Home | About Us | RSS | Subscribe | Support Us | User Login | Search

At Issue Ezine

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At Issue **EZINE**

At Issue **ezine**

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- Purpose
- Editorial policy

Looking ahead . . .

Vol. 18 - Land Rights

Looking back . . .

Ezine issues:

- Vol. 1 EDUCATION
- **■** Vol. 2 CORRUPTION
- Vol. 3 OIL IN AFRICA Vol. 4 LAND REFORM
- Vol. 5 SMALL ARMS ■ Vol. 6 CHINA IN AFRICA
- Vol. 7 ECONOMIC EMPOWER-

MENT OF AFRICAN WOMEN

- Vol. 8 SA IN AFRICA
- Vol. 9 CLIMATE CHANGE
- Vol. 10 DARFUR
- Vol. 11 DRC IN AFRICA Vol. 12 LIBERATION OF
- SOUTHERN AFRICA
- Vol. 13 LARGE CITIES
- Vol. 14 GOVERNANCE AND ETHNICITY IN AFRICA
- Vol. 15 MARGINALIZATION IN AFRICA
- Vol. 16 GENDER AND GENDER EQUALITY IN SUB-

SAHARAN AFRICA

Forum articles: ■ At Issue Forum No. 1 (February-June 2005)

EDUCATION:

Africa and the UN Millennium **Development Goals**

EDITORIAL / EDUCATION IN AFRICA: Colonialism and the Millennium Development Goals

By Hugh McCullum It is important to question a few realities as all 53 of Africa's countries search for Universal Primary Education (UPE) by 2015 and ask why it will likely be closer to 2050 before this target is achieved

EDUCATION FOR PEACE IN KENYA: Indigenous peace traditions and the Millenium Development Goals

By Timothy Gachanga Since peace is a prerequisite for the realization of the MDGs by the year 2015, it is important to re-examine and reclaim traditional African approaches to peace building in schools. Though currently neglected or underused, traditional approaches prove simple, effective, constructive and in keeping with the norms of African communities.

REPORT CARD: Botswana a model for Africa?

By Rodrick Mukumbira Botswana has done much to improve the education of its citizens, not only in areas stipulated by the Millennium Development Goals, but more broadly, including areas such as education for people with special needs, literacy in the workplace and alternative methods of delivery. Botswana has been blessed with diamond revenue and has used it wisely for education. But there is still room for improvement.

EDUCATION FOR LIFE: Statistics and reality for women in Lesotho

By Craig Hincks How does the small southern Africa nation of Lesotho measure up to the UN Millennium Development Goals for education? This article suggests that the framework for success in education is there, especially in relation to universality and the education of girls. However, certain social, legal and economic realities limit progress.

LACK OF INTEREST IN MATHEMATICS AND SCIENCE AMONG AFRICAN LEARNERS IN SOUTH AFRICA

By Chris Kanyane This study focusses on weaknesses in the teaching of maths and science in the South African education system. Chris Kanyane, Senior Information Specialist at Tshwane University of Technology, suggests the problem was inherited from the apartheid era and needs to be addressed particularly in township and rural schools if South Africa is to be the engine for the African Renaissance.

EDUCATION IN AFRICA: Colonialism and the Millennium Development Goals

by Hugh McCullum

Education is the great engine of personal development. It is through education that the daughter of a peasant can become a doctor, that the son of a mineworker, can become the head of the mine, that the child of farm workers can become the president of a great nation. Nelson Mandela

Education is a universal right, a prerequisite for democracy, a path out of material and spiritual poverty. Millennium Development Goals

We all know how much remains to be done to place national education at the service of the new society that is being created. We all know that such an undertaking, since it is not the result of a merely mechanical act, implies a radical transformation in the system of colonial education, and without this the whole plan for a new society could be frustrated. This is a fundamental theme. Paulo Freire, Pedagogy in Process: The Letters to Guinea Bissau, 1978

Menu:

- Back to top (issue contents)
- Email this article to a friend
- Printable version
- Bibliography & links

Forum Discussion:

I clicked 'yes' (on the Minipoll) before reading this editorial, although I wanted to add the word 'free' UPE.

Having taught in a girls' secondary boarding school in Zambia, I fully agree with McCullum and Freire — on these principles



Some educators, Africanists and analysts could be forgiven if they heave a sigh of frustration: 'Not another diatribe blaming Africa's woes on colonialism... Not another bleak criticism of African failures... Not another impossible dream... Paulo Freire revisited with his visions of revolution and socialism.'

Yet, dear reader, it is important to question a few realities as all 53 of Africa's countries search for Universal Primary Education (UPE) by 2015 and ask why it will likely be closer to 2050 before this target is achieved. The goal is critical not only for



Paulo Freire at UNESCO headquarters in 1986. UNESCO / Michel Claude

people to achieve the dignity and equality that Nelson Mandela so eloquently advocates and for the path away from poverty that the Millennium Goals seek to achieve, but also for the radical transformation envisaged in the New Africa.

Who can argue against UPE or even against a decade to achieve it? Africa has more than 40 million children, almost half the school-age child population, receiving no schooling. Two-thirds of these are girls. Promises have been made and, sadly, broken. The ideal of UPE has drawn an enormous influx of children into schools, but what kind of schools? There is no money for the most minimal universality. There is such a shortage of teachers that existing schools are in acute crisis. Many of those teaching in classrooms in 2005 are woefully unqualified. Curricula largely still follow the colonial model, long since discarded by the North because it alienates students and stifles critical and creative thinking. Indeed, the goals may well be causing more problems they would solve.

'Sadly much of African education ... is still following adaptations of this colonial mindset, as well as failing to keep up with modern pedagogy, indigenous learning and teaching resources.'

As Freire noted in his letters about developing education (Guinea-Bissau, Tanzania, Zambia, etc.), most African countries simply adapted, at independence, the colonial system already in place, usually based on the teaching of various churches. Sadly much of African education, with far less money, material and personnel resources, is still following adaptations of this colonial mindset, as well as failing to keep up with modern pedagogy, indigenous learning and teaching resources.



JUNESCO

educator (1921-1997) might well have said, is a great idea but what about the process, the plan, the coherence needed to achieve the goal, beginning with his or her first classroom, even if it is under a baobab tree?

Universal Primary Education, the late Brazilian

Freire was widely known for his use of the term 'conscientization' in education, a process by which 'both teacher and pupils simultaneously become knowing subjects, brought together by the object they are knowing.' In his best-known work, *Pedagogy of the Oppressed*, Freire wrote that grassroots literacy campaigns were essential to national education. People simply were not literate enough to deal with English (or French or Portuguese or Afrikaans) curricula with its Eurocentricity to educate themselves for the 20th, to say nothing of the 21st, century.

Readers familiar with Freire's basic theories can identify the same insistence throughout his educational life as 'unity between theory and practice, mental and manual work, past and present experience.' He believed that education should be part of the struggle against the colonial past and its on-going legacy today, globalization and neo-colonialism, in order that people might learn to speak 'their own word.'

of education for Africa (and anywhere else). And it is our responsibility, along with theirs, to help make UPE free, along with adequately trained and paid teachers, appropriate buildings and equipment, and community involvement in curriculum so that all children will be encouraged to receive a basic education. HIV/AIDS presents more urgency and opportunity for creative ways to educate in the widest terms. — Eileen Wttewaall, Salt Spring Island, BC, Canada

In Malawi, since free public education was introduced recently, primary school classrooms routinely exceed 100 children, with a single teacher who may have an 8th-grade education and whose spoken English is usually nothing like native English. Therefore, when planning schools, there must be thought given to class sizes, materials and books and, most especially, a school lunch for needy children and — dream on — a basic-treatment clinic for them and their families.

— Abby Pratt, Dickler Family Foundation, New York, NY, USA

I believe that the African continent is plagued with many outside economic leeches that promote the status quo and keep the continent unorganized and in relative chaos because it suits their economic gain. These leeches need to pay greater returns for their profits, past, present and future.

William A Grey Mclaren, Sunvalley, CA, USA

In South Africa it is sad that the government intends to reduce the student population at universities by implementing stringent admission criteria. The Sunday newspaper, City Press, reports on a government proposal that identified repeat learners in universities, who fail their first year of study, as one of the major drains on financial expenditure by institutions of higher learning. It calls on universities not to "automatically enrol" repeaters. The proposal, which has been circulated to all vice-chancellors, proposes that "growth constraints" and "admission capping" be introduced. According to the proposal these mechanisms would involve universities making sure that students who fail are not permitted to re-register automatically and that larger proportion of their students complete their qualifications in the shortest possible time.

The government is clearly obviating the appallingly poor conditions in high schools. It should instead propose that universities set up foundation programmes for under-prepared students.

— Chris Kanyane, Tshwane, South Africa

against the colonial past and its on-going legacy today, globalization and neo-colonism.'

Freire explored the many dimensions of critical consciousness which he believed essential for education of the masses, especially the poor who had a badly planned curricula, regardless of which system they followed, which produced only elites and alienated most people from their culture, language and knowledge. He believed in multi-cultural education with the whole world as his classroom.

He was a man of praxis, he was incredibly industrious and committed to the desperately poor, be they urban or rural. While living in exile in Geneva, because his language was Portuguese, he communicated with educators in Guinea-Bissau in a series of letters that records in a conversational tone his belief that dialogue was almost a synonym for 'education'. His work in Africa records in measured and unhurried stages, the evolution of 'a pedagogic partnership' to assist the educators of new-born nations to get beyond colonialism.

Their common purpose was to develop a literacy programme, followed by an educational process for newly liberated people. The letters and processes extend to several new nations (especially literate Tanzania) – all sharing the heritage of many centuries of European domination.

Freire was also a revolutionary in education and he restated many times that any group of 'outside educators' who had grown up and been educated in a privileged situation where teachers are educated by former European systems, curricula and processes and those elites



Adult literacy class in Dar es Salaam, Tanzania.

UNESCO / Arthur Gillette

who travel to Europe, North America and overseas to continue an elite education, are distanced from the people they might, hopefully, return home to teach. Indeed, the elitism of European class education has failed virtually everywhere in today's Africa.

