regions (Whitton and Potts 2000). The cyanobacteria have been implicated in the production of a variety of cyanotoxins such as neurotoxins, hepatotoxins, saxitoxins (Carmichael 1997; Codd, et
These cyanotoxins have also been linked to human fatalities (Falconer, et al. 1983; Jochimsen, et al. 1998), fish kills (Ochumba 1990) and the death of wildlife and domestic animals (Oberholster, et al. 2009a; Nonga, et al. 2011). Though cyanobacteria are toxic due to the production of cyanotoxins, these are not classified as waterborne pathogens as in the case of Salmonella, Vibrio Cholerae and Shigella and or as opportunistic pathogens as in the case Aeromonas and Enterobacter (Gray 1999). Perhaps this lack of waterborne classification might be due to inability of cyanobacteria to invade and grow in humans and or animals in order to cause disease. The cyanobacteria produce cyanotoxins which may pose a human health risk, especially after direct contact with, or ingestion of water contaminated with these cyanotoxins (Chorus and Bartram 1999). One toxic cyanobacterium genera is encountered in surface water source, is Microcystis spp. There are more than 70 microcystin congeners that have been identified to date, only a few occur frequently and in high concentration (Hoeger, et al. 2004). Microcystin-LR is among the most frequent and most toxic microcystin congeners (WHO 1998). Frequently occurring cyanobacteria genera that contain these cyanotoxins are Microcystis, Planktothrix and Anabaena (Chorus and Bartram 1999). A cyanobacterial bloom often produces harmful secondary metabolites that cause harmful effects on the health and vitality of humans and animals (Wiegand and Pflugmacher 2005).

**Millennium Development Goals and access to safe drinking water**

Goal 7c of the Millennium Development Goals (MDGs) was set as a target for the United Nation (UN) member states to restrain 1.1 billion people which is one-sixth of the world’s population to “halve the fraction of people with no sustainable access to secure drinking water and vital sanitation (WHO/UNICEF 2004)”. The UN General Assembly for the International Drinking Water Supply and Sanitation Decade of 1981-1990 established an objective of “full access to water supplies and sanitation for all,” which builds upon the MDGs target (Mintz, et al. 2001). Since the 1990s, improvement has taken place notably in the area of safe water coverage and sanitation. The number of people with improved access to water sources such as public standpipes, protected dug wells, boreholes and household connections, has
increased to roughly 816 million (WHO/UNICEF 2004). This increase in coverage is keeping pace with population growth. In reality, people who are having lack of access to safe water have remained relatively steady ever since 1990 (Mintz, et al. 2001).

If the target is to be met by 2015 around the world of water and sanitation from MDG 7c, innovative strategies on to bring safe water should be launched. The use of water treatment plants and pipe-distribution systems installation cannot be relied upon as the only method to supply improved water. Insufficient fund or capital to sustain and build infrastructures to deliver piped water to dispersed population in rural communities is poor by the governments and private organizations. Thus point-of-use treatment, situated in the rural house, is a most urgent and sustainable alternative to access safe water instead of centralized water systems which people should use. Thus the use of ceramic water filters may offer a viable and simple water treatment technology at household level.

Millennium Development Goals (MDGs) summarize the development goals agreed on the international conference and the world summits during the 1990s. By 2015 reduce the half population of the people without access to safe drinking water. More than one billion people lack access to safe drinking water and more than two billion lack of proper sanitation during the 1990s, however nearly one billion people gained the access to safe water and the same number to sanitation (Drinking 2006). Inadequate drinking water supply and quality and poor sanitation are among the world’s major cause of preventable morbidity and mortality. Diarrhoea alone cause 2.2 million of the 3.4 million water related disease per year and many of the death involve the children of under five years of age and the poorest household and community and also immunocompromised people (MacKenzie et al. 1994; Dufour et al. 2003). Although the target of reducing the number of people lacking access to safe drinking water, the main challenge is to ensure that at household level, the drinking water remains safe from pathogen and cyanotoxin contamination.
Cyanotoxins in drinking water and their health effects

For access to safe water and the presence of cyanotoxins in the freshwater impoundments is a challenge. For example, *Cylindrospermopsis raciborskii* is tropical cyanobacterium that is now found in South African freshwater bodies and is responsible for the production of cylindrospermopsin, a potent toxin; of which the majority of municipal water treatment plants are unable to remove (van Vuuren and Kriel 2008). Secondly rural communities often rely on surface water (untreated) for their daily needs and this may expose them to low levels of cyanotoxins which are hazardous to their health on the long term (Falconer et al. 1983; Foss-Kankeu et al. 2008). The rural community that was living close to a eutrophic freshwater body, Bospoort dam (located in the North-West Province of South Africa), suffered diarrhoea episodes that were linked to the presence of cyanobacteria in the impoundment (Mogakabe and van Ginkel 2008; Frost and Sullivan 2010). In Australia, elevated concentrations of microcystins were linked epidemiologically to an outbreak of human hepatointeritis (Falconer et al. 1983). The *Microcystis* and *Anabaena* strain are known to produce cyanotoxins such as microcystins (with over 70 variants) and nodularin which are tumor promoters and potent inhibitors of protein phosphatase in 1 and 2A in animal and higher plants (Oberholster et al. 2004). The cyanotoxins if left unmanaged may derail the progress towards achieving the Millennium Development Goals (MDGs) such as child and maternal mortality and access to safe water (South Africa Country MDG Report 2010).

Microcystins bioaccumulate in the liver and can cause liver damage (Falconer et al. 1983). Adverse symptoms from long-term contaminated raw water (weeks to months) may not be obvious, but could range from a feeling of general malaise or gastro-intestinal discomfort, to jaundice. Children appear to be more sensitive to these toxic effects, which are more likely to present as acute gastro-intestinal symptoms (nausea, vomiting, diarrhoea, etc.) (Painter 1999) With lower body weights, children are at greater risk of developing serious liver damage from continued exposure to low levels of microcystins. Because of their comparatively lower body weight, children are particularly at risk of liver damage, as well as gastro-intestinal effects, if they are exposed to the toxin in large amounts over an extended
period of time. At low to moderate levels of exposure, the effects may be reversible. High levels of exposure to the toxins can have irreversible effects.

In South Africa and other parts of the world, microcystins are a major concern to drinking water providers from a health and economic perspectives (Scott 1991; Harding and Paxton 2001). The microcystins have been linked to liver damage that prompted the World Health Organization (WHO) to adopt a provisional guideline value for microcystins-LR (L for leucine and R for arginine) of 1.0 parts per billion (ppb) in drinking water (WHO 1998; Hoeger, et al. 2004). Earlier on, Ueno, et al. (1996) had proposed a more stringent guideline value of 0.01 ppb based on a possible correlation of primary liver cancer in certain locations in China. Consumers in these locations used potable water contaminated with microcystins (Oberholster, et al. 2004). In Australia, the potable water standard for microcystins was set at 1.3 ppb (NHMRZ/ARMCANZ 2001).

**Water treatment approaches to manage cyanotoxins**

The majority of conventional water treatment plants that are located in rural areas of South Africa cannot afford to retrofit advanced water treatment technologies such as activated carbon and ozone due to financial constraints and also required skilled persons to operate these plants (Momba et al. 2008; Pindihama et al. 2011). These technologies are best at removing the cyanotoxins and improving the taste and odour of purified water. For example approximately R20.4 million was spent retrofitting granular activated carbon (GAC) filtration system for Rietvlei water treatment plant and the operational cost of GAC was R0.23/m³ of purified water (Van der Walt et al. 2000a). Vaalkop water treatment plant downstream of Bospoort dam spent more money upgrading the water treatment technologies to the tune of R55 million (Van der Walt et al. 2000b). As indicated by the case study of Bospoort water treatment works abandoning poor quality raw water, turned to importing purified water from Randwater and Magalies water boards at staggering R4.8 million per year (Frost and Sullivan 2010).
Since cyanotoxins, in particular microcystins are heat stable (Harada, et al. 1996), they are not degraded by boiling, a process which is part of cooking food. Thus the option of using heat to degrade the cyanotoxins does not work. The alternatives water treatment options at household levels are chlorination and reverse osmosis and ozonation. But the use of advanced technologies of reverse osmosis and ozonation are expensive and are beyond the financial reach of rural communities.

