Can we trust
our courts?

About schools,
maths, science,
bullying, and
everything else

ICT is all about
people

Contents

The CEO Notes

BRICS think tanks in the changing world

Over the last decade, a major shift has taken place in the balance of global power in favour of emerging markets. This is especially true of the BRICS (Brazil, Russia, India, China and South Africa) countries. The developing world, and in particular the global South, has experienced an economic boom that is generating rapid growth, prosperity and increasing confidence in those countries.

The shift of balance includes the "Arab Spring", giving rise to a political activism of unprecedented scale in that part of the world, rattling the cages in Tunisia, Libya, Egypt and Syria. In Africa, a democratic wind began to blow giving rise to economic growth, growth of the middle class and intraregional social and economic cooperation. China and India became economic giants, with China replacing Japan as the second largest world economy. The BRICS grouping was established against this background, comprising countries with growing economies that promise to change the economic, social and political landscape of the world.

Representing the voices of the Global South, BRICS intends to reform the Bretton Woods Institutions, consisting of the World Bank and the International Monetary Fund, and establish the BRICS development bank. This would offer preferential funding schemes for infrastructure development in developing countries, thereby unlocking resources from regions such as Africa, with its rich natural resources.

BRICS also advocate democratic and balanced change in global governance, including introducing financial regulations to prevent the global economic crisis from deepening; pushing for a multi-polar world and promoting peace and security through settling conflicts using non-confrontational approaches. The path for the BRICS countries to achieve their goals will not be an easy one; it will involve managing simultaneous transitions of the economy, culture and politics, coupled with possibly unmet expectations that will need to be managed along the way.

Prior to the 2013 Leadership Summit, hosted by South Africa, BRICS countries set up a BRICS Think Tank Council (BTTC), comprising

These think tanks will work towards articulating a long-term vision for BRICS, the outcome of which could be the coalescence of different world views into one that is inclusive and beneficial to all.

the Institute for Applied Economic Research (IPEA, Brazil), National Committee for BRICS Research (NRC/BRICS, Russia), Observer Research Foundation (ORF, India), China Center for Contemporary World Studies (CCCWS, China) and the Human Sciences Research Council (HSRC, South Africa). These think tanks will work towards articulating a long-term vision for BRICS, the outcome of which could be the coalescence of different world views into one that is inclusive and beneficial to all.

Central to the rationale of the BTTC is the need for greater understanding between and within BRICS countries, which will further strengthen and deepen diplomatic, political, economic, social and cultural relations. While bilateral relationships also serve to address such issues, the BRICS Think Tank Council, as a multilateral institution, is assuming an important and strategic role in the creation of a new, more equitable world order. This will require, among other things, research and knowledge sharing. What is the role that the BRICS think tanks and more specifically, the BTTC, can play in shaping policy at a time when the world is rebalancing? How can think tanks bridge the gap between research and policy, and how their impact on policy be accurately assessed? And how can the think tanks translate scientific knowledge into clear and understandable information that would be appropriate for informing the leaders and governments of the BRICS countries?

Independent analysis is becoming ever more crucial, given the growing attention and focus on BRICS and its activities and pronouncements on global issues. BRICS think tanks and the BTTC could consolidate the status of BRICS as an important grouping in the international community, and act as policy guides and incubators, providing strategic inputs for intra- and inter-BRICS cooperation. The final home of the think tank will be a BRICS Centre of Excellence, which is at a planning stage. ■

Dr. Olive Shisana chairs the Interim South African BRICS Think Tank.

News Roundup

Insights into hypertension among the elderly

Analysis of the data from a study commissioned by the World Health Organisation revealed high rates of hypertension among South African adults in the 50 years and older age group. This puts them at risk for cardiovascular disease, reports Professor Karl Peltzer, director of the HIV/Aids, STIs and TB research programme at HSRC.

The percentages of hypertensive subjects who were aware, treated and controlled was very low. This data underscores the urgent need to strengthen public health education and blood pressure monitoring systems to better manage hypertension among older adults in South Africa, Peltzer says.

Little attention has been given to hypertension and associated factors among older adults in our continent. Therefore, this study aimed to investigate the prevalence and associated factors of hypertension in a national sample of older South Africans and formed part of a much larger study, the Study of Global Ageing and Adults Health (SAGE), in 2008. More than 3 800 older adults took part in the study that also looked at sociodemographic characteristics, health variables, and anthropometric (the measurement of the size and proportions of the human body) and blood pressure measurements.

The results showed that the prevalence of hypertension in the sample population was 77,3% (male 74,4%, female 79,6%). The rate of awareness was 38,1%, while 32,7% received treatment and only 17,1% had their hypertension under control. The results also revealed that the prevalence of hypertension was high among the coloured population, especially with those who had a stroke, or were overweight or obese. An interesting finding was that hypertension was not associated with alcohol use.

The SAGE report is available on www.hsrc.ac.za. The full article appeared in the Cardiovascular Journal of Africa*, Vol 24, No 3, April 2013.*

HSRC researcher wins coveted fellowship

A feature of the fellowship programme is that all projects must be in the humanities, defined by the study of history, language and culture, and by qualitative approaches in research.

Dr. Godwin Onuoha, an African research fellow and senior research specialist in the Democracy, Governance and Service Delivery programme, was awarded the prestigious African Humanities Program (AHP) fellowship to the value of $18 000 for early career post-doctoral work related to his PhD thesis. The American Council of Learned Societies (ACLS) awards this fellowship in its annual competition. A feature of the fellowship programme is that all projects must be in the humanities, defined by the study of history, language and culture, and by qualitative approaches in research.

Godwin's project focuses on the political economy of memory and contested narratives of the Nigeria-Biafra Civil War. His research aims to show how the neo-Biafran movement in southern Nigeria is appropriating various kinds of memory to shape its cause; namely a secession from the Nigerian state.

The critical task of the study is to investigate and question the notion of the value and meaning of the role of citizens, and to open up new views on the connection between self-determination and violence in the nation state project in Africa. His research offers a new perspective on the politics of memory by reflecting on the merging of memory production and political economy concerns. His application strongly motivates for new insights into memory studies in Africa. "There tended to be a concentration on accounting for past violence but more recently, on reconciling divided populations in a nation-building effort," Onuoha says.

Cofimvaba Schools Technology Project: from learning to best policy

DST commissioned the HSRC to do the monitoring and evaluation of the CSTP to see if it could be replicated in similar rural environments to ultimately inform policy development.

A pilot project in the Nciba Circuit of the Cofimvaba Schools District in the Eastern Cape aims to test the contribution made by a unique and innovative approach to improve learning and teaching in schools in a rural context. The project, known as the Cofimvaba Schools Technology Project (CSTP), involves establishing themed working groups to design interventions around new and established technologies to be implemented in schools in the Nciba Circuit.

Seven themed working groups have been established thus far, including ICT and e-learning, water and sanitation, science and technology, nutrition and agri-teaching, teacher support, e-health and energy.

The project is a partnership between the Departments of Science and Technology (DST) and Basic Education (DBE), the Eastern Cape Department of Education, the Department of Rural Development and Land Reform (DRDLR), and the HSRC and CSIR. The DST commissioned the HSRC to do monitoring and evaluation of the CSTP to see if it could be replicated in similar rural environments to ultimately inform policy development. In response to the unique nature of the project, a team of researchers from the HSRC's Education and Skills Development (ESD) unit designed a monitoring, evaluation, reflection and learning (MERL) framework, guided by a number of approaches, including participatory action research, evidence-based policy research, and outcomes mapping.

Going beyond traditional monitoring and evaluation approaches, MERL includes participatory reflection and learning processes intended to create a real-time response to learning from successes and challenges of the initiative in an iterative process. The approach also affirms the active involvement of learners, teachers and the broader community to ensure ownership and capacity development. This component of the project will be led by Professor Thenjiwe Meyiwa from ESD and will run until April 2015.

Perspectives on early childhood development

A new project, Early Childhood Development and Education (ECDE), has been undertaken by the Human and Social Development programme (HSD). The venture uses participatory research methods to explore the knowledge, attitudes, beliefs and practices of parents, teachers and other interested parties in three African countries, namely Zambia, Malawi and Swaziland.

Candice Rule, a researcher, explains that this project investigates what access communities in these countries have to ECDE services. High levels of poverty and poor incomes exist in these countries, and the well-being of young children ranks among the lowest in the world. According to the Child Development Index, compiled by Save the Children UK in 2012, Zambia was ranked 101, Swaziland 95 and Malawi 98. The study is now at phase four, whereby a culturally-sensitive tool is being used to gather data.

New@HSRC

Professor Bédia Aka (doctorate in economics, University of Paris-12 Val-de-Marne, France) has been appointed an African research fellow in the Economic Performance and Development programme. Before joining the HSRC, he was professor of economics at the University Allassane Ouattara of Bouaké in the Ivory Coast. He has also worked in the areas of modelling macroeconomic fluctuations and growth at the University of Laval, University of Luxembourg and Statec-Luxembourg, and in the area of social protection at UNICEF-Ivory Coast.

Natalie le Roux (MA in research psychology, University of Zululand) is a registered research psychologist, and has been appointed a chief researcher in the Science, Technology and Innovation Indicators (CeSTII) unit in the Population Health, Health Systems and Innovation research programme. She rejoined the HSRC in March this year, having worked at the University of the Free State as a researcher in research management and research administration.

Dr Nhlanhla Mbatha (PhD in economics, Rhodes University) has been appointed chief research manager in the Education and Skills Development programme. Before joining the HSRC, he was associate professor of economics at University of South Africa (Unisa). He has also worked as a research consultant in the areas of international trade and water resources management.

Mbulelo Ntusi (BSc and post-graduate diplomas in human resources and higher education), took up the position as head of human resources at the HSRC. He previously worked for the Development Bank of South Africa (DBSA) where he was employed as divisional executive for the human resources department.

Dr Udesh Pillay (PhD, urban and economic geography, University of Minnesota, USA), formerly an executive director in the Office of the CEO at the HSRC, has been appointed deputy CEO of management support. Dr Pillay, who joined the HSRC in 2002, previously headed four research programmes during his 10-year tenure at the HSRC.