Freire was often described as a gentle, affectionate human being who believed that education was in dire need of revolution, not just reform and adjustment. He was described as being motivated by love – love of education and people. He spoke often of his close association with Tanzania and Mwalimu Julius Nyerere and their refusal to accept packaged or prefabricated solutions, avoiding every kind of cultural invasion, whether open or cleverly hidden.

'He spoke often of his close association with Tanzania and Mwalimu Julius Nyerere and their refusal to accept packaged or prefabricated solutions, avoiding every kind of cultural invasion.'

If there was anything Freire learned it was that those who are called to teach must first learn how to continue learning when they begin to teach. In learning with students, teachers, workers, peasants, Freire and his colleagues could learn with them while they taught: 'Learning first in order to continue learning in order to teach.'



School children interacting at Mazimbu, Tanzania.

UNESCO / A. Camacho Urtiaga

UPE does sound like the right direction. But what is the long-term approach that will enable every child to learn from the beginning of the first day in a classroom to be a useful, creative citizen in a diverse and culturally vibrant Africa?

Primary education is just a beginning but, at the current slow rates, many will never catch up. The UN monitoring report last year found that 22 countries in sub-Saharan Africa had low enrolments, highly unequal gender ratios, widespread illiteracy and low educational quality leading to high dropouts with many pupils never completing primary

school.

Thirty years ago Freire recognized that we start with literacy, we revolutionize education away from foreign systems developed by and for elites and we teach-learn and teach. Education must lie at the core of Africa's development, not just be a meagre extra in budgets swollen by arms purchases and corruption.

'Thirty years ago Freire recognized that we start with literacy, we revolutionize education away from foreign systems developed by and for elites and we teach-learn and teach.'

Consider this:

- In South America, an average child can expect to attend 12 years of formal education; in many parts of Africa, it is four years
- In four decades of independence from colonialism, education systems in Africa
 are marked by inadequate teaching, lack of resources, like basic textbooks,
 chalkboards and curricula, and teaching methods following the old foreign
 curricula
- The average global spending per child on primary education is US\$629; in Africa it is US\$48
- Of the 42 million primary-aged children not in school, 62 percent are girls
- Where schools once coped with 50 students per primary school teacher, now it is more like 100 students
- Teachers are leaving their profession in droves, many of them succumbing to HIV/AIDS, others unable to live on their meagre salaries.

There is much more, but these stark facts mask an even more important fact. While governments fumble to meet the minimal goals of education in Africa and demand massive funding, the broader debate on education in Africa is stifled.

'While governments fumble to meet the minimal goals of education in Africa and demand massive funding, the broader debate on education in Africa is stifled.'

That broader discussion must include, say educators across the continent, 10 grossly neglected areas that African leaders have to address if Universal Primary Education is *ever* to be achieved, let alone by the target date of 2015 set by the UN Millennium Goals.

- 1. 'Education is the only anti-HIV/AIDS vaccine there is,' observes former South African Education Minister Kader Asma. So many children are forced to abandon school to care for parents, siblings or orphaned relatives. Yet AIDS advocates insist that the virus and disease actually are reduced with increased education. Less schooling means more poverty, more poverty means increased vulnerability to HIV/AIDS. The more girls are educated, the longer they are likely to refrain from sexual activity and require their partners to practice safe sex. The continent has nearly 13 million AIDS orphans. The only way they can get education is through a wide range of government interventions. The pandemic is also reducing the number of teachers. In many countries the equivalent of two-thirds of newly trained teachers are lost every year. Governments need to provide for more testing, medical support including anti-retrovirals, prevention programmes, counseling and support groups.
- 2. Africa needs to radically improve the quality and quantity of its teachers. Africa has about 2.5 million teachers and a three percent increase will be needed in the next 10 years. This requires more and improved teachers' colleges. Under- or unqualified teachers must be either upgraded or retired, replacing them with newer and better qualified teachers. In-service and upgrading must be always available. To be effective, teachers need the support of principals, the broader education system, parents, communities and education ministries.
- 3. Improving quality requires a focus on outcomes. Recent studies conclude that about half the pupils in Africa have not achieved the minimum skill level defined by the authorities in each country. In some countries less than a third of children at the end of primary school have the skills necessary to perform at the secondary level. In some countries where teaching continued in a colonial language, three decades later three-quarters of students were functionally

illiterate after seven years of schooling. Trial programmes that teach students to read first in their own language and then make a transition to the European language in three or four years dramatically improved literacy.

- 4. Africa needs more graduates trained in maths, science and information and communication technology. Primary school teachers need to make learning in these subjects interesting, relevant and fun.
- 5. Corruption is rampant in many education systems. It robs school systems of scarce funds. In some countries school principals have been accused of bribery, favouritism and direct stealing from schools. Irregular admissions, private coaching during class times for pay, collusion, impersonation and other forms of cheating during exams are commonplace in some countries.
- 6. Education institutions are producing inadequate numbers of skilled personnel, according to Nepad's draft document on education in 2004. Education must, therefore, occur in many forms: vocational training, incentives to train staff in parastatals and companies, and apprenticeships. There is a need to fund adult literacy and skills training.



UNESCO / Inez Forbes

- 7. While primary education provides a foundation, secondary education is critical in supplying
 - **qualified teachers and job skills.** According to surveys, only 25 percent of African primary school pupils make it to high school and just 10 percent of those ever graduate. This reflects a shortage of schools and teachers at the secondary level.
- 8. Teaching more than the basics of reading, writing and arithmetic is one of the most critical areas, one that would find Freire's deep approval in the reform of curricula. Teaching by rote is still the most common form of instruction. There is little room for discussion or asking questions. Students do not learn how to be problem solvers. Culture is critical in drafting new curricula, as is learning how to learn.
- 9. Teaching is among the lowest paid professions in Africa. As has been pointed out above, Africa needs many more qualified teachers but countries are failing to attract the best people because teaching is among the lowest paid professions on the continent. Salaries vary greatly but range in Malawi, for example, from US\$27 to US\$127-a-month and in Tanzania from US\$70 to US\$97. African teachers often do not get paid for months and the profession has lost much of the status it once held in many countries. The morale is low so many graduates of secondary school refuse to consider the profession and educated young people look for challenging employment in other fields and other countries.
- 10. Gross gender imbalance in schools is one of Africa's greatest injustices. Boosting female education reduces child and maternal mortality and improves family incomes and overall economic growth. As noted above uneducated girls are more vulnerable to HIV/AIDS, sexual exploitation and trafficking. While the efforts to achieve UPE are being squandered in many cases, the UN target of gender balance at the primary and secondary levels by 2005 has been seriously neglected. Only 63 percent of African school-age girls attend primary school and only 28 percent attend secondary school. A UNESCO study says that 'while governments realized girls' education is important, their policies are inadequate.'

'When creating an education system you need to look at what African societies are today and what we want them to be tomorrow,' says Mamadou Ndoye, Executive Director of the Association for Development of Education in Africa (ADEA).

Giving the last word to Paulo Freire, we return to the need, perhaps above all else, for Africa to find its own educational priorities.

'The deeper I get into the [Guinean] experience, the more important the problem [indigenization and language] becomes. It demands different responses in different circumstances. The fact is that language is inevitably one of the major preoccupations of

a society which, liberating itself from colonialism and refusing to be drawn into neocolonialism, searches for its own re-creation. In the struggle to re-create a society, the reconquest by the people of their own word becomes a fundamental factor.'

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This editorial is the first in a series of articles on Education in Africa to appear each month in At Issue Ezine.

EDUCATION FOR PEACE IN KENYA: Indigenous peace traditions and the Millennium Development Goals

by Timothy Gachanga

Introduction

In recent years, there has been an increase in violence in the learning institutions of Kenya, from the primary school level right through university. In one incident this year, for example, more than 800 primary school pupils stormed out of their classrooms and started stoning some parents for protesting against the reinstatement of their head teacher. One of the parents was seriously injured (*Daily Nation*, January 22, 2005). In another incident in June 2004, over 100 secondary schools were closed down due to violent protests that caused extensive damage to property.

In the aftermath of these kinds of problems, attention has focused on the role teachers play in promoting peace in schools. Indeed, for peace to prevail and be sustained in learning institutions, teachers *need* to play a significant role.

Studies have shown that, collectively, teachers have the potential to influence millions of children during their professional careers. The Ministry of Education information handbook *Education in Kenya* (1987:64) observes that the teacher is in a position to influence the behaviour of children and to enhance the



Kenyan school children at an educational puppet show.

© 1996 Njamburi/Cabak ELS, Courtesy of Photoshare

development of a sense of national belief and way of life. Ansu Datta (1984:115-116) notes that at the primary and secondary levels the teacher is a disciplinarian, a parent substitute, a judge, a confidant and above all a mediator of learning who guides children to achieve certification in education. This is an important point in that it concerns the strengthening of values that could promote peaceful coexistence in schools. Bogonko (1992: 171) considers this as the reason why teachers in contemporary society are regarded as the most important socializing agents of the child. The Kamunge Report (1988:59) sees teachers as the surest media through which schools can foster a sense of nationhood and serve as agents of social and economic change at both the individual and social levels.

Along with many other African countries, Kenya is committed to achieving the UN Millennium Development Goals (MDGs) by 2015. However, because her education system emphasizes competition and the passing of exams and gives little emphasis to the enculturation of values that promote peace, a key ingredient in realizing the MDGs, it may prove a hindrance instead of a help. Despite good will and sincere efforts on the part of many teachers, there are structural and curricular obstacles that need to be addressed.