The promotion of safe methods at household level such as the use of ceramic water filters is a welcome development (WHO 2007; Mwabi, et al. 2011). The success of ceramic water filters has been demonstrated in the pathogen removal in the Limpopo province and elsewhere in the world (Lantagne 2001a; Clasen and Boisson 2006; van Halen et al. 2009; Smith 2010). The ceramic water filter is composed of local raw materials, clay and sawdust (Figure 1). The local clay crafter made the clay pot in the traditional way but added sawdust, a combustible material. After sun drying and fire curing, at temperatures of 800°C, the sawdust was burnt thus creating tiny holes in which water would filter out and at the same time retain the pathogens (Tyeryar et al. 2011). In separate study in Limpopo by Tyeryar et al. (2011) evaluated the feasibility of establishing a ceramic water filter factory at Mukondeni village, Vhembe district, Limpopo. There were successful trials of using PureFilter ceramic water filters containing silver nanoparticles in Tsapasha and Tshibvumo in Vhembe district, Limpopo province in which there were low levels of pathogens in the purified water (Smith 2010). The ceramic water filters without silver nanoparticles (#16) and with silver nanoparticles (#2) were purchased from the ceramic water filter factory.
The removal of cyanotoxins at household level

The use of chlorination (addition of JIK, a bleaching agent) at the household level has been practiced in an effort to inactivate pathogens and has been successful (Potgieter et al. 2009). Thus the chlorination of drinking water at household level may form secondary reactions if there are appreciable quantities of naturally occurring matter (NOM). The end result is the formation of water disinfection by products such as trihalomethanes (THM) (Lantagne 2001b; Westrick et al. 2010). Thus chlorine as an oxidizing agent can destroy NOM including cyanotoxins. The major concern is the formation of water disinfection by products which have been implicated as carcinogenic agents (Melnick et al. 2006).
The burning of sawdust during the firing of the ceramic water filter results in the formation of a carbon layer within the clay matrix (Figure 2). This carbon layer is the basis of the removal of natural occurring matter, including cyanotoxins. Carbon either granular or activated has been effective in the adsorption of cyanotoxins and is the standard water treatment process in the removal of cyanotoxins (Adinata, et al. 2007; Westrick et al. 2010; Ho, et al. 2011). Hence the use of activated carbon seems an attractive option as this is part of the ceramic water filter body (Figure 2).

Figure 2: Wall of the ceramic water filter indicating the carbon layer (arrowed black).
This study was to investigate the algal and cyanobacteria communities and microcystin congeners in Nwanedi and Luphephe water sources and to evaluate the use of ceramic water filters in reducing microcystin congeners in raw water intended for human consumption. The specific objectives were: to determine the physico-chemical analysis of the surface water source; to determine the levels of microcystins congeners in the surface water source and to determine the levels of microcystins congeners in the purified waters after passing through the ceramic water filters and to identify the types of cyanobacteria species in the surface water source.

The study area
Limpopo Province of South Africa is predominantly with rural and agricultural area. Previously microbiological assessment have shown that most of the surface water (stream, wells, and fountains) in the rural community of Limpopo Province are contaminated with microbiological organisms such as enteric bacterial pathogen including *Escherichia coli* and *Salmonella* (Obi et al. 2002; Bessong et al. 2009). Other studies have also found evidence of microcystins in surface water sources and have been linked to the dominance of the cyanobacterium, *Microcystis aeruginosa* (Foss-Kankeu et al. 2008; Oberholster et al. 2009; Makhera et al. 2011). The study by Foss-Kankeu et al. (2008) showed that the drinking water that was collected from surface water sources and kept at home in plastic containers was contaminated with microcystins that showed variation within the WHO guideline values of 1 ppb. The study area lies north of Thohoyandou, is the dams of Luphephe and Nwanedi and Nwanedi River and the rural communities are: Folovhodwe, Muswodi, Gumela, Tshikotoni and Tshilovi (Figure 3). The study area is closely associated with the catchment of the two dams. The Nwanedi Dam is located at the junction of the Nwanedi and Luphephe rivers in Limpopo Province, South Africa, and is an important source of assured water supplies for irrigated agriculture along the lower reaches of the Nwanedi River, upstream of its junction with the Limpopo River on South Africa’s border with Zimbabwe. There is an extensive agricultural activity, upstream and downstream of Nwanedi and Luphephe dams (Ramulwela 2012).
Materials and Methods

Water sampling

The water samples were collected from four different points within the study area, in 20 litre plastic containers during the month of December 2012. Water collection points are Luphephe dam (sample 1), Nwanedi dam (sample 2), downstream of Nwanedi dam wall (sample 3) and pool by roadside, 700 m from the main tar road, (sample 4). The water samples were subdivided for physico-chemical analysis, nutrient analysis, cyanotoxins analysis and identification of algal and cyanobacterial species.
Sample analysis

Physico-chemical analysis
The pH, water temperature, electric conductivity (EC) and total dissolve solids (TDS was measured, in triplicate, using pH meter (Portable pH meter Crison MM40). It was first calibrated according to the manufacturer’s guidelines using pH buffers of four and seven.

Nutrient analysis
For the triplicate measurement of the nutrients, phosphate and nitrate, the Ion Chromatography (IC) Metrohm 850 professional IC (Metrohm, Switzerland) was used. The measurements were conducted in duplicate. The water samples were filtered thru 0.45 µm filter using a syringe and collected in a clear 250 ml plastic tube prior to IC analysis. The Ion Chromatography Metrohm 850 Professional (Metrohm) equipped with air-actuated 8 port injection valve with one sample loop (20 µl) was used to determine the following anions: Cl⁻; Br⁻; NO₃⁻; NO₂⁻; PO₄³⁻ and SO₄²⁻. The eluent mixture was then prepared and used according to the manufacturer Metrohm protocol. The eluent solution was then degassed using nitrogen. The anion standard solutions were prepared according to procedures outlined in Standard Methods for the Examination of Water and Wastewater (APHA 2008). A check standard was also used during the routine analysis to ensure accuracy and quality of results.

Microcystin analysis
The microcystin analysis was done at University of Johannesburg, Department of Applied Chemistry. The 100 ml of water sample was filtered through a 0.45 µm membrane filter and the filtrate divided into three 10 ml portions, which were passed through Oasis® HLB 3 cc/60 mg, for solid phase extraction of microcystins, before injection into the HPLC.
**High performance liquid chromatography (HPLC) running conditions**

The microcystin extracts were analysed by the Surveyor Plus™ modular LC system and the ChromQuest™ data system, products of Thermo Fisher Scientific San Jose, on a 150 × 4.6 mm, 5 μm column (waters) at 30 °C with a mobile phase composition of 60% water+0.1% formic acid and 40% acetonitrile+0.1% formic acid at a flow rate of 1.0 ml/min. The Surveyor Plus modular LC system consists of the Surveyor LC Pump Plus, the Surveyor Autosampler Plus, and the Surveyor PDA Plus Detector. Chromatograms at 238 nm were recorded with the Surveyor PDA plus Detector, and microcystin were identified by retention time and characteristic UV absorption spectra (200–300 nm). Quantification was based on external calibrations of microcystin RR, microcystin LR, microcystin LY and microcystin YR, respectively. The injections were in triplicate.

**Determining the composition of cyanobacteria species in the surface water source**

A bench top FlowCAM (Model VS IV) was used to determine the composition of cyanobacteria species. The FlowCAM was equipped with a blue (488 nm) laser for fluorescent and particle detection. For the analysis of cyanobacteria composition in natural field samples a flow cell (FC300) was used with 4X objective and a cell size range of 20 to 300 μm. The water samples were transferred to the funnel with a pipette. The fluorescent particle/cell was digitally acquired and archived by the FlowCAM for latter processing.

**Data analysis**

Data information were analysed using Microsoft excel to determine the mean and standard deviation.
Results and discussion

The effects of physico-chemical parameters on cyanobacterial communities

The physical-chemical analysis of the raw water was determined (Table 1). The range of pH at all the sampling points was in the range of 6.1 to 7.3 which is within the Department of Water Affairs and Forestry (DWAF) guidelines (DWAF 1996).