In the court of public opinion:
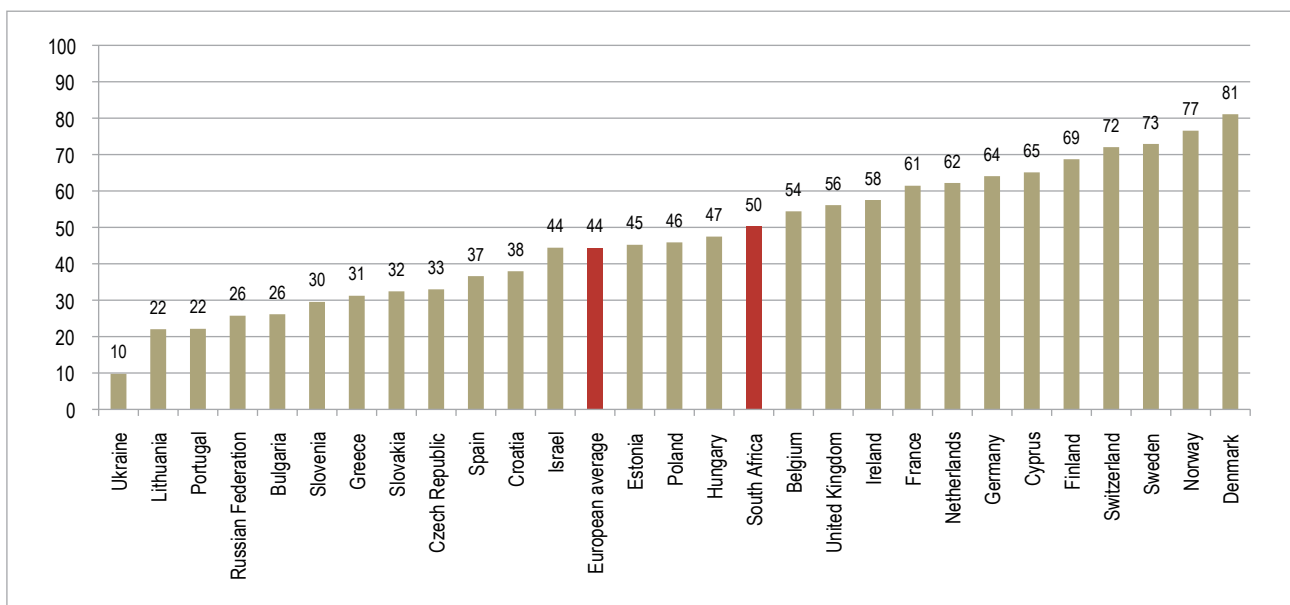
attitudes towards the criminal courts

After two decades of democracy, do South Africans have confidence in our criminal courts? The courts require public support and institutional legitimacy if they are to function in a fair and effective manner. *Benjamin Roberts, Steven Gordon, Jarè Struwig* and *Narnia Bohler-Muller* examine public attitudes towards the courts to better understand how South Africans view this important civic institution.

To establish the extent and nature of levels of trust and legitimacy, cooperation and compliance in the criminal justice system in South Africa, a detailed set of questions was fielded to 2 518 participants involved in the 2012 South African Social Attitudes Survey (SASAS). This nationally representative survey of the nation's adult population has been conducted by the HSRC since 2003. The indicators used in the 2012 SASAS were identical to those tested in the fifth round (2010) of the European Social Survey (ESS), allowing comparisons to be made between South Africa and a wide range of European countries on attitudes towards the courts.

Are the courts doing a good job?

To assess overall levels of confidence, respondents were asked: taking into account all the things the courts are expected to do, would you say they are doing a good job or a bad job? Half the South African adult population indicated that they thought the courts were doing a good job. From a comparative perspective, South Africa ranks above many European states in terms of court confidence (Figure 1).

Figure 1: Overall confidence in the courts: South Africa and Europe compared

Source: HSRC SASAS 2012; ESS Round 5 (2010-11)

Half of all South Africans in 2012 indicated that they trusted the courts, which represented a decline from 2009 when 57% of the population trusted the courts.

Opinions across Europe vary appreciably, with the least positive views evident in Ukraine, Lithuania and Portugal, while the most positive evident in the social democratic states such as Denmark, Norway and Sweden. In this league table, South Africa is positioned alongside post-communist nations such as Hungary, Poland and Estonia, but also – more surprisingly – Belgium and the United Kingdom.

Do South Africans trust the courts?

To further contextualise these findings, trend data covering a 15-year period was examined. For this purpose, responses to a standard institutional trust item that has been included annually in SASAS since 2003, as well as in earlier HSRC attitudinal surveys, was used. Respondents were asked to rate their current level of trust in the courts using a five-point scale ranging from 'strongly trust' to 'strongly distrust'.

Figure 2: Share of South Africans expressing trust in the courts, 1998-2012

Source: HSRC EPOP 1998-2001; HSRC SASAS 2003-2012

As Figure 2 reveals, public perceptions of the courts demonstrated an upward trend from the late 1990s until the mid-2000s, after which confidence fluct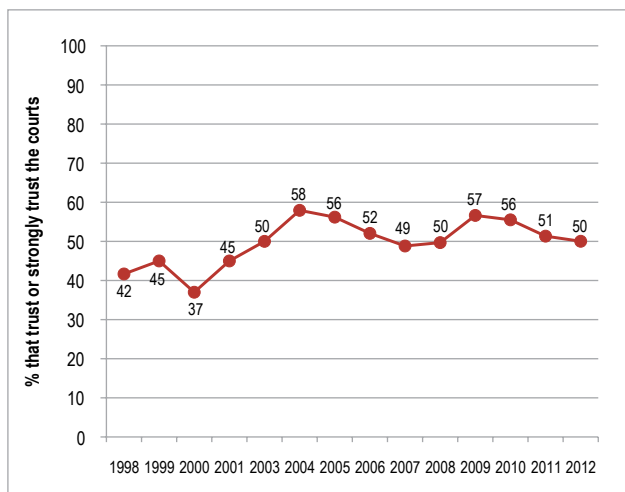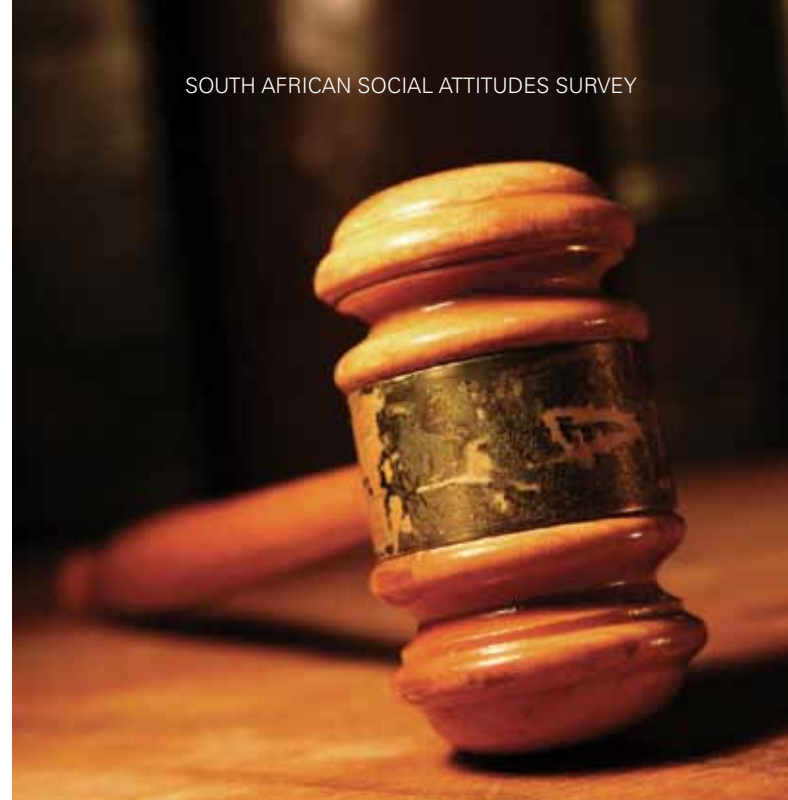uated within a relatively narrow range. Half of all South Africans in 2012 indicated that they trusted the courts, which represented a decline from 2009 when 57% of the population trusted the courts.

The results suggested that the majority of South Africans believed the court system discriminated on the basis of wealth and race.
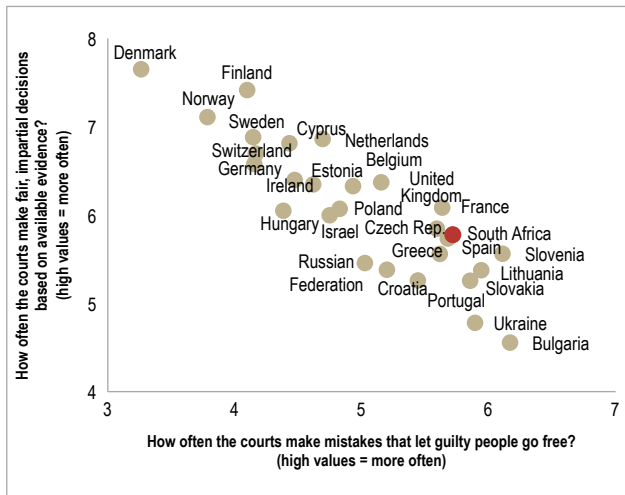
Court effectiveness

Evaluations of trust in the court system are said to be influenced by perceptions about court effectiveness (technical competency), as well as awareness of the manner in which the courts exercise their authority, including whether they treat people fairly, with dignity and acknowledge the rights of citizens. To assess how effective the public deemed the courts to be, respondents were asked how often they felt the courts made mistakes that let guilty people go free. Responses were measured using a 0-10 scale, with 10 representing the most negative assessment. On average, adult South Africans tended to view the criminal courts as more prone to error (mean = 5.7) than Europeans on average (5.1), placing us alongside Spain, Slovakia and the Ukraine.