Menu:

- Back to top (issue contents)
- Email this article to a friend
- Printable version
- Bibliography & links

Forum Discussion:

This is a good study. It shows the meticulous manner in which the author undertook the study. However I do not think teaching learners the history of colonialism and the subsequent triumph over it is all bad. Much as African Indigenous Knowledge Systems are good and need to be infused among learners, heroic military Kenyan achievements are also necessary. Another thing to consider about culture is that we had the domination of Western culture for a long period in Africa, since the 14th and 15th centuries when slavery began, followed by the scramble for Africa. In this period, there was the marginalization of African people to the periphery of economic activity. This marginalization led to cultural expressions such as dancing and singing because someone does not have anything to do. Dancing and singing are truly part of being African, but as I see it, especially here in South Africa, the culture of singing and dancing was made a dominant part of African culture because people were abused with hard work and because they were encouraged to leave their families behind in the villages for years to come and work in the Johannesburg mines, digging gold. The troubles, the headaches of hard labour and memories of loved ones left behind made people to sing and dance in order to get some joy out of their excruciating troubles and pain. In their work, people were treated as tools. They could not find any outlet to express their thinking about their work. They were simply punched and kicked when sleeping as a sign that it is time that they must wake up and go to work. During work, they were

"Despite good will and sincere efforts on the part of many teachers, there are structural and curricular obstacles that need to be addressed."

Teaching indigenous culture

An examination of the education system in Kenya reveals there has been considerable discussion about the need for an education that nurtures an independent African psychology through the teaching of African culture, history, languages, literature and other aspects of African life, which ought to form the core of all learning (Bogonko ibid: 117). In 1964, the first independent parliament under President Jomo Kenyatta set up a commission to advise the government on the kind of education suitable for Kenya. The Kenya Education Commission Report, often referred to as the Ominde Report, indicated that one of the objectives of the school system should be to foster respect for cultural traditions (Ominde Report 1964). According to Somjee (1996: 94) the report emphasized the Africanization of the history and geography syllabi, and the promotion of African art, crafts and music in the school system.



Lunchtime for school girls at Kiambu, Kenya. @ 2003 Sammy Ndwiga, Courtesy of Photoshare

Kenya's indigenous heritage was further supported by the Ndegwa Report of 1971, which stated that the educational system must respect, foster and develop the country's rich and varied cultures (Ndegwa Report 1971). The Mackey Report of 1981 strengthened this again through the syllabus developed for the new 8-4-4 system of education (denoting years of primary, secondary and university). According to Bogonko (ibid: 121), more than ever before, the 8-4-4 syllabus aims to make pupils aware that they are Kenyans, initiating them

into their culture and place in society, both locally and globally. To a large extent, the government entrusts teachers with the responsibility of fostering indigenous traditions in the learning institutions of Kenya. Although this is not part of their training in college, the government expects them to be familiar with traditional cultures so that they can carry out the aforementioned task. However, Somiee notes (1996: 6) that there is no guidance on what aspects of culture are to be integrated into the school curricula. The syllabus only tells teachers what they "must" do, and "should" do, but does not explain how to do it. Thus, the infusion of aspects of indigenous traditions depends entirely on teachers' perceptions of these traditions. If a teacher's

"There is no guidance on what aspects of culture are to be integrated into the school curricula. The syllabus only tells teachers what they 'must' do, and 'should' do, but does not explain how to do it."

perception is positive then s/he will include them in the classroom and, if negative, s/he

Dominant values promote conflict

will not include them.

Unfortunately, the teaching that takes place in most schools is a kind of military training. This occurs through the use of learning materials embedded with values that promote violence and through the use of militaristic teaching methods that emphasize competition over cooperation. The education system gives little room to indigenous traditions that promote sharing, negotiation and cooperation. For example, there is little in the history curriculum about the peaceful values that our ancestors developed in response to conflict.

As I have noted elsewhere (Gachanga, Daily Nation, August 15, 2004) most postcolonial literature in Kenya is couched in terms that do not promote peace. In the first place, it is intended to portray the deeds of heroes who sacrificed their lives in the struggle for independence and to condemn those who acquiesced to colonial rule or failed to take part in the struggle. Second, it does not give an alternative to violence. In its attempt to restore the image of the true African, which the writers believe was distorted by the colonists, it is too fascinated by experiences of war and struggle and forgets the peace heritage that held society together even before the advent of colonialism. Third, the characters that portray military prowess are made the heroes

shouted at and called all sorts of names such as "monkey", "baboon", etc. With this sad treatment they could only express their humanity by singing and

So how do you strike a balance on African culture? How do you make sure that as you yearn for African culture you do not yearn for a culture which is the outcome of white domination over African people. It is a difficult situation. The way out of this is to infuse in teachers the entire history of Africa. You begin from before slavery, then follow with the period of slavery and move with your narration showing: (a) what slavery was about and what it did, (b) what colonialism was about and what it did: (c) what happened to African leaders like Jomo Kenyatta and Patrick Lumumba when they tried to reconstruct and develop African communities ravaged by colonilism; (d) what African Renaissance is. It might sound a complex task but with a university trained teacher it is possible.

School violence is everywhere, in the schools of London, New York, etc. There is no link between school violence and teaching the heroic achievements of a country. - Chris Kanyane, Tshwane, South Africa

while the pacifists are condemned. War itself is portrayed as a sacrificial service to the country and those who are ready to make this sacrifice are honoured. In short, post-colonial literature, much of which is being studied in schools as set books, is associated with virtues such as heroism, self-sacrifice and hostility. It holds up as heroes people with physical or moral courage who are admired for their bravery in armed combat. The concept of heroism is interpreted within the arena of warfare with little attention given to the idea of peaceful heroes whose courage and bravery is able to serve humankind without participating in battle. This literature ends up sowing seeds of violence in our schools rather than seeds of peace, and it is probably part of the culture behind the unrest in our universities.

"Little attention is given (in post-colonial literature) to the idea of peaceful heroes whose courage and bravery is able to serve humankind without participating in battle."

In addition to the overly competitive, exam-driven culture in so many schools, an example of a counter-productive teaching method is the practice of caning as a means of maintaining order in schools. The use of the cane, as many educationists have noted, actually contributes to unrest in schools. Instead of changing the negative behaviour of students, it hardens them. It creates "heroes" who may later be found terrorizing the community. Caning also reduces teachers' creativity in resolving conflicts.

Reclaiming peace traditions

Fortunately, there is no society without significant traditions of peace and peace building. According to Boulding (2000: 91) each social group has developed its own strategies of conflict resolution over time, uniquely rooted in local culture and passed on from generation to generation. This knowledge is woven into religious teachings, music, poetry, dancing ceremonies, celebrations and play. It is present in women's culture, in the world of work, in traditional decision-making assemblies, in environmental lore and in the memory of the past. Hicks asserts (1988: 9), "Children do not of course come



School girls and their teacher at a rural school in Kenya.

© 1996 Njamburi/Cabak ELS, Courtesy of Photoshare

to school unaware of the world in which they live. Schools merely intervene in an ongoing educational process, that of childhood socialization, by which children learn mores expected of their culture, class and gender." This concurs with Whiting and Edwards' observation (1988: 253) that by the time the child joins school s/he has already constructed a working knowledge surrounding the "do's" and "don'ts" of interpersonal aggressiveness, the distribution of resources, social roles, task assignments, damage of property, etiquette, hygiene and other matters of social behaviour.

Despite acknowledgement of the important role indigenous knowledge plays in sustainable development and peace building, however, many governments, donors and NGOs appear to make little use of this valuable resource. Their recognition of indigenous knowledge often amounts to little more than lip service, seldom translating into action or funding. Development plans and conflict resolution are made behind closed doors and in workshops away from local people, hence ignoring their sensitivities, spirituality, relations and experiences. The result is that development projects perform unsatisfactorily and conflicts never end.

"Recognition of indigenous knowledge often amounts to little more than lip service, seldom translating into action or funding."

On the other hand, by infusing indigenous peace education in schools, we may be able to raise a generation sensitive to peoples' indigenous values, their aesthetics, spirituality, sexuality and other daily experiences. These are all key ingredients if Kenya is to realize the MDGs by the year 2015.

Peace study: teachers' perceptions

With the growing recognition of the value of indigenous knowledge for sustainable

development and peace building, I undertook a study to establish how teachers perceive indigenous peace traditions in order to see whether their perceptions could be harnessed to promote peace in learning institutions. The study was conducted in the Kariobangi and Korogocho slums of Nairobi. As Ndaruga and Irwin observe (2003: 201), there is a possibility that teachers' perceptions (of indigenous peace traditions)... may have an influence on its frequency of mention in the classrooms and on the activities in which teachers engage pupils.



Pre-schoolers welcome a visitor to Kibera slum, Nairobi.

© 2004 Alfredo L. Fort, Courtesy of Photoshare

Indigenous knowledge as Ociti observes (1994: 22) focuses on the acquisition of social skills and associated attitudes necessary for living in the present as well as the future. Characterized by a code of conduct transmitted conventionally from generation to generation, these traditions encourage individuals to live in ways that promote the well-being of society. They bring order and social control to all aspects of life. They make provision for socialization and worship, as well as for the sustenance and protection of every individual. They also ensure that there is authority and guidance in shaping values, attitudes and opinions.

and in molding identification with the social group. Furthermore, indigenous traditions provide the means to deal with inappropriate behaviour and conflict within the community. Individuals are bound into a network of social and religious relationships that inhibit severe non-conformity and lead to controlled behaviour according to certain social norms (Mudavadi 1983: 6).

The study I undertook was done in two phases. The first phase was conducted using a questionnaire as the main research tool. The second phase involved other research tools, including interviews, observation and document analysis. (See Appendix for methodology.)

Study results

In the study, teachers were asked how they understood the term "peace". The question was aimed at exploring the meaning teachers develop or create about peace through their interaction with the community and their personal experiences. Their responses revealed significant agreement that peace is a calm, harmonious environment, where people can work or learn without fear of conflict and violence. The reason for this kind of response could be that the people of Kariobangi and Korogocho experience much insecurity. Teachers as well as others in the community desire an environment where they can work and learn free from daily disturbances.

"Teachers as well as others in the community desire an environment where they can work and learn free from daily disturbances."

When teachers were asked whether there are indigenous traditions that promote peace in community, over 60% said that there are. They gave examples such as the traditional dances, songs, proverbs, taboos and rituals that were used to promote peace. When asked where they learnt these traditions, most indicated that they were raised through such traditions themselves, while others said that they heard of them from their parents and grandparents.