Table 1: The physico-chemical characteristic of raw water quality during the study period

<table>
<thead>
<tr>
<th>Physico-chemical parameter</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
<th>Sample 4</th>
<th>DWAF guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>6.8</td>
<td>6.1</td>
<td>6.4</td>
<td>7.3</td>
<td>6.5-8.5</td>
</tr>
<tr>
<td>EC µS/cm</td>
<td>69</td>
<td>54</td>
<td>55</td>
<td>513</td>
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<tr>
<td>TDS (mg/l)</td>
<td>44</td>
<td>35</td>
<td>35</td>
<td>328</td>
<td>0-450</td>
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<tr>
<td>Nitrates (mg/l)</td>
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<td>--</td>
<td>--</td>
<td>--</td>
<td>0-6</td>
</tr>
<tr>
<td>Sulphate (mg/l)</td>
<td>1.52</td>
<td>0.80</td>
<td>0.04</td>
<td>6.46</td>
<td>0-200</td>
</tr>
<tr>
<td>Chloride (mg/l)</td>
<td>14.88</td>
<td>12.69</td>
<td>11.44</td>
<td>27.26</td>
<td>0-100</td>
</tr>
</tbody>
</table>

µS/cm: microSiemens/cm
mg/l: milligram per liter

The electrical conductivity (EC) and total dissolved solids (TDS) for samples 1 to 3 was in the range of 54 to 69 µS/cm and 35 to 44 mg/l respectful and this was within the DWAF guidelines (DWAF, 1996). The EC and TDS for sample 4 were on high side of the DWAF guidelines. The levels of nitrates, sulphate and chloride were within the DWAF guidelines (DWAF, 1996). The level of phosphate was not detected in all the samples sites and nitrates were only found at sample site 1, Luphephe River. At the environmental conditions, cyanobacteria communities are likely to bloom as indicated by the study of van Ginkel (2001) showed that an EC (240 µS/cm) and TDS (160 mg/L) were recorded during a cyanobacterial bloom.
dominated by *Microcystis* and *Pseudoanabaena* in Grootdraai Dam that is situated north-east of Standerton on the Vaal River, in the Mpumalanga Province, South Africa. This is also supported by the study of Makhera et al. (2011) who showed that though the nitrate levels were low but high EC and TDS values may encourage the growth of cyanobacteria as was found in Luvuvhu river catchment, Limpopo during the month of August 2009. A study by Oberholster et al. (2009b) on Nwanedi-Luphephe water sources found low levels of nutrients but the cyanobacteria were able to strive and survive in such nutrient limited conditions.

**The presence and types of microcystin congeners in the water source**

The samples were assessed on different microcystin variants such as microcystin RR, microcystin LR, microcystin YR and microcystin LY (Table 2). The ceramic water filter was designed to reduce or remove the microcystins in the raw water and the reduction percentage was above 93% (Table 2). For microcystin RR was not detected in the raw water sample. There are no official guideline values for microcystin congeners YR and LY.

**Table 2: The level of microcystin congeners (in ppb) in the pool by roadside water source (before filtering) and in the purified water sources (after filtering through the ceramic water filter)**

<table>
<thead>
<tr>
<th></th>
<th>Microcystin LR</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td>Ceramic water filter #2*</td>
<td>155.92</td>
<td>8.29</td>
</tr>
<tr>
<td>Ceramic water filter #16**</td>
<td>155.92</td>
<td>0.00</td>
</tr>
<tr>
<td>Microcystin YR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceramic water filter #2</td>
<td>245.96</td>
<td>4.79</td>
</tr>
<tr>
<td>Ceramic water filter #16</td>
<td>245.96</td>
<td>18.44</td>
</tr>
<tr>
<td>Microcystin LY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceramic water filter #2</td>
<td>369.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Although the ceramic water filters were able to reduce the microcystins in the final purified water, the microcystin LR was zero ppb (with ceramic water filter #16) and 8.29 ppb (ceramic water filter #2) which is above the WHO (1998) has established a guideline value of 1.0 ppb for microcystin LR. However further research is required to understand why the ceramic water with silver there was no 100% removal of the microcystin congeners. From results shown in Table 2, the raw water samples had high levels of microcystin-LR which was above WHO guidelines and this may have an effect on human health. Thus the ceramic water filter was able to reduce microcystin LR and YR in the water samples. The use of ceramic water filters to remove/reduce cyanotoxins at household level is a simple water treatment method and which is affordable. Further studies are also required to understand the role played, if any, by silver nanoparticles in the reduction of microcystins congeners.

**The composition of cyanobacteria communities in the surface water sources**

The filamentous algae and filamentous and colonial cyanobacteria were found in the surface water sources and the physical chemical water qualities of the surface water sources were favourable for growth of the cyanobacteria (Figure 4). Cyanobacteria have been known to thrive in limited phosphorus conditions and the nitrogen nutrient was probably supplied by other filamentous cyanobacteria such as *Anabaena* spp (Vahtera et al. 2007). The cyanobacteria species were tentatively identified by using pictures captured by the Flowcam and then compare with published pictures available in the literature. In the Luphephe water source (Figure 4a) the cyanobacteria were identified as *Cylindrospermopsis* ssp; *Lyngbya* spp; *Anabaena* ssp and *Microcystis* ssp (Cronberg et al. 2004; Huynh and Serediak 2006). In the Nwanedi water source (Figure 4b) the cyanobacteria were identified as *Anabaena* ssp; *Cylindrospermopsis* ssp; *Oscillatoria* ssp and *Microcystis* (Cronberg et al. 2004; Van Vuuren and Kriel 2008). Then downstream of the Nwanedi-Luphephe dams (Figure 4c) the cyanobacteria were identified as *Oscillatoria* ssp; *Trichodesmium*
spp; *Scenedesmus ssp* and *Phormidium ssp* (Cronberg, et al. 2004). The filamentous algae and cyanobacteria dominated the water source by the pool (Figure 4d) and were identified as *Cylindrospermopsis ssp; Oscillatoria spp; Cladophora ssp* and *Anabaena ssp* (Cronberg et al., 2004). The filamentous cyanobacteria, *Oscillatoria spp* and *Anabaena* have been linked to the production of microcystins especially the microcystin congeners LR, YR and LY (Namikoshi and Rinehart 1996). Thus it is possible that the microcystin congeners LR, YR and LY that were identified in this study originated from these filamentous cyanobacteria. However further conformation on the identity of cyanobacteria species is in progress using scanning electron microscopy techniques. The cyanobacteria that were found in these surface water sources are similar to the study of Oberholster, et al. (2009) on the Nwanedi-Luphephe water sources.
Figure 4: (a) Some of the algae and cyanobacteria from the Luphephe water source: (A) Oscillatoria ssp; (B) Lyngbya ssp; (C) Anabaena ssp and (D) Microcystis ssp; (b) Some of the algae and cyanobacteria from the Nwanedi water source: (A) Anabaena ssp; (B) Cylindrospermopsis ssp; (C) Oscillatoria ssp and (D) Microcystis ssp; (c) Some of the algae and cyanobacteria from downstream of the Nwanedi-Luphephe dams: (A) Oscillatoria ssp; (B) Trichodesmium ssp; (C) Scenedesmus ssp and (D) Phormidium ssp and (d) Some of the algae and cyanobacteria from the pool by roadside water source: (A) Cylindrospermopsis ssp; (B) Oscillatoria ssp; (C) Cladophora ssp and (D) Anabaena ssp. Scale 20µm

Conclusion
The physical chemical analysis of surface water showed that the cyanobacteria were able strives in limited phosphorus conditions and the nitrogen nutrient was probably supplied by other filamentous cyanobacteria. The cyanobacteria were tentatively identified as Oscillatoria ssp; Lyngbya ssp; Anabaena ssp; Microcystis ssp; Cylindrospermopsis ssp; Trichodesmium ssp; Phormidium ssp and green algae Scenedesmus ssp and Cladophora ssp. The microcystin congeners LR, YR and LY, were found in the pool by roadside were probably produced by the filamentous cyanobacteria, Oscillatoria and Anabaena ssp. This water source was then filtered through a ceramic water filters in order to reduce the levels of microcystins. The ceramic water filters were able to reduce the microcystin congeners in the final purified waters. However the use of ceramic water filters should be promoted for possible use in households facing raw water containing microcystins.

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The Value of IKS in Higher Education in the 21st Century

Yonah Ngalaba Seleti*

Abstract

The paper states the case for the value-add of indigenous knowledge systems to the higher education sector in South Africa. It communicates the value of IKS from multiple perspectives, beginning with the political imperatives of redress, by valuing the contribution of IKS as a knowledge domain to cognitive justice. The paper is premised on the understanding that to date, higher education reform in the country has not been transformative. Nor has that process developed a solid foundation for transformation. In looking for agency for change, the paper notes that to a large extent, neither academic staff nor students have demanded that higher education content and process be assessed critically, nor have new directions been proposed.

Key Words: Indigenous knowledge systems, marginalisation, decolonisation, transformation, epistemology, cognitive justice.