Procedural fairness

While South Africans harbour some concerns about the effectiveness of courts, to what extent do they trust the courts to wield their authority in a procedurally fair manner in their treatment of people and decision making? Respondents were asked whether they felt that the courts made fair, impartial decisions based upon available evidence. Responses were again captured using a 0-10 scale, with 10 denoting the most positive evaluation of court impartiality. On average, adult South Africans gave responses that were above the mid-point on the scale (5.8). Cross-nationally, South Africans rated the criminal courts slightly lower than the European average (5.9), rating the country alongside Slovenia, Spain and the Czech Republic.

Figure 3: Trust in courts' procedural fairness and trust in their effectiveness: South Africa in European perspective
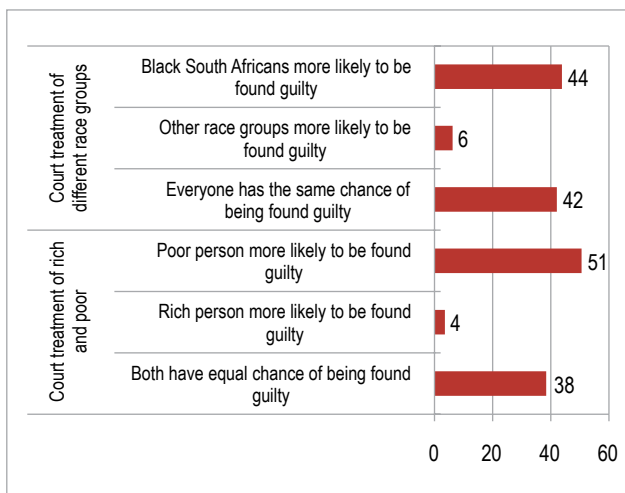

Source: HSRC SASAS 2012; ESS Round 5 (2010)

Figure 3 demonstrates the relationship between trust in the competence of the courts and belief in their procedural fairness. The vertical axis of the chart represents the level of trust in court procedural fairness, while the horizontal axis captures perceived court effectiveness. The figure convincingly shows an association between trust in judicial fairness and trust in court effectiveness, with South Africa located alongside many ex-communist states. Further analysis revealed that concerns over impartiality were keenly felt among the more marginalised and socially vulnerable in society. Poorer South Africans were less convinced of the fairness and impartiality of court decisions than the better-off and therefore, were found to be less trusting of the courts.

Distributive fairness

Figure 4: Public perceptions of class and racial bias in the South African court system

Source: HSRC SASAS (2012)

The final component of trust in the criminal courts that was investigated was of distributive fairness, which refers to whether the courts were perceived to secure appropriate outcomes for all people and provide equal treatment that results in a fair distribution of actual outcomes. In order to measure perceptions of racial bias in the courts, respondents were asked who they felt would be most likely to be found guilty if "two people from different race or ethnic groups each appeared in court, charged with an identical crime they did not commit". More than two-fifths (44%) reported that black South Africans were more likely to be found guilty, with 42% stating that the courts would in actual fact remain impartial.

To measure perceived class bias in the courts, survey participants were asked: if two people – one rich, one poor – each appear in court, charged with an identical crime they did not commit, who do you think would be most likely to be found guilty? Approximately half (51%) of all South Africans felt that the poor person would be more likely found guilty, with less than two-fifths (38%) reporting that both would have an equal chance.

These results suggested that the majority of South Africans believed the court system discriminated on the basis of wealth and race. This belief was particularly pronounced among young South Africans. Those perceiving a race bias in court procedural outcomes also tended to believe the courts were biased against the poor. The youth, black South Africans and poorer citizens were more greatly predisposed than other groups to view the courts as distributively unfair. Those who perceived the courts as being prejudiced also tended to believe the courts were ineffective and distrusted these important institutions.

Conclusion

The findings of the 2012 SASAS suggested that a considerable share of South Africans did not believe that the courts made fair and impartial decisions. Of particular concern were the negative views of the courts held by the young and the socially disadvantaged, since these groups constitute a disproportionately large share of the population. Their characterisation of the criminal courts as prejudiced could have a damaging effect on the legitimacy of the courts. In a context of already middling to poor levels of overall confidence and effectiveness of the courts, this leaves little room for complacency. As important institutions in any liberal democracy, the courts and their representatives need to place a strong and unwavering emphasis on performing their responsibilities in an effective and fair manner. It is only by doing so that they will inspire among the public, a sense of obligation and moral alignment, and a willingness to cooperate and comply with the rule of law. ◼

Authors: Benjamin Roberts and Jarè Struwig, coordinators of the South African Social Attitudes Survey (SASAS), Steven Gordon, PhD intern, Narnia Bohler-Muller, Deputy Executive Director, Democracy, Governance and Service Delivery programme, HSRC.

Understanding the effects of fiscal policy on South Africa

Increased investment spending would decrease the national debt of the country as a percentage of its Gross Domestic Product, reduce government deficit and improve the economic health of the country, says *Margaret Chitiga-Mabugu*.

A low debt-to-GDP (Gross Domestic Product) ratio indicates an economy that produces a large amount of goods and services and most likely, profits that are high enough to pay back debts. Increases in government expenditure can benefit the economy by affecting the level of income and its distribution. This can influence people's wages and returns to capital thereby affecting saving and investment, thus potentially boosting economic growth. However, increased spending translates into greater debt, which might not be sustainable in the long run.

Indeed, if the government increases its spending, it might need to either reduce spending in future or increase taxes in order to return to its original debt-to-GDP ratio.

In a paper oriented towards the constraints the government faces in financing its expenditures, myself and some colleagues evaluated the impact of such policies by constructing an inter-temporal model and applied it to South Africa. By intertemporal model we mean a multi-period model in which results are computed simultaneously for all periods rather than computed one-period-at-a-time.

In such a model, firms and households have a forward-looking behaviour and take into account all future prices in their investment and consumption decisions. By taking this approach, major contributions to existing literature on the transmission mechanism of fiscal policy in African economies are made.

To the best of our knowledge, no published study has empirically analysed the macroeconomic effects of fiscal policy in the context of an open, middle-income sub-Saharan African economy like South Africa, using an intertemporal model that quantifies the implications of sectoral and temporal linkages, which are crucial for understanding the effects of fiscal policy. It is believed that this approach could provide important insights into fiscal constraints as well as their impact on the economy as a whole.

Simulations with the model focused on the intertemporal impact of increased current and investment spending. The results showed that an expansive fiscal policy would have a short-term positive impact on GDP but would translate into a greater debt-to-GDP ratio. Financing increased spending through taxation, direct or indirect, would mitigate this impact but would also have negative short-term impact on macroeconomic variables. Increased investment spending would improve long-term GDP under any financing scheme and would decrease the debt-to-GDP ratio as well as the deficit-to-GDP ratio.

These lessons are not only valuable for South Africa, but for all developing countries where considerable attention is being given to the use of expansive fiscal policy for economic growth and the creation of jobs. These conclusions are driven by the positive impact infrastructure has on total factor productivity. Without this feature, increased public investment would have almost no impact on the South African economy. Although the positive impact of infrastructure on growth is well documented, less is known about the impact current expenditures on education and health have on total factor productivity. More conclusive econometric work for South Africa on how this spending affects economic growth would allow a better modelling of public spending and thus a better understanding of their impact on the economy. ■

Author: Professor Margaret Chitiga-Mabugu, Executive Director, Economic Performance and Development, HSRC

Census 2011 reveals boom in backyard shacks

The 2011 Census revealed some unexpected patterns and trends. One of the striking findings was the sharp growth in backyard shacks in the major cities. *Jackie Borel-Saladin* and *Ivan Turok* discuss the positive and negative aspects of this phenomenon.

The deepening global economic crisis, accelerating climate change and pressures of large-scale urbanisation have rekindled interest in the notion of sustainable urban development. The capacity of cities to absorb the majority of the world's population growth while providing adequate livelihoods and essential public services will be crucial in the years ahead. Disorderly urbanisation will cause social unrest and expose people to dangerous living conditions and environmental hazards through unregulated building on unsuitable land.

Simplified indicators gleaned from readily available data sources can assist decision makers to monitor a dynamic situation and implement policies to help cities become more resilient. We used Census data from Statistics South Africa to develop suitable indicators for the eight largest cities in the country. We wanted to know whether the pattern of urban development was contributing to socioeconomic progress and would be sustainable in the longer term.

Uneven growth
The significance of urbanisation in South Africa is apparent from the fact that nearly two-thirds (63%) of total population growth between 2001 and 2011 occurred in just eight cities. Their average annual growth rate was three times higher than in the rest of the country – a striking disparity. Over half of all population growth occurred in the three Gauteng metro's (Johannesburg, Tshwane, Ekurhuleni) and Cape Town (Figure 1).

This uneven distribution translates into very different challenges and opportunities across the country, placing exceptional strain on the major metro's to accelerate basic service provision and jobs in order to keep pace with rising demand.

Rapid demographic growth requires many new schools, clinics, roads, water pipes, sewage treatment plants, electricity networks and waste disposal facilities. This all adds to the pressure on local ecosystems and natural resources, such as water courses, air quality and biodiversity.

Government systems of resource allocation do not appear to give sufficient recognition to these variations in population growth, adding to community dissatisfaction and protest in expanding urban settlements.

Figure 1: Population Growth in South Africa, 2001-2011

Social sustainability
Migration is not a classic sustainability indicator, but depending on its scale and composition, it can destabilise community cohesion and reduce a city's resilience. Rapid rural and international migration complicates orderly urban development and therefore needs to be monitored and actively planned for. However, urbanisation is most certainly bound to continue.

The 2011 Census showed that migrants now constitute more than double the share of the population in the metro's than in the rest of the country. More than one in three residents in Gauteng moved there from elsewhere.
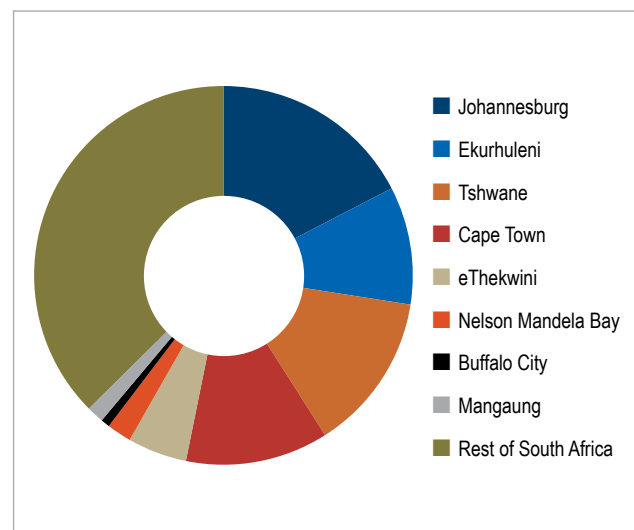
The significance of urbanisation in South Africa is apparent from the fact that nearly two-thirds (63%) of total population growth between 2001 and 2011 occurred in just eight cities.