Teachers were then asked whether they incorporate these peace traditions in their classrooms and over 50% said that they do. When asked what motivated them to infuse aspects of indigenous peace traditions in their classrooms, some of the responses (with the total percentage of teachers giving this answer indicated in parenthesis) were as follows:

- they are effective in promoting behaviour change (15%)
- the weight the stories and proverbs carry is lacking in the available curriculum (12%)
- parents have failed to infuse these traditions in their young ones (8%)
- they are beneficial to me and it is my desire that my students also benefit from them (7%)
- pupils tend to pay more attention when these traditions are used (5%)
- they are appropriate and simple (2%).

Teachers were also asked to provide details of activities they use to promote peace in school. The following were among the responses given:

- drama and traditional dances (23%)
- groups such as scouts and debating clubs where aspects of indigenous peace traditions are incorporated
- sporting activities (10%)
- storytelling (8%)
- praying together (5%).



Enthusiastic school girls in Kenva.

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Many teachers also said that respected community elders and other resource persons are invited to talk to pupils during closing days. Elders advise pupils on various issues, such as being peaceful during the holidays and how to avoid the HIV/AIDS pandemic and the use of drugs. This is important because it ensures continuity in what children learn from their parents and teachers even when they are out of school.

Finally, teachers were asked to identify some of the obstacles they encountered in their effort to incorporate indigenous traditions during classroom learning. Their responses included the following:

- · children's upbringing is incompatible (25%)
- lack of time (20%)
- children are not conversant with indigenous traditions (12%)
- school rules do not allow it (8%)
- the community's attitude is negative (7%)
- the community has changed so much, it wants modern media (5%)
- some of these traditions are now obsolete (2%).

These responses reveal that, even though teachers may be willing to promote indigenous approaches to peace, there are real structural obstacles and curricular deficiencies that hinder or prevent them from doing so.

Discussion

The results of this study demonstrate that, by and large, teachers are active agents in their communities, sensitive to the needs of the people they live with and serve. Because Kariobangi and Korogocho are areas where violence is common due to poverty and insecurity, teachers in these communities have developed very particular, contextual perceptions of what constitutes peace. They have devised approaches for promoting peace in the classroom which are in accord with the community and with traditions that have proved effective in their own lives.

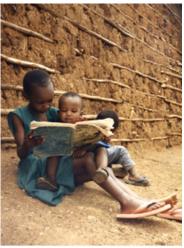
"Most teachers find that indigenous culture promotes values that may not be available in school curricula. This culture embraces the people's spirituality. It is simple. clear and interesting to pupils."

Most teachers find that indigenous culture promotes values that may not be available in school curricula. This culture embraces the people's spirituality. It is simple, clear and interesting to pupils. It considers the way people relate to one another and to their environment, the way they worship, perceive beauty and conduct themselves sexually. Since African spirituality cannot be sensed or stored electronically, we must begin imparting it to children through classroom learning.

The study also revealed that there are activities that teachers use to engage pupils in promoting peace. These activities enhance cooperation, sharing, negotiation and dialogue. All these are important values for promoting peace and development.

Conclusion

Since peace is an important prerequisite for the realization of the Millennium Development Goals by the year 2015, it is important that we re-examine and reclaim the traditional African approaches to peace building in our schools. Traditional approaches are simple, effective, constructive and in keeping with the norms of African communities. When these traditions are ignored, we marginalize the poor and especially rural people who do not have access to modern methods. Moreover, at the grassroots level, much



A Kenyan girl teaches her brother to read.

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development planning will be seen as unrealistic and unattainable because it ignores the people's spirituality and traditional values.

Appendix

The study was done in two phases. Phase one of the study was conducted using a questionnaire as the main research tool. Phase two of the study used other research tools such as interviews, observation and document analysis. Sixty teachers were issued with questionnaires. A questionnaire was used because I wanted to see what information was readily/easily available on indigenous peace traditions that could enable me to focus on specific areas for more detailed information (Irwin 2002:5) using interviews and field observation. Snowball sampling was used in selecting the respondents (Sanders & Pinhey 1974:121). I randomly identified a teacher from each school where I conducted the study. This teacher then introduced me to ten other teachers in their school. Sanders & Pinhey note (ibid: 121) that the method could be used to generate a sample of persons who might not otherwise be easily found. I was interested in teachers who demonstrated both above and below average

perceptions of indigenous peace traditions. A Likert scale was used to allow teachers to give relative weighting to their perceptions of indigenous peace traditions (Ndaruga & Irwin 2003: 222). Semi-structured interviews were conducted for the ten teachers who were selected on the basis of their responses to the questionnaire. According to Patton (1990: 287-290) and (Ndaruga 2004:131) semi-structured interviews have the ability to guide the researcher on question sequence using pre-prepared questions but also allowing flexibility to alter sequence and wording in order to probe further. Purposive sampling was used in this phase of the study. This concurs with what Patton (ibid: 171) refers to as the "intensity sampling technique" where cases are selected for being rich in information that manifest the phenomenon of interest intensely (but not extremely). Patton refers to the intensity sampling technique as the selection of, for insistence, above average or below average, good or poor teachers and not selecting the exceptional cases. The interviews were used to probe some responses further, which emerged or were generated in the questionnaire.

Acknowledgement

This study was sponsored by Mennonite Central Committee (MCC), Kenya, through African Initiative for Alternative Peace and Development (AFRIPAD-Trust). The study is ongoing.

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REPORT CARD: Botswana a model for Africa?

by Rodrick Mukumbira

Introduction

Jacob Nkate, the Minister of Education, had good news to tell the people as he toured northwestern Botswana in early January. The country had achieved its 10-year goal of ensuring every Botswanan child had access to basic education through the provision of schools that cater for children from Standard One to Junior Certificate (ten years of education). The goal was set in 1995 following the Revised National Policy on Education. Beyond this, "the focus is for every child to have universal access to education right from the primary level to secondary and tertiary levels to reach the dream target of 100 percent by 2016," said Nkate.

The year 2016 features prominently in most Botswana programmes and education is no exception. The target year was set by a 1997 Presidential Task Force, which began work on mapping a long-term vision for the country. The result of the task force was the Vision 2016 Report, Botswana's development blueprint, which features education as a prominent aspect in preparing to "own" the future. According to the blueprint, Botswanans "anticipate a future where citizens would have gone beyond basic education to become an educated and informed nation in the year 2016".



Anticipating a future beyond basic education.

USAID / R. Zurba

National Policy on Education

Education has consistently enjoyed a favoured position in the allocation of the national budget since independence from Britain in 1965, and especially following the discovery of diamonds in 1967. This discovery transformed Botswana from one of the poorest countries in the sub-region to the one with the most stable economy. Indeed, when the World Conference on Education was held in Jomtein, Thailand in 1990 and declared 'Education for All' as its major theme, Botswana was already in the middle of implementing its own goals towards the provision of basic education for all its citizens. Those goals were set out in the National Policy on Education (NPE) of 1977, which provided the policy framework for the education system in Botswana.

The 1977 NPE was a product of the National Commission on Education appointed the year before. This Commission was charged with formulating the country's philosophy of education, setting goals for the development of education and training, and recommending the best strategies for achieving those goals. Unlike the current

Menu:

- Back to top (issue contents)
- Email this article to a friend
- Printable version
- Bibliography & links

Forum Discussion:

Botswana communicates a critical message to all of us that democracy, peace, stability and development are all interdependent_

We also need to use African success stories to demonstrate what Africans have achieved in the face of tremendous obstacles. We must do this to prove African pessimists wrong about our continent, and inspire millions of our people to have confidence in their own ability successfully to prosecute the new struggle for Africa's Renaissance. For these reasons the work of Rodrick Mukumbira in recording Botswana's achievements and the challenges it faces as it seeks to empower Batswana is highly appreciated.

As we continue with the African Renaissance project, we should not be shy to give an objective and dispassionate account of what has worked and what has not worked on our continent. We must do this so that we use the available African experience to move forward, and indeed proceed with the necessary speed radically to improve the lives of all African people_

By learning from our success and mistakes we will help ourselves to achieve the noble objectives of walking tall amongst our fellow human beings and occupy our place of pride amongst the nations of the world. The first step is to shed all manifestations of inferiority and self-doubt. We must have the courage to be our own severe judges about what is right and wrong and refuse to accept benchmarks set by others to measure our success.

Chris Kanyane, Tshwane,

South Africa

Millennium Development Goals, the general strategy of the NPE was to increase access to education at all levels and to close a chapter of restricting access to only a few privileged individuals, which was one of the legacies of Botswana's colonial past.

"The general strategy ... was to increase access to education at all levels and to close a chapter of restricting access to only a few privileged individuals."



Striving for universal access at the primary level.

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Emphasis in the NPE was put on universal access at the primary school level by increasing government expenditure. This saw the period 1981-5 enjoying an increase in enrolment in primary schools thanks to the abolition of school fees and the construction of more government and privately owned schools. However, the government also wanted to increase the output of more highly educated people to meet the skills demand and to reduce dependency on migrant workers from countries such as Zimbabwe, South Africa and Zambia. These goals were set for 1990, coinciding with the Jomtein Conference.

As well, a proposal was made for the reorientation of the schools' curricula to embody the citizenship goals of democracy, development, self-reliance and unity. Emphasis was placed on the acquisition of the basic knowledge and skills that Botswanans would need in a developing, rapidly changing society and economy. The aspect of self-reliance was given special prominence and students were required to develop skills in crop production and industrial arts.

Revised National Policy on Education

While Vision 2016 is the guiding spirit behind Botswana's education developments, it was the Revised National Policy on Education (RNPE) of 1995 that shaped the vision. This revised policy was made in response to considerable changes in the country's socio-economic position since the earlier policy of 1977. For instance, while the 1977 policy came into effect only 12 years after independence when most of the country's workforce still lacked basic skills, Botswana was faced in the mid-1990s with the new challenge of preparing a workforce for the global economy. Hence, it was necessary to revise the education policy which had been in operation, in order to realign it with the country's goals and aspirations and to refocus its priorities.

The Jomtein Conference Declaration was an important source of information for the RNPE in that it provided a basis for realigning the goals of Botswana's education system with global initiatives. The RNPE not only identified basic education as a fundamental human right but also established the goal of preparing Botswanans for the transition from a traditional agro-based economy to an industrial economy that would enable Botswana to compete with other countries.