Introduction

The twentieth anniversary of South Africa’s democracy is a timely opportunity to reflect on two decades of policy-making and policy implementation aimed at transforming South African higher education. This paper will assess how higher Education has interacted with the IKS policy adopted by the South African Cabinet in 2004 and the changes that have occurred during the past decade. I argue that attempts at transforming higher education in South Africa have not challenged the dominance of Western knowledge and ways of knowing as ‘truth regimes’. Higher education has privileged Western knowledge and science as dominant modes of thought that continue to disparage and denigrate other ways of knowing. The result of this over the decades has been the silencing and

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conquering of other voices or ways of knowing and given effect to what has come to be known as ‘cognitive injustice’ as the hallmark of South African higher education. It is notable that beginning with the White Paper on Higher Education (1997), the transformation of the curriculum and knowledge-based higher education was not on the radar. The White Paper stipulates that higher education in a knowledge-driven world must fulfil three important roles:

- Human resource development: the mobilisation of human talent and potential through lifelong learning is to contribute to the social, economic, cultural and intellectual life of a rapidly changing society.

- High level skills training: the training and provision of person power to strengthen this country’s enterprises, services and infrastructure. This requires the development of professionals and knowledge workers with globally equivalent skills, but who are socially responsible and conscious of their role in contributing to the national development effort and social transformation.

- Production, acquisition and application of new knowledge: national growth and competitiveness is dependent on continuous technological improvement and innovation, driven by a well organised, vibrant research and development system that integrates the research and training capacity of higher education with the needs of industry and of social reconstruction. (DoE 1997)

In reviewing the challenges facing South African higher education at the dawn of freedom, Pityana (2004) stated:

The new government came in with an agenda of change and transformation. It was reshaping South African society and constructing a new vision. Without any doubt, universities were key instruments in this agenda for change. They would be the ones where the new democracy’s idealism found expression, its leaders trained and its ideas formed. And yet the system that was inherited was inherently unequal, in many respects its academic input outdated and not in step with the emerging ideas in the democratic South Africa, its research culture incompatible with the progressive agenda of the new South Africa and the culture of the academic environment alienating to a large majority of South Africans, black and white. And so the policy approach had to be both about dealing with the legacy of the past and yet shaping and preparing South African universities to embrace the future in a global world.

The transition to majority rule mentioned by Pityana, required South Africa’s education system to address two major transformations. One was to transform a system organized by race into a system in which race was no longer a consequential
criterion for selection, promotion, and academic success. The other was to transform a system designed to educate a small elite into a system that could provide quality education to all South Africans. According to Samoff (2008) the two transformations are intertwined; both remain incomplete and both are at risk. In problematising the role of higher education in the reconstruction and transformation agenda in South Africa, the interrogation of the constituent elements of the knowledge-base inherited from the apartheid era was ignored.

Scholars of change in higher education have noted a period of symbolic policy development where the new democratic government expected higher education to engage in voluntary dismantling of the apartheid landscape of higher education and to embark on the reconfiguration of a new landscape which would allow higher education to achieve the goals. Owing to the failure by higher education to initial change that would go beyond the defense of the historical privileges, in 2004 the government, under the ministerial leadership of Kader Asmal, set out mandatory restructuring, and the state went about recasting institutions in terms of a transformation of ‘fitness of purpose’ – in other words, examining institutional fitness in terms of national policy goals, priorities and targets. Followers of change in higher education would agree that once higher education had grasped this challenge, they proceeded to formulate visions and missions aligned with transformation goals to achieve ‘fitness for purpose’ – that is, conditions that will allow them to implement these visions and missions. What is clear is that some of the radical ideas of ‘people’s education’ with respect to pedagogy and curriculum, and the ‘political’ formation of citizens and actors, were displaced by other discourses that emphasised skilling and training for the requirements of economic growth and globalisation.

A decade ago, Jansen (2004) noted the following changes in South African higher education:

Ten major changes in the higher education system are identified, namely the changing size and shape of the higher education; the changing meaning of autonomy and accountability; the changing nature of higher education providers (private higher education); the changing character of student distribution and characteristics in higher education; the changing organization of university management and governance (new managerialism, councils); the changing roles of student politics and
organization; the changing models of delivery in higher education; the changing notion of higher education - between free trade and the public good; the changing value of higher education programmes (the rise of the economic sciences and the decline of the humanities); and the changing nature of the academic workplace.

It is no secret that the changing landscape in Higher Education might be understood as outcomes of forces associated with the ascendancy of neoliberal politics and forces linked to a rapidly changing and globally interconnected world.

As recent as January 2014 Kamal (2014) reporting the launching of the Department of Higher Education and Training’s White paper on Post-school education wrote:

The Minister explained that despite 20 years of democracy, the legacy of apartheid continues to impact on the education being disseminated, which in turn impacts on the standard of living for the majority of South Africans. “Most people continue to be poor and the education institutions they attend still bear the marks of former Bantu education”.

Only on 5 March 2014, in a HESA presentation to the Portfolio Committee on Higher Education and Training, in Cape Town, entitled “South African Higher Education in the 20th Year of Democracy: Context, Achievements and Key Challenges” was the need for epistemological transformation identified as a critical issue in higher education. The presentation cites Du Toit as arguing that “A key challenge at the heart of higher education transformation in South Africa is engaging effectively with the historical ‘legacies of intellectual colonisation and racialization’ and patriarchy’ (HESA 2014). This presentation stresses the significance of higher education transformation to entail decolonizing, de-racialising, de-masculanising and de-gendering South African universities, and engaging with ontological and epistemological issues in all their complexity, including their implications for research, methodology, scholarship, learning and teaching, curriculum and pedagogy.

This call by HESA requires the creating of institutional cultures that genuinely respect and appreciate difference and diversity – whether along the lines of class, gender, nationality, religion, sexual orientation, linguistic backgrounds, or epistemological or methodological orientations. It would also involve creating spaces for the flowering of epistemologies, ontologies, theories, methodologies, objects and questions, other than those that have long been hegemonic in intellectual and
scholarly thought and writing in the universities. The presentation to the Portfolio Committee on higher education invoked Mamdani’s argument that, “the central question facing higher education in Africa today is what it means to teach the humanities and social sciences in the current historical context and, in particular, in the post-colonial African context” (HESA 2014). It also alluded to his question of what it means to teach “in a location where the dominant intellectual paradigms are products not of Africa’s own experience but of a particular Western experience” (Mamdani 2011).

**Challenging the hegemonic knowledge agenda**

It is notable that HESA chose to include the marginalisation of other epistemologies and ontologies from the mainstream discourses as one of the six challenges facing higher education. It is about time that the constituent element of the hegemonic knowledge regime that has been the centre piece of Western acculturation is questioned from inside of academia. The other challenges discussed at the Portfolio Committee are as follows:

(i) Student access, opportunity and success: Expansion and greater equity, low participation, high attrition and low completion, and variable quality.
(ii) Research and postgraduate education: expansion and greater equity, low participation and graduations, and possible stasis.
(iii) Securing the next generations of academics: strong consensus, clear development programme, lack of state funding.
(iv) The higher education institutional landscape: de facto differentiation and diversity yet not fully settled policy.
(v) The challenge of funding of Higher Education.

What the HESA presentation brings to the fore is that questions of social exclusion and inclusion in South African higher education extend well beyond issues of access, opportunity and success. The HESA report raised fundamental questions and it is worth sharing some of them to anticipate the discussion on how the interfacing of IKS in higher education will answer some of them. The critical questions raised by the report include issues of institutional and academic cultures, and largely ignored epistemological and ontological issues associated with learning and teaching, curriculum development and pedagogical practice. Below are some of these questions:
(i) How have the dominant discourses that characterise the intellectual space of higher education developed and been reproduced historically?

(ii) What are the implications of the dominant discourses for social inclusion and social justice in higher education, for the affirmation and promotion of human dignity and rights, social cohesion and respect for difference and diversity?

(iii) What are the prevailing conceptions of epistemology and ontology and to what extent have these been or are being deracialised, degendered and decolonised?

(iv) There is frequent reference to providing students with ‘epistemological access’ rather than just physical access, but to which epistemologies?

(v) How do the dominant cultures of higher education affect student learning, progress and success and social equity and redress?

(vi) Similarly, how do these dominant cultures also affect the development and retention of the next generations of academics that must, in the light of historical and current inequalities, be increasingly women and black?

(vii) Finally, how permeable is the currently constructed social space of higher education to a critical reflexivity, learning and innovation and institutional change? (HESA 2014)

The focus of this paper is to present the value of IKS to higher education. It has certainly been long coming that one day, the political renaissance that had gripped the country beginning with the Mbeki regime will be taken seriously by higher education. Hopefully, Higher Education South Africa (HESA), the voice of South Africa’s university leadership, representing twenty three Vice Chancellors of public universities, will lead the transformation of the knowledge agenda of universities.