There were substantial improvements in the availability of basic services throughout South Africa between 2001 and 2011. The metro's generally managed to keep pace with the needs of a growing population, as well as making inroads into their historic backlogs. Hence real progress was achieved in access to internal piped water, flush toilets within the vicinity, regular refuse removal, and levels of educational attainment. Towns and rural areas outperformed the metro's in one respect – access to electricity.

Shelter

There was less success in reducing the number of people living in informal dwellings (shacks). Government efforts to build RDP houses in the biggest metro's could not match the demand, resulting in nearly one in five households now living in shacks. The biggest increase was in Cape Town, where the number grew by more than 75 000 (an increase of 53%). The number of households living in shacks in Johannesburg increased by 37 500 (17%).

Even more interesting was the growth in the number of households living in backyard shacks. This is a relatively new social phenomenon whose significance has not been grasped by national or local policy makers or urban researchers. In almost every city there was an increase in backyard shacks (Table 1). This was offset in most places by fewer households living in free-standing shacks in informal settlements.

Table 1. Change in number of households living in informal dwellings, 2001-2011

Type of dwelling	Absolute Difference		Percentage Change	
	Backyard informal dwellings	Other informal dwellings	Backyard informal dwellings	Other informal dwellings
Johannesburg	45 367	-7 844	58	-6
Ekurhuleni	30 154	-24 455	60	-15
Tshwane	27 947	6 446	117	6
Cape Town	42 154	33 646	129	31
eThekwini	10 689	-11 791	39	-10
Nelson Mandela Bay	968	-21 901	12	-42
Buffalo City	108	-5 153	1	-12
Mangaung	256	-11 320	3	-32
Total Metro's	157 643	-42 371	66	-6
Rest of South Africa	95 786	-84 556	44	-14
Total South Africa	253 429	-126 927	55	-9

Johannesburg experienced the biggest increase in backyard shacks, followed by Cape Town and then Ekurhuleni and Tshwane. Cape Town was unusual in experiencing an increase in both backyard and free-standing shacks. Backyard shacks have been far less important outside the big cities, which may be the reason why they're off the radar screens of politicians and the media.

The pros and cons of backyard shacks

Backyard shacks serve a positive function in helping to densify existing townships and RDP settlements. Services such as public transport, electricity, water, sanitation and refuse removal can be delivered more efficiently to concentrated communities. This helps to keep down the costs to users and ratepayers.

Another important advantage is the rent paid to poor households (the "landlords"). Renting backyard space also affords the tenants considerable flexibility. They can move on when their circumstances change, without tying up their assets in property. Many established townships are located closer to work opportunities than informal settlements, so backyarders have more chance of finding a job.

These advantages need to be set against several negatives. The capacity of basic services is already overloaded in many townships. Unplanned population growth can push infrastructure networks and distribution systems beyond the tipping point, causing them to collapse. The quality of service delivery is most likely to suffer from more frequent breakdowns and blockages.
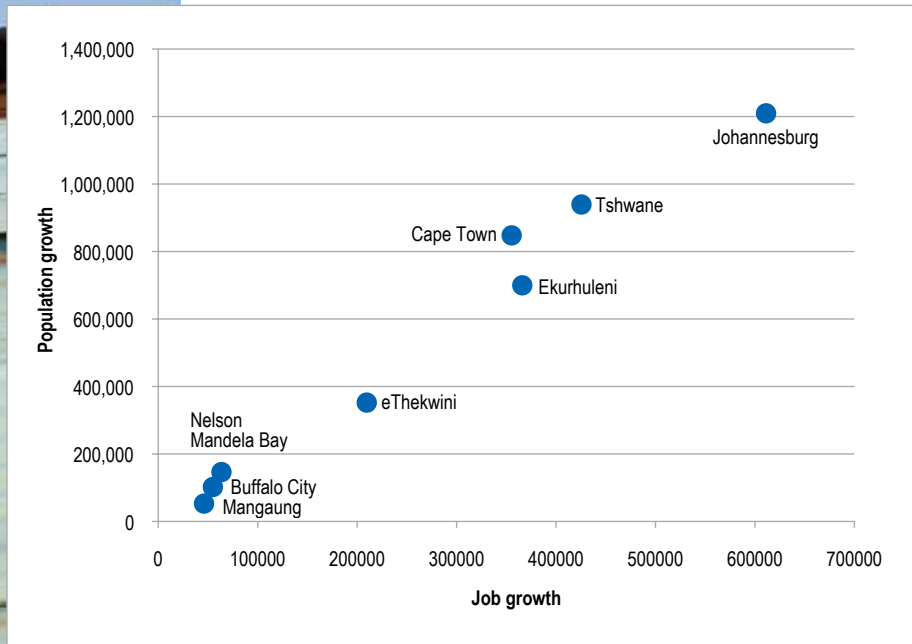
Furthermore, overcrowded properties can pose health risks and lead to outbreaks of infectious diseases, especially if the tenants cannot access the services in the main dwelling. Excessive densities of people living in confined spaces and under squalid conditions also contribute to social tension and increased frustration.

Employment in the metro's grew more strongly than in the rest of the country between 2001 and 2011. This accounts for approximately 60% of all job growth.

Economic sustainability

Employment in the metro's grew more strongly than in the rest of the country between 2001 and 2011. This accounts for approximately 60% of all job growth. The largest absolute gains were in the Gauteng metro's and Cape Town, with just under half of all job growth in the country. This demonstrates the unique role of cities in providing sustainable livelihoods. The scatterplot (Figure 2) shows that employment growth broadly kept pace with population growth in the metro's.

Figure 1: Population Growth in South Africa, 2001-2011

Environmental sustainability

The 2011 Census is least effective in reflecting environmental indicators. A big achievement was the reduction in the proportion of households using solid fuels in the cities. There are positive environmental effects (less air pollution) and major health benefits from the fact that very few households in the metro's still cook with solid fuels.

The take-up of solar energy is still low throughout the country. Adequate and affordable energy services are integral to sustainable economic and social development. South Africa relies very heavily on coal to generate electricity, leading to substantial greenhouse gas emissions, pollution and health problems for people living near power stations. Greater use of renewable energy sources is therefore an important indicator for the metro's.

Conclusion

The census variables discussed here show important improvements in sustainability in South Africa over the last decade. Given the disproportionate population growth in the metro's, the extent of progress on most indicators is encouraging. Progress in relation to informal housing has been much more mixed, and the new phenomenon of backyard shacks deserves much greater attention from policy makers and researchers. ■

Authors: Dr Jackie Borel-Saladin, Chief Researcher, and Professor Ivan Turok, Deputy Executive Director, Department of Economic Performance and Development, HSRC.

There were substantial improvements in the availability of basic services throughout South Africa between 2001 and 2011.

Spreading the news:
the use of ICT to raise rural living standards

Twenty-first century technologies are rapidly spreading into rural Africa, Asia and Latin America. What prospects for broad-based socioeconomic and human development do these innovations open up in rural communities with poor socioeconomic prospects? *Kgabo Ramoroka* and *Peter Jacobs* look at how local communities benefit from the spread of state-of-the art information and communication technologies (ICT).

Local municipalities in South Africa are helping many rural communities to access broadband wireless networks for social communication, learning and business activities. For example, the Peebles Valley community in Mpumalanga close to the Kruger National Park now enjoys the benefits of a community internet link.

The local clinic, which is also a major HIV/Aids care training and support clinic, forms the hub of this internet user network. The clinic uses 60% of the available wireless bandwidth per month, but it also serves as the link through which surrounding schools, homes, farms and other clinics have internet connectivity free of charge. In this case, reliable access to a broadband wireless network translates into many benefits for local communities, serving as a catalyst to deliver better rural healthcare services with positive spillovers cascading across the delivery of other social services.

However, cost, adequate infrastructure and local skills are crucial determinants of what social gains this venture could yield for rural communities in the long run. These barriers could undermine the sustainability and developmental impacts of innovation.

The UK International Development Research Centre (IDRC) funded the start-up installation and operational costs of the network, but there is a need for additional sources for future investments. Adequate infrastructure is vital for its continued existence and effective operation. Moreover, from the outset, this initiative relied exclusively on bringing in highly-skilled personnel from outside this rural locality. Yet technological innovations are vital and skills intensive, and to maximise long-term benefits requires transferring technological capabilities and building adequate local skills.

How do innovations spread in rural areas?

Technological innovations might be made available in a rural area, but their spread among the intended local users is not automatically guaranteed. Understanding the dynamics of innovation diffusion and adoption might be a helpful first step towards exploiting technological innovations for sustainable rural development.

> In this case, reliable access to a broadband wireless network translates into many benefits for local communities, serving as a catalyst to deliver better rural healthcare services with positive spillovers cascading across the delivery of other social services.

The ways in which role-players in an innovation system communicate, share and disseminate new knowledge is known as diffusion. This process depends on, among other determinants, appropriate communication channels and social systems. Mass media (TV, radio, newspapers etc.) and interpersonal communication are examples of communication channels. Without a channel for the flow of scientific and technological information between actors in the innovation system, diffusion is blocked.

The social structure incorporates the relationships, networks and institutions that govern the behaviour of individuals or groups in a community. The contextual environment influences both the types of knowledge transfers (including indigenous knowledge) as well as the informal ways of distributing innovative knowledge.

Adoption takes place when actors decide to make full use of an innovation because they see it as a solution to a problem. However, the speed at which users adopt innovations varies greatly, and adoption is neither a linear nor a smooth process. The experiences of "early adopters", for instance, often affect how potential users react to an innovation and their adoption decision. An innovation that is perceived to be difficult stands a high chance of rejection. The easier it is for would-be users to see the benefits of an innovation, the more likely they are to adopt and apply it.