Its objectives were as follows:

- · To raise educational standards at all levels
- · To emphasise science and technology in the education system
- To make further education and training more relevant and available to larger numbers of people
- To improve the partnership between school and community in the development of education
- To provide life-long education to all sections of the population
- To assume more effective control of the examination mechanism in order to ensure that the broad objectives of the curriculum are realised
- · To achieve efficiency in educational development.

Achieving balance

The NPE of 1977 did not set any explicit goals for the provision of education to Botswanans with special educational needs. Providing for these needs became a concern of government in the early 1990s. As per the recommendations of the 1995 RNPE, the government established the Division of Special Education which was charged with the responsibility of providing planning, advisory, and administrative services for children with disabilities across all levels of the education system. One of

the goals of the new division was to mainstream special education services in the regular education system and, where necessary, set up separate special education units.

"Providing for special education needs became a concern of government in the early 1990s."

In addition to achieving universal access to basic education through schooling, the RNPE devised other strategies through which universal access would be achieved, both for children and adults. These included out-of-school education and education for the poor and disadvantaged such as the introduction of distance learning programmes through the Botswana College of Distance and Open Learning (BOCODOL). These programmes were designed to afford people the opportunity to learn as they continue with other aspects of their lives, including work. Other RNPE strategies for the disadvantaged included a facility for the identification and referral of children with special needs; increased enrolment of children with special needs; establishment of a Braille Production Unit; and the introduction of Diploma and Degree programmes in Special Education.



RNPE emphasis on Remote Area Dwellers: Mosarwa (San) woman near Ghanzi, Botswana © C. Hincks

Importance was also placed on educating disadvantaged communities such as Remote Area Dwellers (RADS) like the Kalahari Bushmen. Other groups of disadvantaged people included rural destitutes and pregnant girls who drop out of school. The emphases on RADS and drop outs due to pregnancy are significant because historically these were groups that received the least government support as far as provision of social services, particularly education. Provision of education for these special populations was historically the domain of NGOs.

The revised policy also identified the need for improving the quality of education, which was generally believed to have been compromised by concerns of access. For example, the RNPE recommended raising the standard for teachers, both in terms of academic and professional qualifications, and introducing remedial teachers into the basic education system.

Reaching special groups

As noted above, the RNPE recognized the need to increase participation of disadvantaged groups in basic education. The education of RADs in the primary sector provides a good example of how both formal and non-formal means were envisioned. In 1995, the country adopted a curriculum for schools that is skill-based and non-prescriptive, meaning that teachers receive standard materials, which they can then adapt to local contexts to incorporate the knowledge and experiences of their students. This adaptability aspect has been used all over the country in such subjects as agriculture, where components are taught according to the terrain and climate of a given area (very important in view of the difficult arid conditions in much of Botswana).

"In 1995, the country adopted a curriculum for schools that is skill-based and non-prescriptive."

A second special group is the children of destitute families. Policies were devised to address issues of school fees and feeding programmes. However, a weakness in the RNPE was a lack of stock-taking to ascertain how many learners fall into this group, where these learners are, and whether the relief that is planned for their benefit would actually reach them. No specific targets were set for this population.

A third special group are teenage girls who become pregnant. This is a problem that the school system has lived with for quite some time. In the past, it dealt with this issue in a punitive manner. School girls who became pregnant (and in some cases the boys who were implicated in the pregnancies) were expelled, most of the time never to return to the public school system. A small percentage of these girls re-entered school and attended private night schools, or chose to pursue their studies through non-formal means. The present regulations are more progressive in that they exhibit greater

tolerance and sympathy for young learners who fall pregnant. Again, however, no specific targets were set either for reducing teenage pregnancy or for devising measures that would enable them to pursue their education.

National Literacy Programme

On another front, Botswana created the National Literacy Programme in the Department of Non-formal Education (DNFE) to ensure everyone access to basic education. Its initiatives include the Literacy at the Workplace Project, Income Generating Projects, the Village Reading Rooms, and English as a Second Language.

The Literacy at the Workplace Project, though conceived in the 1980s, started as an organised initiative in 1991. The purpose of this project is to reach non-literate people at their places of work. The general operational strategy is that the DNFE and the target organisation work together to identify non-literate workers. The responsibilities of the organisation are to provide space or identify a venue where classes can be held, to arrange a class schedule and to release the employees to attend classes. It must also provide payment for the teacher. For its part, the DNFE identifies and trains the teacher and provides teaching materials. A total of 51 organisations have participated in the Literacy at the Workplace Project since its inception in 1991. To date, there have been 580 participants.



Women in Botswana learn new skills in a micro-enterprise employment programme.

The Income Generating Activities Project is charged with imparting productive and business management skills to people who participate in the National Literacy Programme as a means of improving their livelihood. This affords them the opportunity to use their literacy and numeracy skills in real life situations, thereby avoiding a relapse into illiteracy.

The Village Reading Rooms project is run jointly by the DNFE and the Botswana National Library Service (BNLS). It was conceived in the 1980s as a post-literacy programme to offer the newly literate an opportunity to read beyond their primers.

The English as a Second Language programme is an outcome of the 1984 and 1987 evaluation studies of the National Literacy Programme. These evaluations revealed a need for the provision of English as a Second Language for communication and further studies.

In addition, DNFE has planned activities to commemorate International Literacy Day in every year this decade. These activities have included speeches, learner testimonies, poetry, singing, and exhibits of learners' work, both from within the classroom and outside it.

Distance and open learning

The premier institution offering alternative learning opportunities is BOCODOL, which was established to offer basic education courses. Other kinds of distance and open learning are also employed. The medium of radio, for example, is utilised in the dissemination of educational Messages to Botswana citizens. There are a wide variety of programmes, especially on state-owned Radio Botswana, that are aired for their educative value. These include instructional support programmes that are designed and produced by the School Broadcasting Unit of the Department of Curriculum Development and Evaluation, programmes that publicise and support literacy activities, programmes that offer agricultural education and publicise and support agricultural events.

Other mass media are also used as avenues for disseminating training and educational support materials. For instance, the local newspapers Mmegi and The Guardian carry inserts that address topical issues on education and/or offer revision materials to students enrolled in distance and open learning classes. The Mmegi newspaper's insert, "Bokamoso", is a monthly publication, while The Guardian publishes "The Guardian Learner" bi-monthly.

"Other mass media are also used as avenues for disseminating training and educational support materials."

In further efforts to foster education wherever possible, the RNPE policy encourages shared use of all educational facilities in order to get maximum utility from classrooms and resource centres. And it allows for the easy registration of private vocational colleges.

HIV/AIDS and education

Despite Botswana's many educational achievements, the HIV menace has eroded much of the progress to date. The gains have been undermined by the fact that young people in Botswana are at present the hardest hit population by the AIDS virus. Preliminary survey results released in December 2004 by the Central Statistics Office indicate that 17.1% of the total population over 18 months of age is estimated to be infected with the HIV virus. The worrying statistic is that the population aged 15-49 years is hardest hit with an infection rate of 34.4%.

Botswana has followed the example of other southern and eastern African countries and declared an HIV/AIDS national disaster and it has charged the education sector with a more prominent role in fighting the pandemic. For example, a Life Skills education programme, with the possibility of a peer-education mode of delivery, has been developed and introduced at all levels of schooling. In addition, all sub-sectors of education have an HIV/AIDS focal point, and adapt the Life Skills programmes for the population in that sub-sector. An HIV/AIDS school policy has also been developed as a matter of urgency to help children who are infected and affected by HIV/AIDS.

While one can recognise the efforts in Botswana of infusing Life Skills across the curriculum, lessons from other countries are beginning to show that such programmes have disappointing results in that they are often viewed as just another subject that has to be learned in order to pass an exam.



Botswana radio show features peer-to-peer AIDS education for youth. © Population Services International, Courtesy of Photoshare

Botswana's Ministry of Education believes that it is during the school years that the battle for HIV prevention is won or lost. Aware of the fundamental importance of education and sensitive to the impact of HIV/AIDS on the entire education sector, it has developed the Teacher Capacity Building programme with help from the UNDP and the African Comprehensive HIV/AIDS Partnership. This programme tries to support teachers in their frontline efforts to limit the spread of the pandemic. In a strategy adopted from Brazil, teachers attend workshops to receive training in interactive teaching skills. The programme provides mentoring and encourages participants to share practical lessons on teaching methods. The methods are then employed in the classroom to help students confront the realities of HIV/AIDS in their daily lives. The programme, now two years old, aims to promote cultural and behavioural changes in order to prevent the spread of HIV and achieve the vision of an AIDS-free generation by 2016.

Conclusion

Botswana's Ministry of Education says that the country is two percent short of achieving universal access to primary school as envisaged by the Millennium Development Goals. This compares favourably with most countries in sub-Saharan Africa, which have very low primary completion rates, many less than 50 percent.

Botswana has been able to counter low primary school rates by using its revenues from diamonds wisely, thus making it a model for Africa. Between 1966 and 2000, primary school enrolment rose from 66,100 to 327,600, representing an average compound growth of 4.8% per annum. During this post-independence period, access to education has improved tremendously. As a result, children no longer walk long distances to school and their nutritional needs are being met, including food rations for destitute children during school holidays. These measures have been taken not only to have children enrol in school but to stay in school until the end of the basic education cycle. As well, essential learning materials have been provided so that the bulk of the cost of education does not fall on parents. Today, there are no significant disparities in school attendance by orphans and non-orphans or by gender.

"Botswana has been able to counter low primary school rates by using its revenues from diamonds wisely, thus

making it a model for Africa."

In addition to the education of children, the new emphasis on functional literacy and assisting learners not only to acquire literacy and numeracy skills but also to apply them in profitable ventures has given a new lease of life to literacy activities, ensuring that literacy is sustained.