I am under no illusion that by addressing the value of indigenous knowledge systems to higher education and identifying this paper as a contribution to one of the challenges that HESA considers being an urgent priority to be addressed, that this paper will draw an enthusiastic following to its clarion call. There are many academic, strategic and political reasons for this cautious optimism to the advocacy and promotion of the value of IKS in higher education. Firstly, it has been ten years to date since the adoption of IKS Policy by the South African Cabinet and since then very little uptake by universities has been done on a voluntary basis. It should be obvious that the universities have not yet identified the value of IKS to their enterprise or they are so implicated in the colonial business of intellectual dependency of Western fonts of knowledge that they are content with playing a second fiddle in pursuing a knowledge agenda that is based on the Western experience.

In March 2014, I was at the World Intellectual Property Organisation (WIPO) in Geneva negotiating on behalf of South Africa, a legal international instrument for the effective protection of traditional knowledge and traditional cultural expressions. The
Western countries’ delegates have banded together to question even the subject matter of traditional knowledge. In their perception, they challenge the simple fact that it is a knowledge that is dynamic and evolving. Furthermore, even the characteristic of traditional knowledge that it should be acknowledged that it is created and continues to be created even in the present era is contested. To these negotiators, the indigenous peoples of the world only hold and maintain this knowledge. It is unimaginable to think that the negotiators representing great nations in the production of knowledge should persist in denying the ability of the indigenous peoples to create knowledge or even to acknowledge the knowledge of indigenous people as worthy of intellectual value to be protected by the Western intellectual property rights system. It is now fourteen years since the Intergovernmental Committee (IGC) on Genetic Resources, Traditional Knowledge and Folklore of WIPO was established and no final instrument is in sight as yet. (What used to be classified as folklore in cultural and anthropological studies is now referred to as Traditional Cultural Expressions or TCE’s). By using this institution of knowledge governance and denying access to economic and moral rights for IKS and compensation rights for the illegally accessed IKS, the Western countries continue to pursue the hegemonic mind-set that insists that only Western knowledge matters in world affairs.

From a heuristic perspective, I have found that African scholars are the most impervious to the concept of integrating IKS in the national system of innovation and more especially in universities. It is unfitting that African scholars who should be open to defend and advocate epistemic pluralism have become the opposition. They should show more refexibility because of their daily experience of both worlds, the professional reality is that they are trained in the knowledge tradition of the Western world, while on the daily basis they live a nuanced world that is embedded in another world view that intertwines the spiritual and the physical in a holistic view of the world. It is equally true that the advocacy for IKS has taken unforeseen dimensions that are seeing its ranks swell like a social movement. The possibility for this epistemology of hope to flower lies in the mobilisation of all sectors of society, from the civil society organisations, through government and the private sector to universities. Knowledge production is no longer a domain only of universities. Nongovernmental organisations, civil communities, government departments and the private sectors
have all become sights of knowledge production. It is in such a fertile, dynamic and unrestricted nexus/landscape that the roots for a rebirth of the African agency for change that embracing IKS as one of the foundations of an epistemology of hope will find tracking.

**The making of Western hegemony on the knowledge agenda**

In his speech at the conference on Africa Days of the German Federal Ministry of Education and Research, the former President of the Federal Republic of Germany, Professor Horst Köhler (2014), observed that “Our definition of Africa can only ever be partial, our interpretation of Africa can only ever be distorted, and we have no alternative but to acknowledge that our image of Africa says more about us than it does about Africa itself”. This view is confirmed by the fact that for the past 500 years, African-based knowledge has been viewed and expressed through the lens of Western thought, language and perception. As Europe spread its influence across the globe, it also projected itself as the forerunner of the only knowledge that counted in the world. The Western world has hence come to see other cultural traditions and knowledge through the filters of the modern view of the world, their own view of the world. Colonization deliberately created paradigmatic opposites: traditional versus modern; oral versus written and printed; literate versus illiterate; rural and agrarian versus urban and industrialized. In this classification the traditional, oral, illiterate, rural and agrarian were considered to be inferior and backward and so were their knowledge and their theories of knowledge. The role of the colonized was consigned to that of consumers of Western knowledge. Technology and science as perceived in the Western sense was used as a measure of the level of civilization and the humanity of the societies that were brought under colonization. This resulted in the trivialization of the entire mode of life and the spiritual orientation of millions of people (Seleti 2013)

In recent times, however, in Africa and elsewhere, the quest for self-determination in British, French, Portuguese and Spanish colonies has focused on political emancipation. The attainment of political liberation was accompanied by a cultural renaissance that saw a growth in education and the creation of new universities as symbols of independence. While these countries invested in education, however, they did not seek the overthrow of the disenfranchisement that colonialism had
imposed. They were happy to seek modernization with its accompanying underpinnings that placed Western knowledge systems as drivers of this development. For over fifty years, therefore, most African countries have continued to pursue their dreams of development within the confines of Western theories which have discounted knowledge from the periphery as of no value.

The pursuit of African development within the parameters of Western dominated theories has translated into African universities driving a very narrow knowledge agenda. Kaya and Seleti (2013) argue that despite decades of self-rule, African scholars have not succeeded in empowering the continent to develop its own educational theoretical and methodological framework for knowledge production and sustainable development. There could be several reasons for this, but the paper argues that one of the key factors is that higher education in Africa has not been relevant to the needs and concerns of African societies. This is in spite of the substantial resources expended to boost higher education in Africa and South Africa (Kaya and Seleti 2013). The intellectual dependence of African scholarship extends to the reliance on Western publishing houses for publishing their academic works. It is thus not surprising that publications by African scholars are judged to be acceptable only when they meet standards set by the Western press. This has meant that fewer African scholars have succeeded in publishing in the Western presses and this has resulted in the situation where African universities are net importers and consumers of Western published knowledge. We have become a continent of net importers of foreign knowledge to fix the African condition.

The major feature of African countries (including South Africa) is the concentration of the knowledge sector on distribution of knowledge products at the expense of the production of relevant knowledge products. Even the universities that boast of in-house publishing houses continue to use standards of relevance and scholarship that do little to create their own context-based and relevant publication standards. It has also become apparent that since most knowledge products are to meet foreign standards, the knowledge produced in the African context demonstrates weak linkages between the creators of knowledge products and the consumers. The issues of relevance of the knowledge produced is in high jeopardy and does not
surprise the impact of the knowledge sectors on reducing poverty in rural African has been little than impressive. Higher education in much of Africa has concerned itself with inculcating a theoretical knowledge at the expense of community engagement and this has lent opportunities for criticism for making higher education in the continent distant from community concerns, and for producing graduates who tend to be inadequate and insensitive to the developmental challenges of their local communities and country (Muya 2007). This point of separating the needs of the communities from the university curriculum has resulted in situations where universities are often neighbours of squatter compounds with appalling conditions. The question that remains to be answered is how these institutions of higher learning have made the appalling conditions in their neighbourhoods a part of their education and interventions, as they seek to improve the quality of lives of their neighbours. What then is the relevance of these institutions if they cannot even indulge in finding solutions to the local problems? While the World Bank has, over the years, slowly come to realize the importance of the integration of local knowledge as an ingredient to finding solutions to local problems, our universities are oblivious to the knowledge resources embedded in their neighbouring poor communities (Gorjestani 2000). A significant challenge for higher education is how to shift the current concentration on the reproduction, distribution and coordination of external knowledge to a focus on the production of relevant and context-bound knowledge.

The Quest for IKS and democratic politics

At the global level of knowledge production, the work of Michel Foucault and Jacques Derrida sparked a movement that allowed for the emergence of a new moral and cognitive space within which constructive dialogue between people and between knowledge systems could occur. For Thomas Kuhn (1962), science is not an evolutionary, progressive march towards greater and greater truth, but rather "a series of peaceful interludes punctuated by intellectually violent revolutions" in which one point of view is replaced by another.

The quest for the recognition of the role of indigenous knowledge in the knowledge sector in South Africa did not arise from the universities or science councils. In fact, the articulation of the African Renaissance and New Partnership for Africa’s
Development created a space for a search for an African rationale for an African-centred initiative. In South Africa, the birthing of IKS emerged outside the leading academic institutions. It was a product of intellectual activism and political elites in Parliament. Initially, it was the historically disadvantaged universities – North West University (Mahikeng Campus) and the University of Venda, who took an active interest in the promotion of indigenous knowledge (Seleti 2013).

Another contributing factor to the ascendance of IKS in recent years is the positioning of knowledge as an intrinsic part of democratic politics. In the liberation struggles against colonialism and apartheid, Africans relied on the knowledge from within their societies to wage their campaigns. Indigenous knowledge played a critical role in challenging the knowledge injustices of the past. Knowledge production, access to knowledge and information and its dissemination and distribution have become contested issues in modern democracies. Further, the role of society in raising issues on governance of knowledge - knowledge politics - is on the rise as civil societies challenge the role of research institutions in setting the research agenda. Knowledge generators are being challenged to orientate their contribution to the welfare of local communities.