Transfer of innovation to underdeveloped areas

Real-life examples from elsewhere in Africa compellingly illustrate how multiple factors help or hinder the diffusion and adoption of innovation among rural communities in underdeveloped localities.

In Macha, a rural area in Zambia's Southern Province, there is a community broadband wireless network similar to the service operating in rural Mpumalanga. This village, located 75km from the nearest town of Choma, was never seen as a viable business area by telecommunication operators. Today this community, dependent on subsistence farming and migrant labour, has access to computers and a functional wireless internet network.

Farmers use the internet to research information on production and job seekers use it to search for employment opportunities. A young sunflower farmer credits this network with his discovery of new ideas about farming. Locally trained ICT experts support recording patient information, maintain ICT hardware and software on a daily basis, and train other community members in effective ICT usage.

On average, more than 90% of rural households in South Africa had access to working cellphones – almost totally eclipsing landline telephone access.

Table 1: Self-reported access to functional ICT services within rural households by province (GHS 2011)

Province	Households (N)	Cellphone		Landline telephone		Internet access	
		Rural locality type					
	Share of all households (%)	Ex-homeland	Formal	Ex-homeland	Formal	Ex-homeland	Formal
Eastern Cape	(N)	3,038,070	103,491	26,654	36,264	17,346	29,382
	(%)	**87.78**	**77.02**	**0.77**	**27.13**	**0.5**	**21.75**
KwaZulu-Natal	(N)	4,444,576	458,880	68,608	31,414	34,213	26,328
	(%)	**93.1**	**96.64**	**1.44**	**6.71**	**0.72**	**5.66**
North West	(N)	1,501,156	291,495	15,163	10,571	21,180	27,382
	(%)	**92.75**	**90.22**	**0.94**	**3.3**	**1.31**	**8.47**
Mpumalanga	(N)	1,772,365	336,871	15,915	9,636	32,279	19,108
	(%)	**96.28**	**91.93**	**0.86**	**2.61**	**1.73**	**5.19**
Limpopo	(N)	4,030,373	133,379	43,618	18,184	30,550	12,594
	(%)	**94.48**	**89.93**	**1.02**	**12.33**	**0.72**	**8.39**
Northern Cape	(N)	162,918	98,271	3,740	16,408	0	7,285
	(%)	**91.39**	**63.79**	**2.1**	**10.64**	**0**	**4.73**
Free State	(N)	265,453	192,781	1,568	31,302	4,805	23,720
	(%)	**92.17**	**84.94**	**0.54**	**13.6**	**1.64**	**10.45**
Gauteng	(N)	156,908	266,696	1,028	43,473	0	35,888
	(%)	**95.49**	**93.24**	**0.61**	**14.96**	**0**	**12.55**
Western Cape	(N)	n/a	231,596	n/a	38,534	n/a	18,777
	(%)	**n/a**	**72.08**	**n/a**	**12.15**	**n/a**	**5.84**

Source: Statistics South Africa, 2012. General Household Survey 2011

The 2011 General Household Survey (GHS) of Statistics South Africa included a module on household-level access to functional landline telephones, cellular phones and internet connections. This information provided a sense of household-level access to the basic ICT devices across rural South Africa.

Table 1 summarises self-reported access to functioning cellphones, landline telephones and internet connections within rural households across South Africa's nine provinces. The findings showed that, on average, more than 90% of rural households in South Africa had access to working cellphones – almost totally eclipsing landline telephone access even in remote and underdeveloped villages in the former homelands.

By contrast, landline phone access was relatively higher in the formal rural locations of all provinces, concentrated below 15% of households per province except the formal rural areas of Eastern Cape, where 27% of households reported access to a working landline telephone. Connection to the internet was virtually nonexistent within rural households across ex-homeland localities, but internet connectedness is beginning to diffuse into the formal rural areas.

Conclusion

Through cellphones, rural households are linked into the modern information and communications revolution. Solar panels and wind turbines give rural households access to more environmentally friendly energy sources. Sustainable use of these technological innovations opens new possibilities to lift people trapped at the bottom of the rural social pyramid out of poverty and underdevelopment. ◼

Also read the article, Terms of endearment*.*

Authors: Kgabo Ramoroka, master's intern, and Dr Peter Jacobs, Chief Research Specialist, Economic Performance and Development research programme, HSRC.

This article summarises a concept paper of a new DST-funded project designed to develop and pilot-test a Rural Innovation Assessment Tool (RIAT).

Terms of endearment:

sustainable ICT development

Introducing information and communications technology (ICT) in deep rural areas brought the glaring contrasts between Western and African thinking sharply into focus, says ICT engineer *Gertjan van Stam*. He shared some observations at a workshop jointly hosted by the Department of Science and Technology, the European Union and the HSRC. In this article he elaborates on his research, concluding that ICT outcomes benefit from interactions aligned with the oral culture.

Development must be conducted on the terms of those being developed. This is the philosophy behind a research project attempting to implement ICT in deep rural areas, which involved making an effort in finding solutions that would ensure the long-term acceptance and use of technology where many other projects have failed.

The goal of the research included identifying and inspiring local talent, and introducing ICT through participatory oral research methodology. It included building capacity through community-led activities that could achieve sustainable progress – not only in economic terms but also in terms of intellectual growth, culture and social wellbeing.

Methods

The research consisted of observations, interactions, assessments, interventions and feedback within the context of the local rural community, while thoroughly immersed in the local culture, utilising oral culture, action and participatory research. The research strived to unearth relevant ways of interaction while simultaneously introducing ICT.

Findings

Data gathering

The collected data was stored in an "oral manner", that is, residing in the minds of people. The data not only contained the record of evanescent sound, but also contained all nonverbal communication such as the season, place, sun position, mental state of the people present, the seating arrangement, and somatic information such as gestures as well as facial expressions.

Interaction with a specific stakeholder was instantly followed up with interaction with all stakeholders, assuring quick dissemination of information and a level playing field for all involved. Only at a later stage, when the research and interventions were established, did interactions become far more individual.

The use of all verbal communications as per oral cultures is a valuable and valid means of research.

The memories of people in the oral tradition are formidable. The manner in which data is stored can be designated as a remembrance of the meeting as it happened. The existence of data was regularly tested by interviewing the people to retrieve and re-assess the information.

On writing

Due to the existence of barriers to data collection in rural settings, the use of writing and paper was avoided. Community members observed that writing instilled uncertainty and was unclear; texts allowed for word play, whereas verbal communications were regarded as particularly clear. Especially valuable was the idea that whoever was present would know the information as it was communicated. It was felt that writing was difficult to control and thus posed significant cultural challenges.

Carrying written texts, or even paper, into a meeting would completely change the atmosphere of the encounter. Even writings on the contents of the meetings posed difficulties, with apprehension about acknowledging that a written text was an accurate representation of that meeting or that it was being used to shame people (for example, pointing out mistakes, grammatical or otherwise, in the texts). Writings therefore appeared to be seen as a potent means of exercising control.

Data processing

Processing the orally-stored information was done in an oral equivalent of social networks. Networks of community members and stakeholders validated the orally stored data and processed it through meetings and discussions. That way, aggregation and abstraction of information was recognisable, and output was evident in various modes of communications.

Tangible outcomes occur when large numbers of people affirming their support of the change within existing cultural realities, and individual community members displaying explicit comprehension of change and its benefits, each testify about having a hand in the change. This happens through various formats like stories, songs and human interactions. The social networks change with membership and existence. They are inclusive and in constant flux, assuring relevance and efficiency, and they lead to outcomes that empower individuals with the necessary authority to effect the change.

During the data processing stage, which takes place during in-person conversations with leaders, groups of people or other social networks, the community discusses the designation or effect of the matter at hand. Oral culture heavily restricts experimentation or adding new information without the communities' consent, and the whole procedure of processing new information by itself is a tool for community acceptance.

Conceptualisation of the information emerges naturally through the process of verbalisation, often incorporating aspects of the immediate, familiar environment. As such, the new world is assimilated into the old world.

All high-technology interventions, like the introduction of ICT or an aeroplane, are described in a context of events involving people, like a medical doctor sourcing a car on the internet, a local farmer finding information on a potential new cash crop, and key stakeholders flying on the first aeroplane ride. This correlates with the fact that oral culture does not use counting, statistics or linear facts, but rather keeps track of activities in which humans are involved.

Assessments

The people involved are intelligent, knowledgeable and keen masters of mental processes. The use of all verbal communications as per oral cultures is a valuable and valid means of research. Local culture primarily validates evidence through oral processing, not through written representation. In practice, oral information can be verified. Validation of written communications is deemed impossible as their contents are not registered, nor are the writings secured.

The assessment of data incorporated aspects of "being together" and while assessing the data, it was always asked: who was present? Another question that came up was: what was the disposition of the inter-actors?

While storing and assessing data in oral cultural formats, assessments of causation include all aspects of the data, including intangibles such as character and authority.

Ironically, what was a simple deduction for the oral person was often a complex assessment for the researcher. Even for myself, I often found that I was overlooking a relevant aspect as soon as I turned to documenting my findings and theories. Further, the process was recognised as highly hermeneutic, searching for meaning and inter-relational messages in the data, and incorporating systems and methodologies involving traditional experience, knowledge and wisdom from history.

The environment does not necessitate work with formal deductive procedures, nor in purely logical forms, but with a more practical thought pattern. It depends on "who talks" to see what is true; not only for the data processing stage, but also during acceptance phases. It is witnessed that even the most experienced people – those who work with ICT on a daily basis – describe technology in terms of its operations, and assess its benefits mainly in the operational context.

Lastly, interventions or activities were never readily accepted. Much time is needed for new occurrences to mature and to be incorporated in the community and culture. When an intervention occurs more or less unexpectedly, the community default is to "wait and see which way the cat jumps" or go back to the default setting. ◼

Author: Gertjan van Stam, ICT engineer, initiator of projects for Worksgroup, Macha, Zambia

The good, the bad and the potential:
unpacking TIMSS 2011

International studies of educational achievement have been conducted since the 1960s. There are an increasing number of these kinds of studies and growing numbers of participating countries. Participation in international achievement studies allows for the comparison of performance with other countries and provides access to technical expertise in measurement and analysis, which can be shared and transferred. *Vijay Reddy* discusses the positives and negatives of such achievement studies, including the 2011 Trends in International Mathematics and Science Study (TIMSS).