All these things constitute Education Minister Nkate's good news. However, major challenges remain. Nkate himself recognizes the need for improved access to secondary school (currently, for example, only 52 percent of Junior Certificate leavers have access to senior secondary schools, well short of the 100 percent target in the Vision 2016 document). And the government still has the mammoth task of financing the expansion of existing education facilities and the construction new institutions to cater for the ever-rising number of students.

More needs to be done as well to promote a human rights based approach to social and economic development, with special emphasis on reaching the most vulnerable children. The government and donor community need to increase investment in children, and promote the practice of analysing budget expenditure to monitor the impact on children's welfare and development.

Finally, the biggest question that remains is to what extent the economy can survive the devastating effects of HIV/AIDS.

With files from:

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EDUCATION FOR LIFE: Statistics and reality for women in Lesotho

by Craig Hincks

Edwin Senyane just smiled in response to my question. At 70 years of age, my neighbour was still teaching primary school on the other side of the highway from where we lived, in an urban sprawl area of Lesotho's capital. I sometimes gave him a lift on my way into town and we chatted. He had seen a lot of change in his time. I asked him once when he planned to retire. He told me he couldn't afford to. He was on his second marriage and still had five children at home – three older daughters, all of whom would soon have a secondary school education and two younger sons, both still in primary school. One day I asked him how many pupils were in his standard four class. Ninety,

Menu:

- Back to top (issue contents)
- Email this article to a friend
- Printable version
- Bibliography & links

he said. That's a lot! I exclaimed. Yes, but better than last year, he said. Last year he had 120. How do you teach anything to that many kids? I wanted to know. That's when Mr Senyane just smiled.



Learning in Lesotho: basic literacy or education for life?

The good old days?

It would be easy to cite statistics in order to lament the decay of education in Lesotho since Independence or to long for 'the good old days' when the mere recitation of the country's education achievements engendered pride. For indeed Lesotho's list of educational 'firsts' and other milestones is comparatively long and impressive. The first mission schools were established in the mid-1830s, well before most African countries. By the early 1840s, there were already two in-country presses producing a range of learning and reading materials in

several languages, including Sesotho. By 1863 Lesotho was publishing the first vernacular newspaper in southern Africa – and probably on the continent. A secondary school was established in 1868 and an industrial school in 1878. By 1905, a British Government report stated: 'there is probably no African native tribe for which more has been done in the way of Education than for the Basuto.' Already, by 1934, 65 percent of school-age children were enrolled in school. And at Independence in 1966, Lesotho was believed to have the highest basic literacy rate in Africa – 80 percent. For a population at that time of well under a million people, there were no less than 1,066 primary schools, 21 secondary schools, 7 teacher training colleges, 4 vocational schools and a university.²

"At Independence in 1966, Lesotho was believed to have the highest basic literacy rate in Africa."

Yet statistics can be cited – or manipulated – to paint a very different picture than the reality they purportedly describe. And there are many things that statistics do not tell. In pre-Independence Lesotho, for example, they say nothing about the fierce rivalry between the main Protestant and Catholic missions (which together ran well over 90 percent of the schools), a rivalry that greatly diluted the quality of education and fostered deep divisions in the political life of the country. They also say nothing about how poorly trained many Catholic teachers were, or how poorly equipped many Protestant schools were, or how unimaginative and indifferent the British administration was, or how inappropriate the curriculum was for the needs of the people or the country's development.

Since Independence, in fact, Lesotho has actually improved on some of these things. Despite problems in many areas, there is now less friction between Protestant and Catholic schools and their communities (the churches still administer well over 90 percent of the schools, while the government pays teachers' salaries and sets the curriculum), teacher training has been centralised and standardised, and at least some advances have been made toward a more appropriate curriculum for the needs of the country. As well, access to education has greatly improved, especially at the secondary level. After just 25 years of independence, the number of secondary schools rose from 21 to 175.³ And by 2000, according to the UNDP, the adult literacy rate had actually increased to 82 percent (surpassed only by Mauritius, Namibia and South Africa). It would be wrong, in other words, to believe that education has decayed or declined since Independence in all respects.

"It would be wrong to believe that education has decayed or declined since Independence in all respects."

Lesotho and the MDGs

Today, almost all African countries are striving to meet the two UN Millennium Development Goals (MDGs) that deal explicitly with education:

 To achieve universal primary education by ensuring that all boys and girls complete a full course of primary schooling To promote gender equality and empower women by eliminating gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015.⁵

Again, the statistics for Lesotho look good. With respect to the first of these goals, for example, Lesotho was one of the first countries in Africa to commit itself to free universal primary education (UPE). Between 1999 and 2000, the year when free UPE was introduced for standard one, the country's enrolment ratio at the primary level went from 61.1 percent to 83.4, by far the largest jump on the continent. And with respect to the second of these goals, of 37 sub-Saharan countries with gross enrolment rates at the secondary level of less than 50 percent, Lesotho is the only one that has more girls enrolled than bovs.

So what do these statistics mean? Do they matter? Do they accurately describe the health of Lesotho's educational system or its position relative to other African countries? The answer, as one might suspect, is yes ... and no. Yes, it matters that Lesotho cares about education. It matters that the government is spending more on public education as a percentage of GNP than almost every other African country (8.4 percent in 1997, compared, for example, to oil-rich Nigeria's 0.7 percent). It also matters that Lesotho wants education for all and is on track to meet the goal of UPE by 2015. And yes, it matters that girls are being educated at the primary and secondary levels in equal – in fact, higher – numbers than boys. All these things matter and they should engender pride.

"It matters that the government is spending more on public education as a percentage of GNP than almost every other African country."

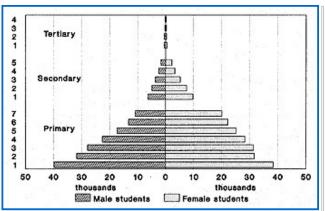
On the other hand, these statistics do not tell the whole truth. For what is the quality of education Lesotho's children are receiving? How many classes are as large as Mr Senyane's? How well equipped are the schools? Are all the teachers properly trained? Is the curriculum appropriate to the needs of the children and their future in the country?

To answer some of these questions, this article will now take a closer look at just one area: the primary and secondary education of girls – an area in which Lesotho appears to excel but in reality faces numerous problems and challenges.

Why girls are educated

The education statistics for girls in Lesotho, as already indicated, are impressive. Not only are there more girls in school than boys at both the primary and secondary levels, but there are more in almost every single grade at these levels, including the final two years which prepares students for the Cambridge Overseas Secondary Certificate (COSC) examination – see graph below. At the primary level, the drop out rate among girls is almost half that of boys. And while the adult literacy rate in 2000 for both sexes was 82 percent, for women it was an astonishing 98 percent – the highest in Africa.⁹

But does this mean Lesotho is more 'progressive' than other countries? Again the answer is yes ... and no. The fact that by and large women in Lesotho have been better educated than men for many years has in itself had a definite impact on traditional perceptions regarding the role of girls and women in society. People in Lesotho are used to the fact that girls can do as well as boys in school and



Education in Lesotho: by level 10

that women are better educated than men. They are also used to seeing women exercise leadership, from the household and village levels, where they are often the de facto heads and chiefs, ¹¹ right up to some senior government positions. To this extent, the outlook of people in Lesotho may be more progressive than elsewhere.

However, to the extent that the education of girls has been more an accident of history

than a specific plan to improve their lives or elevate their status as women, it is not progressive. In other words, the underlying reasons have more to do with why boys do not go to school than with why girls do. Historically boys have been required for herding livestock (a cultural taboo for girls) and, in their late teens, for working as migrant labourers, which usually requires little education. ¹² These economic activities make it difficult or impossible to attend school. Nobody really planned to educate girls in such large numbers, therefore, and nobody really had a good plan for them – as is evident in the quality and content of their education and in their prospects upon graduation.

"Nobody really planned to educate girls in such large numbers... and nobody really had a good plan for them."

Purpose of education

It is a good idea to pause now and then to ask: What is the purpose of education? Education for education's sake may or may not have its merits (depending largely on what one means by this), but one can at least say that in Africa it does not have much currency, for traditionally, as A.B. Fafunwa has pointed out, education has been understood as 'intrinsically functional'. The purpose of education is to train and assist children to assume their responsibilities and become integral and productive members of society. Education must draw out of an individual and his or her society the knowledge, wisdom and skills that enable society to reproduce itself and sometimes to remake itself in order to meet new realities. But as one study of Lesotho's development observed: 'schooling may or may not achieve this result.' Ideally, schools will educate children, but just because children go to school does not mean they are being educated.

It has been shown that, in addition to promoting the classical ideals of 'beauty, truth and goodness', education does more in to combat poverty and ill health (including the current AIDS pandemic) and to enhance economic and social welfare than anything else. Simply put, education improves human capital. And in Africa, 'the benefits of one educated woman, given the crucial roles she play in society, are immense.' 15

"In Africa, 'the benefits of one educated woman, given the crucial roles she play in society, are immense.'"

So what about the women of Lesotho? Does the education system really educate them? Does it elicit what they need for their training in life and their liberation into a healthy, productive and meaningful role in the 21st century? Regrettably, there are serious internal and external realities that prevent girls in Lesotho from getting the kind of education they need.

Deficits in the education of girls

Most of the internal realities that prevent or dilute real education in Lesotho apply to boys as well as girls. They include the following problems:

- Teachers. The morale of teachers in Lesotho is often low and the profession is not attractive due to its low level of pay. As well, too many teachers in the country are either untrained or inadequately trained.
- Schools. The pupil-teacher ratio in many schools is so poor that it precludes the
 possibility of a good education. Many schools exceed the 40:1 ratio that the
 government deems acceptable. The pupil-classroom ratio is even worse. If one
 excludes the many makeshift classrooms (such as church halls), the ratio is
 approximately 100:1. 16 Basic school furniture and equipment are also often
 inadequate or non-existent.
- Curricula and focus. Although some effort has been made to offer 'practical' subjects such as home economics, woodworking and bookkeeping, the curriculum continues to focus on major examinations with a priority on social sciences and the humanities, and too little emphasis on livelihood skills, science, agriculture and technology. While schools succeed in educating a small elite for the 'bureaucratic bourgeoisie', they do very little to prepare the vast majority of pupils for their future well being or for the things society needs most.