The increasing involvement of society in requesting accountability from knowledge producing entities should contribute to the creation of a holistic framework for societal development. The need for new ethics of knowledge production that takes cognisance of indigenous concepts of justice should be stressed in this chapter; otherwise the rising momentum and pressure from below for change could lead to rendering knowledge producing institutions such as scientific research organisations less relevant to society. This becomes significant in an environment where universities may no longer exercise the monopoly of knowledge production.

In South Africa the knowledge agenda, as reflected by the science curricula and qualifications, continues to mirror Western knowledge systems at the cost of excluding and marginalizing local or indigenous knowledge. For an inclusive and democratic knowledge network to emerge within Africa it will require a significant mind-shift to be in a position to recognize the contribution of other knowledge systems. Africa’s knowledge needs must be determined by those who produce it
and consume it. As Africans, we are seeking our own programmes of renewal and rebirth by using indigenous knowledge systems for physical, spiritual, psychological, socio-economic and political well-being. We should guard against the risk of dividing society that could emanate from the enunciation of African views based on IKS, but should strive to indicate how IKS can enrich and inform Western science to the benefit of both worlds.

It was indeed enlightening to listen to Professor Horst Köhler urge two Federal Republic of Germany government ministries, the Federal Ministry of Education and Research and the Federal Ministry of Economic Cooperation and Development, to reconsider the framework for development aid and the knowledge agenda. I wish to recite some very honest statements on Europe’s images of Africa that in his view persist to shape relations between Africa and Europe:

Movies, too, frequently fall back on the clichés of vast plains and spectacular sunsets, reducing Africa to a backdrop for white heartache in which, to quote the US/Nigerian writer UzodinmaIweala, Africans are ‘used as props in the West’s fantasy of itself.’ Iweala’s great compatriot, Chinua Achebe, warned against seeing Africa solely as the recipient of European projections, as the ‘setting and backdrop which eliminates the African as a human factor.’ It is self-evident that we can – and must – break free of these stereotypes of Africa. But are we really able to escape our Eurocentric paradigms? Our definition of Africa can only ever be partial, our interpretation of Africa can only ever be distorted, and we have no alternative but to acknowledge that our image of Africa says more about us than it does about Africa itself. (Köhler 2014)

Köhler (2014) made further observations about the relationship between Europe and Africa that are so revealing and he exposes the continuing framework of developmental aid to Africa in higher education and research. He observes that:

There is no escaping the fact that, from a historical perspective, the defining characteristic of Europe’s relationship with Africa has not been partnership, let alone friendship, but rather objectification. Please don’t misunderstand me: I am not calling here for self-flagellation by the West nor, perhaps, for guilt and certainly not for a crude allocation of blame in identifying the root causes of Africa’s current problems. No, what I am calling for is an awareness of our shared, fraught history and awareness of the possibility that many colonial and post-colonial attitudes persist to this day, sometimes latent and unsuspected but sometimes quite overtly. Have we really moved on from perceiving and treating Africa as an object? Have I moved on from that?
Köhler’s speech was chilling and brutal, as he reminded the audience that it was in that city of Berlin that Africa was parcelled to European countries and individuals such as King Leopold of Belgium, who acquired a vast area of 2.3 million square kilometres – the Congo – as his personal domain where, it is estimated, up to 10 million people subsequently lost their lives in one of the worst crimes against humanity of modern times. Kohler’s critique of modernity is echoed by others in the area of knowledge production.

**Modernity and its critiques**

There is no scarcity of scathing critiques of Western Modern Science and its role in marginalizing and denigrating IKS. Scholars of indigenous knowledge trace the subjugation of diverse knowledges through systematic misinterpretation, misrepresentation and marginalization of IKS to the colonial encounter with indigenous people. The combination of colonialism, capitalism and modern Western science has been highlighted as a lethal combination of historical processes in the expansion of Europe that not only culminated in the colonization and subjugation of the entire world but also led to the trivialisation of the ways of life of the colonized. This chapter provides a few examples as illustrative rather than a repetition of the well-argued critiques of modernity.

A leading critique of modernity, Bruno Latour (1993 translation) in ‘We have never been Modern’, highlights four premises of modernity that have shaped the making of the modern world, namely:

1. The separation of nature from society by making nature’s laws above all, we can do nothing about them - they are transcendent.
2. The separation of society from nature by making society totally free, with no unlimited possibilities - immanent.
3. The separation of powers between nature and society - nature will remain without relationship to society.
4. A crossed out God - an arbitration mechanism without a deity (presence of power).

Caution should be exercised when handling Latour’s discourses, in that his critique of modernism and also post-modernism is not a wholesome rejection of these ideas because he recognizes values that must be retained. His caution to the anti-modern philosophy must be read carefully lest the indigenous knowledge systems paradigm be lumped in the camp of the anti-modern. IKS does not aspire to replace Western
based knowledge systems, but wishes to interface with them. IKS scholars should avoid the tradition of the Africanist school that succeeded in creating mirror images of the colonial historiography. The Africanist historiography rejected the colonial history that celebrated Europeans as actors in history and replaced them with African centred activities with Africans as the heroes (Temu and Swai 1981). The interfacing of IKS with other knowledge system seeks a mutual respect and reciprocal recognition of knowledge systems.

The aim of the critique by Latour was to find a third space, where the separation between human and machines, society and nature come back together in a new paradigm. Indigenous Knowledge systems offer this holistic conception of knowledge.

A leading African scholar, Odora Hoppers (2002), in her stringent critique of modernism summarises the effects it wrought among the subjugated as follows:

- Epistemological disenfranchisement,
- Imposition of a Western paradigm that is cruel, blind and has no place for defeated knowledges or alternative theories of knowledge,
- Absence of cognizance and moral sensitivity to local conditions,
- Cognitive injustice,
- Condescending and paternalist attitudes,
- Production of paradigmatic opposites: traditional vs modern; oral vs written and printed; literate vs illiterate; rural and agrarian vs urban and industrialized,
- Trivialization of the entire mode of life and the spiritual framework of the millions of people.

In his speech on ‘Impossibilities of speaking of Africa’, Köhler offers new possibilities of constructing future relations between Europe and Africa but much more of constructing a common future that is nuanced, pluralistic and mutually benefiting to both knowledge systems. This is the way he phrases the possibility, it is a construct to which this paper aspires:

Can we really imagine an African modernity that is defined not as the culmination of a linear development towards technology-based prosperity measured by GDP – the way in which we in the West understand prosperity – but as something pluralistic, evolving in multiple directions, a juxtaposition of the local and the global, of tradition and innovation – in short, an African modernity sui generis? And then, to go further still, could that perhaps give rise to a concept of development that no longer divides the world into ‘developing countries’ and ‘developed countries’ but that shows clearly that all societies need to develop and be transformed, regardless of whether they are in the North or the South,
the East or the West? A new concept of development of this kind oriented to the huge transformation that resource scarcity and climate change are imposing on us all, could then also transform our view of Europe’s relationship with Africa. We could have a relationship that, for all the existing asymmetries, would facilitate a partnership of equals, free of paternalism and condescension. The question would no longer be just ‘What can Africa learn from the Europeans?’ but also ‘What can Europe learn from the Africans?’ (Köhler 2014)

Speaking about an African modernity *sui generis*, meaning a modernity of a special kind, an African modernity based on Africa’s peculiarity and its contribution to the world. It is important that we reject from the beginning the definition of modernity as a form of social life determined by a unitary Weberian rationality. Instead, we agree with de Jong (2007) that modernity is a hegemonic discourse that labels some privileged societies as modern, while others are represented as fundamentally stuck in tradition. It is this regard that it is important to make the point made by President Mbeki in 2002 about the invisibility of the African people in history. While modern societies are defined by history, traditional societies are deprived of their past. What is crucial to understand is that while the modern claims to have liberated society from clutches of tradition, it continues to invent tradition, to depend on it and to define itself in relation to it. The traditional consequently is part of the modern (Seleti 2014).

**Setting the Knowledge Agenda and the Value of IKS to Higher Education**

This paper offers an opportunity to position IKS as a knowledge domain that can help bring into academia pluralistic approaches, evolving in multiple directions, a juxtaposition of the local and the global, of tradition and innovation – in short, an African modernity *sui generis*? In response to the challenge highlighted in the HESA presentation to the Higher Education Portfolio Committee in the South African Parliament, namely; the largely ignored epistemological and ontological issues associated with learning and teaching, curriculum development and pedagogical practice, IKS may suggest some of the opportunities to bridge the gap.