Achievement studies are regularly conducted in South Africa. Mathematics and/or science assessments form part of the following comparative studies: Trends in International Mathematics and Science Study (TIMSS), Monitoring Learning Achievements (MLA), the Southern Africa Consortium for Monitoring Educational Quality (SACMEQ) initiated studies, and Performance in International Student Achievement (PISA).

South Africa participated in the TIMSS (1995, 1999, 2002 and 2011) and SACMEQ (2000, 2007) cross-national studies, with TIMSS 1995 providing the first national analysis of learner achievement. Participation in the four rounds of TIMSS has provided the country with systemic information, external benchmarking against other countries and a trend analysis of the mathematics performance since 1995. This has yielded significant insight into the well-being of the educational system. In addition to its participation in international studies, South Africa undertook systemic

evaluations in 2002, 2004 and 2007. In 2011 the then-Department of Basic Education introduced the population based Annual National Assessments (ANAs) for grades 1 to 6 and grade 9.

Participating in international, cross-national achievement studies has both benefits and limitations. The main concerns about international comparative studies relate to:

- Comparisons, or the league table presentation of the results, could take on a competitive edge with negative consequences;
- TIMSS uses the curriculum as the major organising concept and a way to explain achievement, and this raises the concern of possible pressure for the gradual convergence of different curriculums;
- Countries such as England and the United States are concerned about the possible negative effects of the TIMSS results trying to shape the national curriculums and push the curriculums to a "back to basics" approach at the expense of areas in which children are doing well; and

- Although instruments are intended to be designed on the basis of consensus among countries, the instruments may be influenced by, and better suited to, the more influential countries. Large-scale assessment studies are expensive and need both financial and human resources. There are also opportunity costs linked to participating in such studies, especially in poorer countries.

Comparative achievement studies, whether loved or hated, catalyse debate when the results are published, which can benefit participating countries.

Benefits of participation in TIMSS

Lever of change

The publication of the 1999 TIMSS results in South Africa sparked a great deal of debate in different circles and was one of the events that catalysed an increased allocation of resources to science and mathematics at school level, thus acting as a lever of change for these two subjects.

TIMSS could have the potential to harness positive changes in countries where policy making may not be informed or influenced by key research, or in countries where there are no robust civil society structures to lobby for change. In countries with outdated curriculums and weak academic voices to campaign for improvements, the international agendas can sometimes be those that catalyse the change.

Providing a benchmark

In addition, the comparison of performance with countries of similar context and histories could provide a basis for benchmarking a country's performance, thus exposing the strengths and weaknesses of its education system.

Benefit from international technical skills

Not all countries have the resources and capabilities to organise national studies, but international research organisations have a vast repertoire of technical skills to design and manage these surveys.

TIMSS: the origins

TIMSS is a project of the International Association for the Evaluation of Educational Achievement (IEA) that aims to provide trend information on learner achievement in mathematics and science. Boston College's International Study Centre for TIMSS and PIRLS manages the international project activities. The other organisations that work closely with Boston College are Statistics Canada in Ottawa, the IEA Data Processing and Research Center in Hamburg (Germany) and Educational Testing Services in Princeton, New Jersey (USA).

South Africa participated in TIMSS 2011, and the articles that follow provide the first analysis of the data gathered. This analysis could provide insights to policy makers and practitioners for interventions that could contribute to improving the state of South African education. ■

Author: Dr Vijay Reddy, Executive Director, Education and Skills Development research programme, HSRC.

[1] Programme d'Analyse des Systemes Educatifs des Pays de la Confemen (PASEC) is the French equivalent of SACMEQ.
[2] PIRLS is the IEA's Progress in International Reading Literacy Study.

Use what you have to get what you need

The appropriateness of TIMSS to appraise and inform policy

Education is a key priority in the country, and outcome one in the presidential delivery agreements. It is therefore important to use reliable data to appraise the well-being of the system to date. *Shawn Rogers* and *Lolita Winnaar* explore how the TIMSS design and framework generate data that provides invaluable information on the nature and extent of learner achievement, and measure improvement, quality and outcomes of the education system.

The Trends in International Mathematics and Science Study (TIMSS) has been undertaken in South Africa in 1995, 1999, 2002 and more recently, in 2011. TIMSS is one of the first studies to provide international and national learner assessment trend data for mathematics and science, and places quality of education in the eye of politicians, policy makers and the public.

Why do we need assessments?

Although South Africa has made significant progress towards rectifying the issues of its past, its society remains highly unequal with limited access to quality public education. Government has stated it intends to improve the quality of the education system and provide the younger generation with better opportunities and a brighter future.

The Education Action Plan 2014 Towards the Realisation of Schooling in 2025 is a policy response by

the Department of Basic Education (DBE) to strengthen the education system. The action plan focuses on short-term goals, which it aims to reach by 2014, towards the realisation of longer-term goals in schools by 2025.

To achieve these objectives, DBE has established goals related to learning, enrolment and other areas identified in the system that require improvement. These include:

- Improving the minimum quality standards and increasing the number of learners in the different grades (grades 3, 6, 9, 12);
- Improving the average performance for literacy and numeracy;
- Improving the access and progression of learners through the system;
- Improving teacher training and teacher supply and demand, upskilling teachers and ensuring that they are prepared and able to cover the curriculum; and
- Improving access to quality learning materials/ resources, improving school infrastructure and support services, and engaging with the community to improve the learning environment.

TIMSS provides invaluable and reliable data on factors directly linked to learning that could improve learner outcomes by benchmarking within the country and comparing internationally.

Accountability through assessment

Studies such as the International Association for the Evaluation of Educational Achievement's (IEA) TIMSS study are used to evaluate the improvements and outcomes of policy-implemented changes to the education system. TIMSS is one of the largest nationwide achievement studies, and provides invaluable and reliable data on factors directly linked to learning that could improve learner outcomes by benchmarking within the country and comparing internationally.

TIMSS methods

TIMSS has a very robust methodological design and framework that allow for both valid and reliable data. This makes it an excellent study to rely on when trying to establish the level of learner achievement in the country so as to compare this to the international standards of approximately 60 other countries. The objective of the study is to determine the impact underlying contextual factors have on learner achievement, with the hope of informing policy and offering a positive change.

The curriculum model grounds the TIMSS framework and links the data collection to national ideals of what the learner is expected to learn (intended), and the

actual opportunities offered by schools and teachers (implemented) with what skills the learner masters (attained). Therefore, the intended, implemented and attained curriculum model shows the relationship between learner achievement and the impact of national educational policy, teacher and classroom practices, and the learner's home environment.

The South African TIMSS 2011 selected 298 schools with approximately 12 000 learners. The data provided information on national and provincial performance, performance by language of learning and teaching (English, Afrikaans), performance by school type (public, Dinaledi and independent schools), and by school poverty index (quintile ranking).

The learner achievement scores were gathered using achievement instruments, which the learners had to complete. These included mathematics and science subject matter, and differentiated between specific cognitive domains. The cognitive domains assessed the learners' thinking processes, specifically knowing, applying and reasoning.

The TIMSS assessment booklets are developed using a matrix sampling design, which evenly distributes the different subject and cognitive domain blocks across 14 different booklets. This complex design increases the reliability of the data, ensuring that learners are unable to replicate each other's work, as the booklets are all varied and it is unlikely that two learners in close proximity will have the same booklets.

Mathematics items cover numbers, algebra, geometry, and data and chance. Science includes biology, chemistry, physics and earth science.

More notably, each of these booklets contains the all-important trend items. These items are never released to the public and remain consistent throughout every TIMSS cycle. These enable countries to get the same measure of learners' achievement rates over time that are used to gauge improvements and the effectiveness of implemented policies and programmes.

TIMSS gathers information about each learner's social and educational environment using student background, teacher, school and curriculum questionnaires. The aim of this is to determine what specific contextual factors (according to the curriculum model) have the greatest impact on learner achievement, with a view to evaluate government goals and improve learning.

These questionnaires cover four broad areas, namely the national and community context (cultural, social, political and economic factors), school context (indicators of school quality and effectiveness), classroom context (teachers, classroom characteristics and resources) and student characteristics and attitudes (experiences, expectations, demographics as well as attitudes towards learning).

During the data collection phase, the international TIMSS team provides detailed operational manuals, which include strict guidelines on all procedures and preparations for administrating the instruments to ensure the data collected is valid, reliable and standardised for accurate comparability across countries.

TIMSS is dynamic and beneficial, placing countries in a position to quantify the impact interventions and policies have had on the quality of education and the performance of the learners over time.

All procedures are monitored by IEA-trained national and international representatives in selected and previously undisclosed schools. The quality assurance continues throughout the scoring of the assessment booklets, the double-marking of selected scripts, and exchanges between northern and southern hemisphere countries. This is to validate the scorer reliability within and across countries, once again strengthening the quality of the TIMSS data.

Additional verification is done at the data processing stage, whereby all of South Africa's collected data is captured twice and compared to the original data, to confirm the information is accurate and not contaminated by human error. The rigorously cleaned data set is then sent to the Data Processing and Research Center (DPC) in Germany for further cleaning and verification. Once released, countries are able to undertake analysis and evaluate the changes that have occurred in their countries.

Overall, TIMSS is dynamic and beneficial, placing countries in a position to quantify the impact implemented interventions and policies have had on the quality of education and the performance of the learners over time. ∎

Authors: Shawn Rogers, PhD intern, and Lolita Winnaar, Chief Programmer, Education and Skills Development research programme, HSRC.

Solid foundations:
the role of the home in education

The home environment should be an extension of the school learning environment. It is here that learners should be doing their homework and reflecting on what has been taught at school. *Andrea Juan* and *Mariette Visser* looked at the resources learners obtain at home that could help them perform better.