With regard to the external realities that inhibit education, the present focus on girls clearly illustrates how poverty and social practice have such a profound and tragic impact on the non-realisation of these young people's potential. These external realities

account for the low attendance rates and the high failure and drop-out rates in Lesotho.

"Poverty and social practice have such a profound and tragic impact on the non-realisation of these young people's potential."

Despite the fact that girls' enrolment in primary school is said to be as high as 99 percent, actual attendance may vary from about 50 to 80 percent, depending on the region in the country. ¹⁷ In addition, low attendance and high failure rates require many pupils to repeat classes in order to advance. In 1999, it was found that it takes 13.1 pupil years to produce one successful primary school graduate in Lesotho and a staggering 37.3 years for a secondary school graduate. ¹⁸ Furthermore, even though fewer girls than boys drop out of primary school, almost 50 percent of the girls who begin do not finish. At the secondary level, the drop-out rate for girls overtakes that of boys: less than 25 percent of the girls who begin high school finish the first three years or Junior Certificate (JC). The reason why the drop-out rate shifts like this is because, as girls get older and further in school, the external realities become more gender specific – as the following list (ordered from generic to gender specific) indicates:

 High cost of education. Although tuition is now free at the lowest primary level, many parents still find it very difficult to cover the cost of uniforms, books, loss of domestic labour and in some cases payment for extra teachers funded by the school. At higher levels it becomes even more difficult. Fees for tuition and for sitting examinations are substantial and well beyond the reach of most parents. In many cases at the secondary level, boarding fees are also required.



A rural homestead in Lesotho: girls often drop out to look after family members, including those with HIV/AIDS.

- Fewer spaces. Access to spaces in school becomes more difficult the higher the level. This means that average or below average pupils may not find spaces. Families who belong to no church or to one of the smaller churches may also find that priority is given to members of the larger churches administering the schools.
- HIV/AIDS. The AIDS pandemic in Lesotho hits young people the hardest. The 2003 adult HIV infection rate was 28.9 percent and of these 53.1 percent were women in the 15 to 49 age range. ¹⁹ Those in the 15 to 24 year old age range are most likely to contract the disease. Girls in this age range are also more likely than boys to be required to stay at home to look after parents or other relatives who have the disease.
- Domestic responsibilities. Girls are often prevented from attending school because they are required for domestic work. The older they get the more likely it is they will be needed to perform household chores, to work in the family garden or fields and to look after others.
- Cultural/economic bias. Many families faced with the hard choice of sending
 either a son or a daughter to school (due to financial constraints or lack of
 spaces) will choose the son, believing that his future economic contribution to the
 family is both more likely and more lasting. This is due to society's economic bias
 in favour of men (all things being equal) as well as to the cultural understanding
 that when a daughter marries her economic contribution will switch to her
 husband's family and therefore be lost to those who sacrificed for her education.
- Pregnancy. Girls often face sexual pressure from their mid-teens on. In 2002, 13.1 percent of girls in the 15 to 19 year old age range were either pregnant with their first child or already mothers.²⁰ Those who become pregnant almost always drop out of school.
- Early marriages. Traditionally males do not marry until their twenties, but females are often married in their teens. Marriage usually necessitates leaving school in order to look after the new household.

Any one of these factors can either disrupt or prevent girls from getting the kind of education they need. The reality is plainly visible in the pyramid shape of the graph above: the higher the level, the fewer the pupils. For the fortunate minority of women who do complete their JC or COSC, however, additional obstacles await them after school.

Barriers faced by educated women

There are numerous barriers awaiting women who complete secondary school. Here we consider those that can be addressed, partially or fully, through legislation. The following are some major areas of concern:

• Minor status. Perhaps the greatest barrier women face is their status as minors under Lesotho's dual legal system. Under customary law, women remain legal minors all their lives, first under their fathers, then under their husbands or other male relatives. Under common law (a hybrid of British and Roman-Dutch law), women are minors until the age of 21 and then again when they get married.²¹ These laws mean that very few women in Lesotho can do simple yet essential things like open a bank account, obtain credit,



Women are the primary farmers in Lesotho: a market gardener hand-waters her potato plants.

own property, start a business, sign contracts or obtain a passport, unless a male relative gives his permission. It also means that the economic potential of the country is severely curtailed by thus excluding the better educated half of the population.

- Land inheritance. Women are the primary farmers and caretakers of the land in Lesotho and yet, until recently, they were denied the right to inherit land. More reforms to the Land Act are still required to enhance women's rights in this area.
- Glass ceiling. As soon as women leave school, they begin hitting the proverbial glass ceiling: they are qualified but not hired, they are hired but not promoted, they are promoted but not to the highest levels. Anti-discriminatory legislation needs to be strengthened and enforced.
- Factory work. Many educated women cannot find suitable employment and settle
 for very low-paying work in factories (some of which have recently closed due to
 the ruthless dynamics of globalisation). Stronger laws and law enforcement are
 needed to ensure workers' rights, especially in the areas of health and safety and
 a higher minimum wage.
- Sexual exploitation. Many women suffer from sexual violence and exploitation.
 The penalty for rape under customary law is merely a fine. Laws protecting
 women need to be strengthened and applied more stringently, especially in the
 context of the HIV/AIDS pandemic in which women are now paying a higher price
 then men often as victims of violence or economic desperation.

For women in Lesotho to prosper and realise the potential of their education – even if their education may not have been high quality – they must have full legal rights. In 1997, a Law Reform Commission was established in Lesotho to review and revise all laws that discriminate against women. It has yet to complete its work. Why so long?

Legal barriers are often intertwined with cultural barriers and normally it takes a long time – generations even – for changes in culture to be fully accepted. In itself this is not a bad thing. The accumulated wisdom of tradition should not simply be thrown out because it does not fit the fashion of the day or the dictates of Western aid. It requires careful consideration, lengthy debate and communal consent. It takes time. However, some of the realities women are living with in Lesotho today have already been debated for many years and there is a remarkable degree of consensus on the changes required. In many cases, it is simply a matter of getting politicians, too often overtaken by inertia or by more immediate concerns, to act. None of the legislation required for women to realise their potential is likely to cause a riot or widespread rebellion. Some people will undoubtedly grumble but most people, men and women, know it is the right thing to do. What is needed is a greater sense of urgency, for the longer one waits the poorer the country.²²



Factory workers making shoes for export.

C. Hincks

"Some of the realities women are living with in Lesotho today have already been debated for many years and there is a remarkable degree of consensus on the changes required."

Way forward

What then of the Millennium Development Goals for education? Clearly, UPE is not enough. Neither is gender parity at the primary and secondary levels. Lesotho is not impossibly far from achieving the former and it has already achieved the latter - yet serious problems remain. Some of these problems require resources the country simply does not have. These will take longer to address. Other problems, however, are within Lesotho's power to begin addressing today. Such opportunities must be grasped. Within the school system, they include fundamental changes in the curriculum toward meeting the country's pressing needs and away from an obsession with rote learning to pass colonial-style exams. Beyond school, they include a range of legal reforms aimed at empowering women to maximise the education they already have. As the major study, Lesotho's Long Journey: Hard Choices at the Crossroads, asserts: 'The potential of educated women in Lesotho is not fully tapped... A country which does not use its human resources is a country which will find it hard to better itself.'²³

Women themselves of course must take the lead, for as another study of poverty and livelihoods in Lesotho states: 'the best guarantee for positive change is for there to be a "critical mass" of enough women asserting their rights.'²⁴ Today, one of these women is Motseoa Senyane, Edwin's eldest daughter. She is the current Director of Transformation Resource Centre, one of the best education and advocacy NGOs in the country. As for my neighbour Edwin Senyane, he has since passed on – but I like to imagine he is watching his daughter and smilling again, this time with a measure of hope.

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Lintle Mokhethi sits among bags of maize: will aid or education provide for her future?

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- 8. Mario Azevedo & Emmanuel Nnadozie, African Economic Development (Academic Press, 2003) p. 221. Only four countries were in the highest percentile bracket (7-9%): Namibia, Lesotho, South Africa and Tunisia.
- 9. UNDP. loc. cit.
- 10. Lesotho Ministry of Education, 1993, in Gay, Gill & Hall, p. 67.
- 11. Over 25 percent of Lesotho's villages have female chiefs and a high number of households are headed by women due to the migrant labour system which necessitates the absence of men. At higher levels, approximately 35 percent of area chiefs and 25 percent of principal chiefs are women.
- 12. Today, fewer boys are required for livestock herding (though it still keeps almost 10 percent of boys in the lowlands and more than 20 percent of boys in the mountains from attending school) and fewer young men are going to work in South Africa (due to massive retrenchment of migrant labourers, especially from the mines where the numbers of migrants have halved since the early 1990s). With time, therefore, one expects that the number of boys in school will catch up and possibly surpass that of girls. (Gay & Hall 2000: 7-8.)
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- 20. Ibid., p. 11.
- 21. The question of whether a given case should come under customary or common law sometimes requires a test of lifestyle: those considered more traditional are judged under customary law and those closer to a 'European' way of life under common law.
- 22. A glimpse of the potential benefits of removing legal barriers may be seen in the fact that a 1993 national household survey found that the most prosperous people in Lesotho's capital, by far, were women who had never been married (Gay, Gill & Hall 1995: 185).
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LACK OF INTEREST IN MATHEMATICS AND SCIENCE AMONG AFRICAN LEARNERS IN SOUTH AFRICA

by Chris Kanyane

Introduction

South Africa is often regarded as the economic engine of Africa. It has good infrastructure in the form of roads, information and communication technologies (ICT),



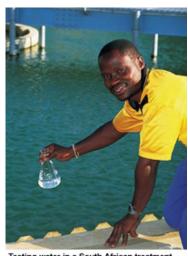
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energy, transport, water and sanitation, developed banking institutions, etc. However, South Africa's skills shortage is critical. The country simply does not have enough skilled human resources. That is the reason most of the key jobs in engineering, ICT, accounting and construction are filled by expatriates.