**Humanising the dominant Western knowledge systems**

This paper’s call for the interfacing of IKS with other knowledge systems is based on the conviction that it can contribute to the humanizing of the Western knowledge systems. I will shortly show that the interfacing of IKS with other knowledge systems
is a right step towards the realization of cognitive justice (Shivji 2002). The integration of IKS in higher education will promote epistemic pluralism which can only be beneficial to higher education. The holistic approach to knowledge production and dissemination embedded in IKS has the potential of placing the human needs at the core of higher education.

In an earlier paper on the value of IKS in the 21st Century, I made a link between Ubuntu and knowledge generation (Seleti 2013). The paper showed that in African societies, relationships between people hold pride of place and are best captured by the African concept of Ubuntu. Ubuntu is the container of the ntu; it carries the life force of ntu. It carries, depicts, gives, and imparts the life force of ntu. To have Ubuntu is to be caring, generous, hospitable and compassionate to other humans. It is always about how you relate to others. Harmony, friendliness and community are the greatest social good and are celebrated and rewarded in society. On the other hand, anger, resentment, revenge and success through aggressive competition corrode this social good and are to be discouraged as they impart negative energy (Odora Hoppers 2002). Ubuntu does not seek to conquer or debilitate nature, but rather stresses the interrelatedness and interdependence of all phenomena. In this context knowledge production, exploitation and dissemination is about building the collective and communal well-being. Anything that contradicts and works against the well-being of society may be considered as a negative force, probably the same as witchcraft. Ubuntu does not seek mastery, certainty and hegemony but rather seeks harmony, consensus and dignity for all. The outcomes of knowledge production, exploitation and dissemination should therefore result in a harmonious society based on consensus and providing dignity for all. Knowledge production underpinned by this world view strives to create harmony, friendship and interconnectedness between people and also between different knowledge systems.

It can be argued that in South Africa the knowledge agenda, as reflected by the science curricula and qualifications, continues to mirror Western knowledge systems at the cost of excluding and marginalizing local or indigenous knowledge. This paper maintains that Africa requires a significant mind-shift to be in a position to challenge the setting of our knowledge agenda simply in terms of our capacity to be integrated into the global knowledge economy. Higher education in South Africa should not be
content with a low threshold of acting as merely a supplementary knowledge producer to the global knowledge system. Africa’s knowledge needs must be determined by Africans and produced within the African world views and dreams. African universities should reconsider the role of playing second fiddle to Western institutions of knowledge generation.

**Complimentary knowledge agenda**

The interfacing of IKS in higher education will begin to answer questions on how South Africa’s can enter the global knowledge system on its terms rather than in terms that are laid down by those of the North. IKS will assist higher education to assume the responsibility for generating knowledge about its context in its quest for a complimentary knowledge system. The rebirth of the postcolonial societies in Africa requires a relevant, dynamic and evolving knowledge agenda which would lead to the inscription of an African modernity driven by an African knowledge agenda in which IKS would assist in expanding the current ontological and epistemological base of higher education in South Africa. It will be important for South African universities and other knowledge intensive institutions in these postcolonial contexts to begin the processes of re-imagining their role in the making of an African Modernity, *sui generis* as depicted by Köhler cited above.

**Renewal and Rebirth in Academia**

In the new ecosystem of higher education it might be useful to determine what might be the curriculum project of these universities in these contexts? As Africans, we are seeking our own programmes of renewal and rebirth by using indigenous knowledge systems for physical, spiritual, psychological, socio-economic and political well-being. Here we are not concerned with what knowledge is, which is essentially a metaphysical question, rather the concern should be with the benefit that society can derive from knowing. Although the utilitarian end of Knowledge especially the benefit to the whole of humanity is important, which is this paper’s emphasis, we do not play down the importance the normative and intrinsic value of knowledge to society. Nonetheless, it should be appreciated that Science, engineering and technology, which are products of knowledge like IKS should aim at the betterment of life for all, at all costs.
The interfacing of IKS with other knowledge systems in higher education will significantly lead to the pluralistic approaches in the programme offering. One of the main contributions of IKS is that it will proffer an epistemology of hope to humankind that acknowledges cognitive flexibility. It should be stressed that the value of IKS to the modern Western knowledge systems is that IKS promotes the acceptance of multiple truths or knowledges and rejects the projection of Western modern knowledge as the only universal truth (Odora Hoppers 2011).

**Promotion of Multiple mental and pedagogical Representations**

It is also useful to argue that the interfacing of IKS in higher education will promote the use of multiple mental and pedagogical representations of the reality that will not certainly culminate in one truth but will give result to multiple truths. At the centre of this approach is the promotion of multiple alternative interpretations when they are allowed to interact would translate into multiple interconnectedness between knowledge systems, all to the benefit of humankind. By integrating IKS into South African education it will become a humanizing agent that will complement the cosmopolitanism of universities. The value of IKS is that it takes cognizance of moral sensitivity to local conditions. It also calls for a rethinking of the modern science and technology through enlargement by integration of IKS in the twenty first century (Odora Hoppers 2011).

**Contribution of IKS to Community Engagement Missions**

Another dimension of the value of IKS to higher education is in the area of providing a bridgehead for community engagement mission of the universities. Most universities’ mission statements identify community service as part of the universally recognised functions of a modern university, namely teaching, research and community engagement. Gerda Bender has questioned whether higher education institutions in South Africa are committed to curricular community engagement and whether these higher education institutions have changed from a philanthropic or community service orientation to a scholarship of engagement. (Bender 2007) In as
much as Academic Service Learning (ASL) has been singled out as an appropriate educational philosophy, which is a vehicle for change in curriculum-related community engagement at higher education institutions in South Africa, the extent of its embeddedness in academic cultures and programmes as a vehicle for change is still circumscribed by its approach that is still anchored on philanthropic and community service discourses. In this regard IKS offers a marvellous platform for community engagement from a perspective of scholarship of engagement. IKS led community engagement recognises the wealth of knowledge assets embedded in those communities and seeks ways of integrating such in the main stream of education. It seeks to make the communities as the laboratories for both theoretical and experiential knowledge generation.

The Department of Science and Technology working together with the South African Qualification Authority (SAQA), the Universities of North West (Maheking), Venda and Limpopo have introduced a Bachelor of indigenous knowledge systems and made ASL an integral part of the qualification. By institutionalising ASL through a final year programme of practical work based in communities, the BIKS has transformed the relations of knowledge production where the barefoot organic intellectuals in the village become professors and supervisors of the students. These barefoot professors together with the students design research projects based on the communities’ needs. In this project the university locates its sites of knowledge production within the community, the university become part of the village. The relevance of higher education to the communities cannot be more apparent than this. The programme also allows the university professors to interact with their students in the field and hence this bridges the theoretical with the experiential. Through offering the BIKS these universities’ research, teaching and community engagement programmes will have institutionalised ASL and made the curriculum responsive to the community needs.

IKS and the Creation of inter-disciplinary discursive spaces

Another way of valuation of IKS to higher education is that it contributes to creating discursive spaces within the academy that transcend disciplinary boundaries, where
the commonality underpinning the collective is a shared identity as professional educators, rather than the separate disciplinary identities that more often underpin working groups of academics. Cecelia Jacobs (2008) emphasises the importance of creating trans-disciplinary discursive spaces within higher education that would enable academics to reconfigure how they construct their roles and identities within higher education institutions. Everard Weber summarises the significant findings of Cecilia Jacobs’ study as follows:

The study shows that three factors and associated processes, namely transdisciplinary engagement, collaborative interactions, and academic identity construction, are key in the change process. The findings further suggest that discursive spaces in higher education need to provide both ‘iziko’ (a physical space around which ‘academic’ communities can gather) and ‘eziko’ (processes through which ‘academic’ communities provide nourishment, sustenance and shared learning through dialogue with one another). ‘Eziko’ characterises the spirit of connectedness, humility, and respect that should underpin the interaction of diverse and often dissonant disciplinary perspectives that occur when academics across disciplines make collective meaning of change (Weber 2008).