When considering the resources learners have access to within the home environment, three predominant factors were assessed: educational, general (socioeconomic status) and parents. Using data from the 2002 and 2011 Trends in International Mathematics and Science Study (TIMSS), several significant changes were observed.

Home educational resources
The presence of certain items in the home creates an atmosphere that promotes academic skills and motivation. Examples of educational resources at home are own books, a study desk, a computer, an internet connection and a separate, dedicated room.

Only 9% of South African grade 9 learners – compared to 25% internationally – had more than 100 books at home. A quarter (25%) of grade 9 learners had their own room and internet connection at home, while the comparable figure internationally was 53%. What was also evident from the analysis was that performance decreased with a decrease in home resources. In addition, a comparison of 2002 with 2011 public school data on the number of books at home of South African grade 9 learners showed no significant improvement.

Table 1: Percentage of learners and mathematics average achievement scores by the Home Educational Resources Index

Home Educational Resources Index	Many resources		Some resources		Few resources	
	% of learners	Average achievement	% of learners	Average achievement	% of learners	Average achievement
Maths (South Africa)	3	487	55	362	42	333
Maths (international average)	12	530	67	470	21	415

Source: Findings from IEA's 2011 Trends in International Mathematics and Science Study

To enable international comparison, an index called the Home Educational Resources Index was developed using the following components: the number of books at home, the availability of two specific home-study resources (own room and internet connection) and the highest level of education of either parent. Table 1 shows the percentage of leaners and their average mathematics achievement scores, according to the 2011 Home Educational Resources Index.

The study suggested that there was a positive association between the number of resources at home and the achievement scores of learners – the more resources available, the higher the achievement scores (Table 1). It was further evident that almost half the grade 9 learners (42%) had very limited educational resources at home. The wide learner performance range (from 487 to 333 points) between learners who were not affected and learners who were affected a lot, pointed to inequity in the system.
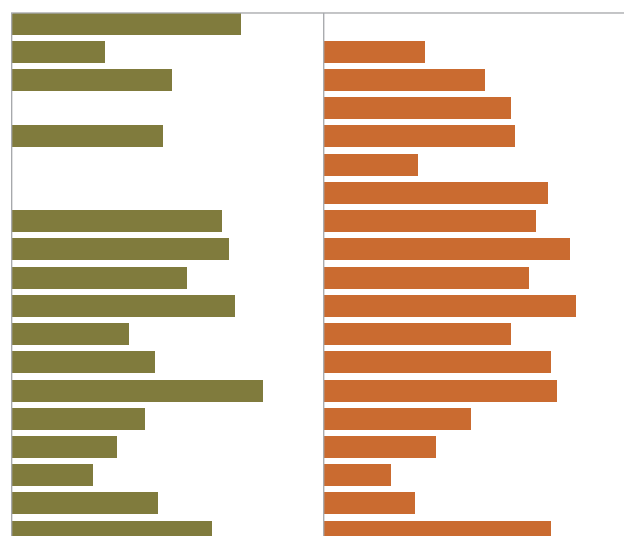
Socioeconomic status
The socioeconomic status of a particular household is positively associated with educational performance. The presence of certain assets relates to the socioeconomic context in which the learner lives. These typically include items such as refrigerators, calculators, computers and internet access.

An overview of resources at grade 9 learners' homes as self-reported in 2002 and 2011 provided background information on the home environment, and showed positive change over time in learners' home environments. The existence of own books, own cellphone and an internet connection at home was not investigated in 2002, while the existence of a calculator was not investigated in 2011 (Figure 1).

From learners' reports, the presence of electricity and water supply increased since 2002. The percentage of learners with electricity at home increased by 6%, while the percentage increase in the number of learners with running tap water at home grew by 7%. The presence of electronic devices such as televisions, video players, computers and CD players in learners' homes also increased during this time. In 2002, almost all public school grade 9 learners had a radio at home. In 2011, television took the place of the radio, with 88% of public school grade 9 learners having a television at home. In addition, the percentage of learners

with their own room, access to a motor car in the household and a fridge at home also increased since 2002. Conversely, the data showed that the percentage of learners with resources such as a study desk, dictionary and their own bicycle decreased since 2002. It was encouraging that a third of students (31%) indicated they had ready access to the internet.

Figure 1: Percentage of public school learners that reported having the selected resource at home in 2011 TIMSS compared to the same figures reported in 2002 TIMSS

Source: Derived from IEA's 2011 Trends in International Mathematics and Science Study

The study suggested that there was a positive association between the number of resources at home and the achievement scores of learners – the more resources available, the higher the achievement scores.

Parents as resources

There is a strong relationship between learner achievement and parental education, especially that of female guardians. In 2011, 19% of parents had completed a university degree. This was a substantial increase from 2002, where 11% of parents had completed a university degree. The qualification levels of parents positively affected learner performance in mathematics. The corresponding figure for international learners was almost twice the South African figure of 32%.

Parents themselves are resources that learners can use to supplement what is taught at school. Learners were asked various questions related to parental involvement and interest in learners' schoolwork at home. The study suggested that parental involvement in learners' schoolwork was relatively high; more than 80% of learners' parents spoke to them about their schoolwork or checked if they had enough time to do their homework once or more times per week. Furthermore, 66% of learners' parents made sure that their children set time aside for their homework on a daily basis; 61% of learners' parents asked them every day what they were learning in school; and 54% of learners' parents checked daily if their homework had been done.

Conclusion

Although South Africa's average household income increased nominally by 113% in 2011 compared to the last census in 2001, a comparison of available selected educational resources in 2002 and 2011 in learners' homes did not show remarkable changes. The evidence showed considerable resource limitations and shortages at most of learners' homes and their school environments compared to international standards. However, there have been improvements in terms of parental education levels and home conditions since 2002. A continuation of this trend may eventually lead to improved educational outcomes. ■

Authors: Andrea Juan, Researcher, and Mariette Visser, Research Manager, Education and Skills Development research programme, HSRC.

A climate of achievement:
factors that impact scholarly performance

The school environment is the main setting for educational instruction. *Mariette Visser* and *Andrea Juan* examined the resources, both tangible (school environment) and intangible (school climate), that influence school performance. They found that around 95% of grade 9 learners in the sample group were affected by inadequate educational resources at school.

For purposes of the study, we drew data from questionnaires that formed part of the 2011 Trends in International Mathematics and Science Study (TIMSS). These included questionnaires completed by learners, teachers and schools. The findings depicted considerable resource limitations and shortages at most of South African school environments compared to international standards. We addressed the following questions:

- What is the effect of well resourced schools on mathematics performance?
- What is the effect of a safe, orderly and disciplined school climate on mathematics performance?

School resources

Tangible elements of the school environment refer to physical resources. Schools with physical assets and infrastructure, such as libraries, laboratories and computers, exhibit more positive educational outcomes, while indicators of inferior infrastructure and assets tend to be negative.

In South Africa, 95% of learners were affected by inadequate resources for mathematical instruction at school (Table 1). The average achievement of South African learners (510) that were not affected by resource shortages was higher than the international average (488), but such conditions applied to only 5% of local learners.

Table 1: Percentage and average achievement of learners by the resource shortage scale

Instruction affected by resource shortages	Not affected		Somewhat affected		Affected a lot	
	% of learners	Average achievement	% of learners	Average achievement	% of learners	Average achievement
Mathematics (SA)	5	510	85	342	10	350
Mathematics (Int. Avg.)	25	488	69	464	6	453

Source: Findings from IEA's 2011 Trends in International Mathematics and Science Study

In South Africa, 95% of learners are affected by inadequate resources for mathematic instruction at school.

School climate

The term "school climate" describes the intangible elements of the school environment, for example, the organisation at the school and classrooms. It refers to the "feel" of a school and can vary from school to school. Factors conducive to the creation of a learning environment in general are:

- Students and teachers are (and feel) safe and comfortable everywhere on school property;
- Classrooms are orderly;
- Classrooms and grounds are clean and well maintained.
- Noise level is low;
- Areas for instruction and activities are appropriate for those uses.

Safety and discipline problematic

An index called the School Discipline and Safety Index was developed from the responses of principals to 11 items in the school questionnaire. The items included problems with the following issues: arriving late, absenteeism, classroom disturbance, cheating, profanity, vandalism, theft, intimidation or verbal abuse among students (including texting, emailing etc.), physical injury to students, intimidation or verbal abuse of teachers (including texting, emailing etc.), and physical injury to teachers or staff.

It is evident from Table 2 that South African schools experienced many safety and discipline problems. Only 4% of grade 9 learners attended schools with hardly any problems. Almost all South African grade 9 learners (96%) experienced problems with discipline and safety at their schools. It is also evident from Table 2 that an unsafe and ill-disciplined environment had a negative effect on learner performance. The average achievement score for South African learners dropped from 406 points for schools with hardly any problems to 345 points for schools with only moderate problems.

Comparison with international figures revealed that four times fewer learners (4%) in South Africa attended schools with hardly any problems compared with 16% of international learners. Additionally, more than twice as many South African learners (41%) attended schools in the most affected category of the School Discipline and Safety Index than international learners (18%).

Table 2: Mathematics achievement scores by School Discipline and Safety Index

School Discipline and Safety Index	Hardly any problems		Minor problems		Moderate problems	
	% of learners	Average achievement	% of learners	Average achievement	% of learners	Average achievement
Maths (South Africa)	4	406	55	352	41	345
Maths (international average)	16	483	66	467	18	437

Source: Findings from IEA's 2011 Trends in International Mathematics and Science Study
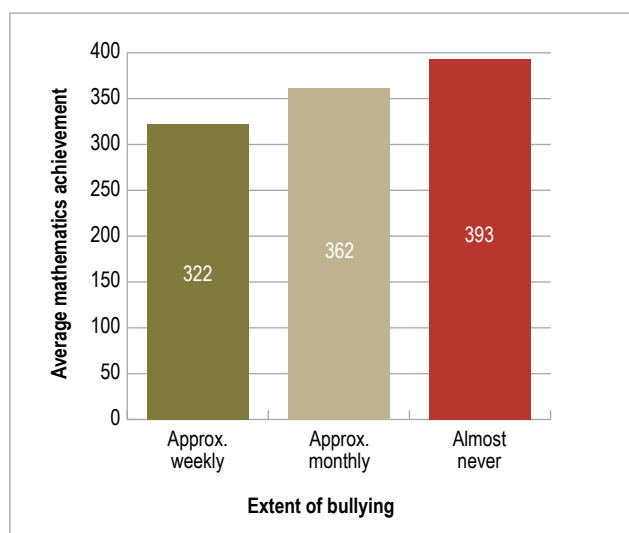
Learners in South African schools are suffering physically and emotionally from schoolyard bullying.