According to an article entitled "Skills shortage pitfall will curtail economic growth" by David Butler, chairman of Global Trader, published in the *Star* newspaper (04/21/2005), South Africa must actively seek skilled labour from abroad. The article concludes that South Africa must address the "supply side" issue now before it has significant effects on inflation and threatens the sacrifices that have already been made to turn the country into an economic success story.

Unless practical steps are taken to solve the skills shortage, NEPAD objectives cannot be achieved. These objectives are:

- · To eradicate poverty;
- To place African countries, both individually and collectively, on a path of sustainable growth and development;
- To halt the marginalization of Africa in the globalization process and enhance its full and beneficial integration into the global economy;
- To accelerate the empowerment of women.



Testing water in a South African treatment facility: many jobs require math and science. USAID / B. Zurba

In this article, I will examine one of the most critical ingredients for addressing the skills shortage and meeting NEPAD objectives: the need for major improvements in the teaching of mathematics and science in schools.

Background

South Africa has 12 million learners, 366 000 teachers and around 28 000 schools - including 390 special needs schools and 1 000 registered private schools. Of all the schools, 6 000 are high schools (grades 7 to 12) and the rest are primary (grades 1 to 6). School life spans 13 years - or grades - although the first year of education, grade 0 or "reception year", and the last three years, grades 10, 11 and 12 or "matric", are not compulsory (Garson, 2004).

In 1976, in what came to be known as the Soweto Uprising, thousands of scholars protested against the learning conditions in their schools, especially against the policy of instruction in Afrikaans, thus sowing the seeds for a popular resistance movement which ultimately contributed to the downfall of the apartheid government. Unfortunately, the cost of taking the "liberation now, education later" stance taken during those years severely damaged the culture of learning and teaching in schools and universities.

"The cost of taking the 'liberation now, education later' stance during those years severely damaged the culture of learning and teaching."

Although today's government is intent on rectifying the imbalances in education, the apartheid legacy lingers on. The greatest challenges lie in the poorer, rural provinces like the Eastern Cape and KwaZulu-Natal. In the more affluent provinces like Gauteng and the Western Cape, schools are generally better resourced. Many of the financial problems facing the educational sector stem from the failure of some these provinces to manage their spending properly.

Like so much else in South Africa, the education system is characterized by diversity: schools and universities vary greatly in terms of quality, financial resources, ethos and size. Nevertheless, top quality schools and universities are found in both the state and the private education sectors (Garson, 2004).

In state schools, the government provides the minimum, while parents contribute to basics and extras in the form of school fees. These fees vary considerably, depending on factors such as class size, facilities and the quality of teaching offered. Most schools in the townships and in rural areas struggle for resources, but some manage to be "pockets of excellence" despite the odds.



Beating the odds: after 14 years of teaching chemistry and physics without any tools, Alexandra Township teacher Nomvula Tsehla is delighted to have new science learning kits - and students stay late to use them.

USAID / R. Zurba

"Most schools in the townships and in rural areas struggle for resources, but some manage to be 'pockets of excellence' despite the odds."

Today the central government provides a national framework for school policy, but administrative responsibility lies with the nine provinces, which must decide how to spend their education budgets. Power is further devolved to the grassroots level by elected school governing bodies. They have a significant say in the running of their schools, and many now employ their own teachers in an attempt to improve teacher/pupil ratios and keep class sizes manageable (Garson, 2004).

The higher education sector falls under the auspices of the national government. Private schools and higher education institutions have a fair amount of autonomy, but are expected to fall in line with certain government non-negotiables. Theoretically, no child may be excluded from a school on grounds of his or her race or religion, for example.

Challenges

The negative impacts from so many years of apartheid education are profound. According to an annual report of Project Literacy (2000), 48% of South African adults are functionally illiterate. Teachers in township schools are poorly trained, and the matric pass rate remains unacceptably low. However, at 68.9% in 2002, compared with 61.7% the year before, the matric pass rate has shown some improvement. While 65% of whites over 20 years old and 40% of Indians have a high school or higher qualification, this figure is only 14% among blacks and 17% among the coloured population (Garson, 2004).

As already noted, the "liberation now, education later" stance of the anti-apartheid struggle severely damaged the culture of learning and teaching in South Africa. Instead of being places of learning, schools became sites of protest. Furthermore, the Bantu Education Act of 1955 restricted what black children could be taught. This was true, for example, of the amount of mathematics that was permitted. The mathematics covered in teacher training for black schools was similarly limited, and these restrictions were in force until the early 1990s. Accordingly, many teachers in schools today are not properly qualified in their subject areas.

Retraining teachers, rebuilding the educational environment, redressing the resource imbalances and encouraging African learners to pursue courses in mathematics and science are major challenges for the Department of Education.

According to Dr Liz Rasekola, a Nigerian Chemical Engineer, the seemingly endemic poverty and poor quality of life in black communities will only be overcome when young people have professional mobility beyond the limited stereotypical professions of sports, music and the arts. And according to a study done by Tsheole (2002), the problem begins well before young people enter upon their careers, for in reality most black students learn in appallingly poor conditions. In most cases, students in townships are still being taught subjects by teachers who never specialized in them. And there are no libraries or laboratories.

"Students in townships are still being taught subjects by teachers who never specialized in them. And there are no libraries or laboratories."

The situation is reflected by the experience one black student who wanted to become an engineer but was discouraged by the lack of appropriate learning opportunities along the way. For example, when he was in Standard 8, his science teacher used to come into the classroom to demonstrate the mixing of sodium and water saying: "imagine this is a glass beaker (referring to a piece of chalk), imagine I pour salt into it, imagine I pour water into it, imagine I mix the salt and water. Imagine what will happen." Such stories lead one to question whether the supposed indifference of African learners to mathematics and science is really a lack of interest, or the result of a learning environment that is unable to encourage interest.

The question some students and I looked at therefore is what specific factors in the learning environment lay behind the supposed "lack of interest".

Procedure

In this study we examined the way mathematics and science subjects are taught, the qualifications of teachers who teach these subjects, the availability of facilities or the lack thereof. We also looked at the method of teaching. From there we interviewed pupils to see the degree of their exposure to careers such as engineering, medicine and information technology.

The study was restricted to township and rural learners, our assumption being that, since the township and rural learners are almost 100% African, this would give us a true reflection of the problem of the lack of interest in mathematics and science subjects by African learners. The rural schools we looked at are in the Maubane group of



High school students in KwaZulu-Natal: lack of interest in maths and science or a poor learning environment? © 2000 Patrick Coleman/CCP.

2000 Patrick Coleman/CCP, Courtesy of Photoshare

villages outside Hammanskraal. For township schools we investigated those in Soshanguve.

Key Findings

Our findings of the conditions in which African students learn can be summed up as follows:

Many black teachers are poorly qualified, and there are too many pupils per teacher in both rural and township schools. Rural schools have fewer classrooms. Shortages of textbooks are common, in both township and rural areas, and in both there are few schools with science laboratories of any kind.

What students say

Students reported that mathematics and science are too dull and theoretical, and too difficult. They tend to switch to other subjects that are more interesting and less demanding than mathematics and science. In a society dominated by consumerism, young people would rather study things like economics and business, which are "not so hard to learn" and which lead to popular jobs such as accounting, marketing, radio and television acting, etc. These careers are promoted in the media.

"Students reported that mathematics and science are too dull and theoretical, and too difficult."

Teachers and methods

Teachers claimed that lack of science equipment and laboratories prevent them from teaching science practically. They also indicated workloads in which one teacher may be teaching all subjects offered in the school. Where laboratories are found in township schools, most teachers lack the knowledge to use chemicals and apparatus effectively. Teachers occasionally reported reservations about touching equipment lest these were damaged, while others expressed fears of attempting experiments that might not work in front of learners. Thus, science equipment was not being used as it should in these schools. Underutilisation of science equipment seemed to be caused by deficiencies in practical skills and understanding of science.

Ogunniyi (1996) notes that no education system is higher than the level of the teacher.

Thus, standards in science classrooms may fall because of the shortage of properly trained science teachers. As for mathematics, according to the African Institute for Mathematical Sciences (1998) there is a very serious shortage of teachers in South Africa equipped to teach it. Just as in many other countries, those who are qualified either do not enter the teaching profession at all, or leave it due to the pressures of the job or for alternative employment opportunities, better status and pay. These factors contribute much to students lacking interest in pursuing maths and science.

Finally, the classroom approach to teaching mathematics and science is almost entirely authoritarian: lecturing, note-taking, and question and answer sessions. In both rural and township schools, experiments are demonstrated by the teacher (where the equipment exists and the teacher can use it) while the students watch and take notes. The development of a scientific way of thinking is abandoned in favour of the learning of definitions and standard procedures.

"The classroom approach to teaching mathematics and science is almost entirely authoritarian: lecturing, note-taking, and question and answer sessions."

Conclusion

Although the study was based on a small sample, it highlights serious problems in township and rural schools, the schools which accommodate most African learners. The study also shows that even though the government has tried to improve schools in disadvantaged areas the problem of a lack of resources still exists.



Future nurse or doctor: will this South African girl's math and science education be able sustain her interest?

Mathematics and science teaching and learning, it could be said, is in crisis in South Africa. One of the key problems is a lack of qualified educators, with fewer than 20 percent of mathematics and science teachers having adequate qualifications. Getting young people enthusiastic about science calls for extra effort by teachers, who are generally poorly prepared to teach the subject and often did not study or like science themselves at school.

Recommendations

All the problems highlighted above require increased funding. The provision of new,

spacious, state-of-the-art laboratories would encourage learners to take maths and science subjects and stimulate their interest to pursue careers in science.

New teachers in maths and science must be properly trained. They must have solid knowledge of the subjects, and a full understanding of the equipment. Field-based and problem-solving experiences should be incorporated into all years of pre-service teacher training.

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There should be a reduced workload for beginning teachers. They should be provided with a meaningful internship experience supervised by an experienced teacher. Sustained and relevant staff development should be provided for all teachers.

I believe the above suggestions are both practical and realistic. New investment in the learning and teaching of these fields and areas of study will, in the long term, undoubtedly improve the learning outcomes of all students, particularly those from the disadvantaged communities we identified in this study.

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