Two examples relating to the implementation of the IKS programme at Walter Sisulu and KwaZulu-Natal universities present the value of IKS in the creation of the discursive spaces and meeting the criteria enunciated in the above quotation. The University of KwaZulu-Natal is the first university in South Africa to dedicate its financial resources to the development of an IKS portfolio across the entire university. Owing to the priority placed on the initiative Professor Hassan Kaya was employed in 2012 to drive the development and coordinate IKS curricula activities in all the schools. The strategy adopted was the search for IKS champions in each school with the responsibility of mobilising colleagues and coordinating academic inputs at the school level. With the support of the Deputy Vice Chancellors for Research development, Professor Nelson Ijumba and Professor RenukaVittal, responsible for teaching and learning, they have created an annual forum for the inter-disciplinary engagement. Better still, the champions from the schools constituted an inter-disciplinary steering committee to develop IKS based curriculum for post graduate studies and teaching and learning programmes. I was invited to participate in the development of the first Institutional IKS policy in the country. There is no doubt that the University of KwaZulu-Natal has succeeded to mobilise towards the creation of sustainable ‘iziko’ that cut across disciplinary boundaries, and for academics to become the architects of ‘eziko’ which enable them to explore
change collectively and individually through the development of shared meaning. The success of this approach validated by the fact in March 2014, the University KwaZulu-Natal Council approved the institutional IKS policy making it the first university in sub-Sahara Africa, if not globally, to have an institutional IKS that position IKS as one of the strategic flagships.

Professor Nomalungelo Goduka, the South African Research Chair in Systemising Indigenous Knowledge Systems at the Walter Sisulu University, has taken the creation of discursive spaces of Eziko and Iziko to an inter-university level. She has mobilised scholars from South African universities to write an anthology with the following purpose:

The purpose of EzikosiPhekasiSophula Vol.1 is to create spaces for indigenous scholars/researchers to re-claim, re-discover and restore indigenous identities, voices, realities and knowledge systems that were part of the colonizing agenda. Eziko is neither tied to race, ethnicity nor a specific geographical location. It is about articulating spaces/processes rooted in specific African/indigenous worldviews, and philosophical assumptions for collective and communal affirmation and validation of ethnic/cultural identities, voices and new knowledge co-created around eZiko (Goduka 2013).

Goduka has brought these scholars to produce Volume I of the anthology mainly intended for university students in natural, social sciences, and humanities working with indigenous knowledge for learning and conducting culturally sensitive research. The three retreats hitherto and the anthology aim therefore to create a discursive space for transdisciplinary engagement, collaborative interactions, and academic identity construction.

Lifting the bar to complexity theories of education

In contrast to the reductionist thinking this paper has identified IKS with complexity theories of knowledge by indication that IK as a system is an integrated whole, whose properties cannot be reduced to the sum of its parts. Indigenous peoples have grown to understand that all phenomena are interrelated yet independent and that each system forms part of a larger system, yet each has its own individual properties. This is the idea of systems being nested or arranged in a hierarchy. IKS
is thus an embedded knowledge, interdisciplinary that celebrates the interrelatedness of all knowledge including things living and inanimate.

The idea of a knowledge ecosystems system can also be a goal towards which we can plan and work, recognising the fragmentation that exists, while espousing the ideal of a whole in which component parts interact with one another in a purposeful coordinated way. The concept of a knowledge systems ecosystem would capture diversity and complexity, and the idea of interaction between the system (or organism in ecological terms) and its environment. A knowledge ecosystem is one in which the sub-systems are inter-linked and interdependent, where there is continuous co-evolution, where change is systemic and where complementarities encourages niches for different roles and functions (Nardi and O'Day 1999). It is also characterised by interactions of “actors and organisations linked by flows of resources and information” (Mars, Bronstein and Lusch 2012: p.277).

This paper has thus called for reciprocity and co-existence - between knowledge systems. It is hoped that this paper has highlighted the need for building fraternity between knowledge systems at the cognitive level. The value of this approach will culminate in an inclusive citizenship of knowledge characterized by cognitive justice - the right of different knowledges to survive to the benefit of humankind.

IKS and Science Communication

IKS provides an opportunity to embed local and indigenous knowledge in the dominant Western paradigms and creates multidisciplinary dialogue on public engagement on science. This approach will ensure that local and indigenous knowledge from the grassroots’ level is mainstreamed while on the other hand, providing structures for the local absorption and understanding of global science local communities. It is pleasing to note that although Western science rejects local knowledge that develops differently from knowledge applying scientific methods, it does now acknowledge some of indigenous knowledge components, such as knowledge of plants and traditional medicines. Indigenous knowledge adds another layer to the complexity of science communication.
Despite its different epistemology and characteristics, indigenous knowledge may promote the public's understanding of science and the holistic-systemic view applied. In this context, the weaving and packaging of content is directed to benefit all of society as it engages all ages from parents to children as learners; from workers as active citizenry to scientist as purveyors of knowledge; from the local and indigenous communities to the private sector; from nanotechnology and biotechnology to IKS, and from the laboratories to the science centers, expos, science fests, media, and so on. Clearly, this is a complex process which will require utilisation of communication science and communication technology, and not withstanding indigenous approaches and ethics underpinning public engagements and understanding of science.

Over the years Science Communication at the DST has taken the necessary steps of interfacing IKS with the mainstream science. The Youth into Science Policy that has promoted the National Science Week provided a partnership on the inclusion of IKS a building block of the National Science Week. There is no doubt that many parents, learners, educationist and scientist were challenged by the integration of IKS in the National Science Week. In addition to the participation of IKS as part of the National Science the National Indigenous Knowledge Systems office launched the Annual IKS expos. The expos targeted the knowledge holders and practitioners from indigenous and local communities to display their IKS products. Hitherto Department hosted four provincial IKS Expos in Gauteng, Limpopo, KwaZulu-Natal and in North West. In 2014 the DST together with the Botswana government organised the first regional SADC IKS Expo and Policy Workshop in Gaborone. It is hoped that the quest for effective science communication would result into a global IKS Expos to heighten the global nature of IKS as part of the global science.

**Promotion of Cognitive Justice**

The notion that different forms of knowledge or their knowers should be treated as equal is a provocative proposal in terms of the method of Science that has dominated higher education in South Africa. The proposition advance here is that by interfacing IKS in higher education dominated by Western science we will be promoting cognitive justice. It will be a step towards building a fraternity between knowledge systems at the cognitive level. Higher education in South African needs
to accord the right of different knowledges to survive to the benefit of humankind. Cognitive justice asserts the diversity of knowledges and the equality of knowers. Visvanathan, a leading architect of the concept of cognitive justice argues that the impact of post-Second World War science on third world countries should be characterised as the museumisation of indigenous knowledge and scientific endeavour. “It entails the relegation of indigenous knowledge forms as obsolete artefact, useful only for historical display” (Shiv 1999).

Visvanathan (1999) argues that romantic or revivalist ideas of a return to indigenous and traditional knowledge and solutions are unrealistic in the “political and economic onslaught of globalisation”. The solution, he argues, lies in a political economy and cosmology based on the following principles of cognitive justice:

- All forms of knowledge are valid and should co-exist in a dialogic relationship to each other.
- Cognitive justice implies the strengthening of the 'voice' of the defeated and marginalised.
- Traditional knowledges and technologies should not be 'museumized'.
- Every citizen is a scientist. Each layperson is an expert.
- Science should help the common man/woman.
- All competing sciences should be brought together into a positive heuristic for dialogue. (Velden 2006)

The confrontation of Science by traditional, indigenous, and local knowledges will result in more comprehensive dialogues on sustainable and peaceful development. Cognitive justice offers us the option for a pluralist and inclusive knowledge base from which we can draw our plans for building a better world. The advent of IKS will contribute to the emancipation of the African voice in academia where every citizen is a scientist and each layperson is an expert. The interfacing of IKS not only does it speak to enhancing the value of science, but also promotes the transformation of the knowledge sector from clutches of Western situated knowledge.

**Conclusions**

The paper states the case for the value-add of indigenous knowledge systems to the higher education sector in South Africa. It postulates the post-colonial knowledge agenda of South Africa has not taken the contribution of indigenous knowledge seriously. The paper argues that notwithstanding the academic merits of the value of IKS to higher education, very few South African universities have invested their
own resources in IKS teaching, research and community engagement. The paper also notes that the knowledge governance level only one South African university has an institutional IKS policy that position IKS as part of the strategic priorities of the institution. The paper communicates the value of IKS from multiple perspectives beginning with the political imperatives of redress by valuing the contribution of IKS as a knowledge domain to cognitive justice. The paper is premised on the understanding that to date, higher education reform has not been transformative. Nor has that process developed a solid foundation for transformation. In looking for agency for change the paper notes that neither the academic staff nor students have demanded that higher education content and process be assessed critically or proposed new directions. In assessing the value of IKS to higher education, the dilemma is that it has not been led by academia but rather it was kick-started by the political elites and policy makers who are far removed from the terrain where the change is needed.

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