Bullying at alarming levels

An alarming finding from the study concerned bullying at school. Learners in South African schools are suffering physically and emotionally from schoolyard bullying. An index called Learners Bullied at School Index was developed from six questions posed in the learner questionnaire. The questions explored how often the learner had been made fun of or called names, was left out of games or activities by other learners, had had someone spread lies about them, had had something stolen from them, had been hit or hurt by other learners, and was made to do things that he/she did not want to do by other learners.
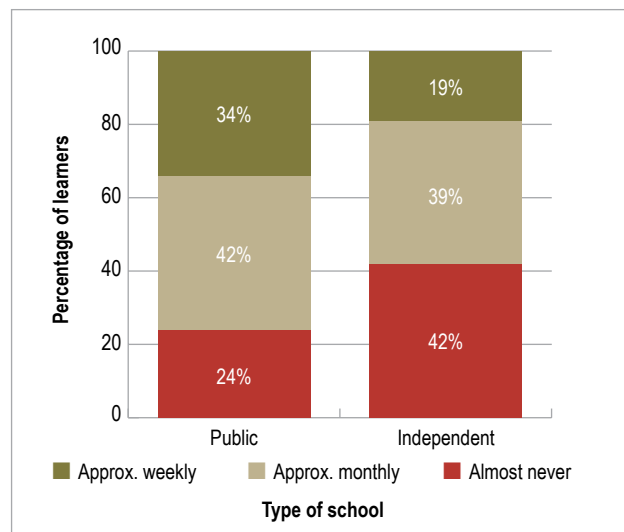
Almost three times more learners (33%) were exposed to bullying on a weekly basis than the international average (12%). More than half (59%) of international learners had almost never experienced bullying at their schools, while three in every four learners (75%) in South African schools experienced bullying on a monthly or weekly basis. It is further evident from Figure 1 that bullying had a negative effect on learner performance in mathematics. In addition, the study revealed that independent school learners were less affected by bullying than public school learners (Figure 2). Almost half (42%) of independent school learners – compared to one in every four (24%) public school learners – had almost never experienced bullying.

Figure 1: Learner average mathematics achievement by extent of bullying

Source: Derived from IEA's 2011 Trends in International Mathematics and Science Study

Figure 2: Extent of bullying by type of school

Source: Derived from IEA's 2011 Trends in International Mathematics and Science Study

Almost all South African grade 9 learners (96%) experienced problems with discipline and safety at their respective schools.

Conclusion

A favourable school environment for teaching and learning must have efficient and effective management procedures and practices; motivated, competent and satisfied teachers; sufficient facilities, books, technology, teaching and learning materials; and motivated, healthy and disciplined learners. The study showed that on average, most of South African learners were deprived of some or all of these aspects when compared with international standards. It was also evident that the performance of South African learners compared well with international averages in all instances where learners were exposed to favourable school environments. ■

Authors: Mariette Visser, Research Manager, and Andrea Juan, Researcher, Education and Skills Development research programme, HSRC.

The good teacher:
what teachers need to teach well

Who are the teachers that get good results in teaching mathematics and science? Does gender, qualifications, attitude or experience have anything to do with it? *Fabian Arends* analysed results from the 2011 Trends in International Mathematics and Science Study (TIMSS) and found a dissonance between what teachers say about themselves and the achievements of their students.

This article attempts to describe the characteristics of teachers that are most likely to have an impact on, or be associated with, learner achievement. The mathematics and science teachers' responses to the questionnaires are not necessarily representative of all South African mathematics and science teachers, as they were simply the teachers of a representative sample of learners assessed as part of the 2011 TIMSS. As such, the findings should be thought of as indicative of, rather than representative of, South African teachers.

Gender, age and experience
Most mathematics learners in grade 9 (58%) were taught by male teachers, while female teachers in science were in the majority (about 57%). Since 2002, the proportion of learners taught by female teachers has increased from 39% in 2002 to 42% in 2011 (mathematics), and from 43% in 2002 to 57% in 2011 (science). Mathematics and science achievement was on average higher among learners taught by female teachers in mathematics (364 vs. 337) and science (330 vs. 318).

The TIMSS teacher corps has matured since 2002, with the majority of mathematics and science learners (2011) being taught by teachers in their Fourties, while in 2002 the majority of mathematics and science learners were taught by teachers in their Thirties. Approximately 60% and more of mathematics and science learners were taught by teachers with more than 10 years' teaching experience. Of these, more than 30% of mathematics and science learners were taught by teachers with more than 20 years' teaching experience.

An important finding is that the results do not show a relationship between learner performance and the age of teachers, or learner performance and teachers' years of experience. This is in contrast with the international experience, where performance and teachers' experience have a positive correlation.

Academic qualifications

Table 1 presents teachers' reports regarding their highest level of formal education. On average, across the ninth grade, 98% of the TIMSS learners had mathematics and science teachers with a post-secondary qualification. Of these, 43% and 33% respectively had mathematics and science teachers with at least an initial university degree, and 17% and 20% respectively had teachers with a completed postgraduate degree.

There was an increase in the percentage of teachers with both an initial and postgraduate degree from 2002 to 2011.

The percentage of mathematics teachers with an initial and postgraduate degree increased from 23% and 8% in 2002 respectively to 43% and 17% in 2011 respectively. The percentage of science teachers with an initial and postgraduate degree increased from 26% and 10% in 2002 respectively to 33% and 20% in 2011 respectively (Table 1). On average, mathematics and science learners taught by teachers with an initial and postgraduate degree scored higher than those learners taught by teachers with a diploma.

Table 1: Highest educational level of mathematics and science teachers: 2002 and 2011

		2011	Average Achievement	2002	Average Achievement
Mathematics teachers	Finished post-secondary education	38	338	64	269
	Completed bachelor's degree or equivalent	43	356	23	305
	Completed post-graduate university degree	17	353	8	367
Science teachers	Did not complete grade 12	1	-	1	-
	Finished post-secondary education	46	314	61	254
	Completed bachelor's degree or equivalent	33	326	26	287
	Completed post-graduate university degree	20	342	10	307

South African teachers attended a higher number of professional development activities than the international average for activities related to mathematics or science content, mathematics or science curriculum, improving critical thinking, and mathematics or science assessment.

Pedagogy training (the method and practise of teaching) seems to play an important role. Of grade 9 mathematics learners, some 54% were taught by teachers that specialised in mathematics but did not have any pedagogy training, and 27% specialised in both mathematics and pedagogy. Learners in the latter group scored higher than learners taught by teachers that specialised in either mathematics or pedagogy.

The same applied to teachers that specialised in science but not pedagogy: science achievement was highest, on average, among learners taught by teachers specialising in both science and pedagogy (20%).

Professional development

In addition to the formal training for teaching mathematics, teachers have to update their knowledge continually. Teachers responding to the TIMSS questionnaire were asked about their participation in different types of professional development activities in the past two years.

More than half the learners were taught by teachers who indicated that they had participated in professional development activities in the last two years. The type of professional development activities that most mathematics and science teachers had participated in related to

mathematics/science content, mathematics/science curriculum, and mathematics/science assessment.

South African teachers attended a higher number of professional development activities than the international average for activities related to mathematics or science content, mathematics or science curriculum, improving critical thinking, and mathematics or science assessment.

A relatively low percentage of learners were taught by mathematics and science teachers who had participated in professional development in mathematics or science pedagogy/instruction. There was a high level of professional development among TIMSS mathematics and science teachers, but this did not translate into outcomes for students.

Readiness to teach

The 2011 TIMSS asked teachers how ready they felt to teach the mathematics and science topics included in the TIMSS mathematics and science framework.

In South Africa, about 80% and more of learners had mathematics teachers who felt very well prepared to teach the mathematics topics, and about 57% and more of learners had science teachers who felt very well prepared to teach the science topics. Across the mathematics content domains,

most learners had teachers who felt very well prepared to teach algebra (96%) with relatively fewer well prepared in numbers (86%), geometry (82%), data and chance (80%).

Across the science content domains, most learners had teachers who felt very well prepared to teach chemistry (74%) and biology (73%), and fewer learners had teachers who felt very well prepared to teach physics (62%) and the earth sciences (57%).

The role of motivation and career satisfaction

Teachers who are satisfied with their profession and the working conditions at their schools are more motivated to teach and to prepare their instructions.

Overall, almost all teachers who taught mathematics and science, 90% and 92% respectively, reported that they were "satisfied" or "somewhat satisfied". Teachers with a strong sense of personal ability to organise and execute teaching

are more open to new ideas and less likely to experience emotional burnout. Research has shown that self-confidence in their teaching skills is not only associated with professional behaviour, but also with learners' performance and resulting motivation.

Internationally, more than 70% of learners had mathematics and science teachers who were very confident in teaching mathematics and science to their respective classes, while in South Africa, more than 80% of learners had teachers who felt this way (Table 2).

On average, the achievement scores of learners with teachers who felt very confident (mathematics 354 and science 332) were slightly higher than learners with teachers who were only somewhat confident (mathematics 336 and science 317). In conclusion, the South African 2011 TIMSS teachers were older; experienced; better qualified than they were in 2002; considered

Teachers who are satisfied with their profession and the working conditions at their schools are more motivated to teach and to prepare their instructions.

Table 2: Confidence in teaching and career satisfaction

Teachers' confidence in teaching		Very confident		Somewhat confident	
		Learners %	AA*	Learners %	AA*
Mathematics	SA ave.**	88 (2.8)	350	12 (2.8)	333
	Int. ave.***	76 (0.5)	470	24 (0.5)	456
Science	SA ave.	81 (3.2)	327	19 (3.2)	316
	Int. ave	73 (0.4)	479	27 (0.4)	467

Note: * Average Achievement; ** South African average; *** International average
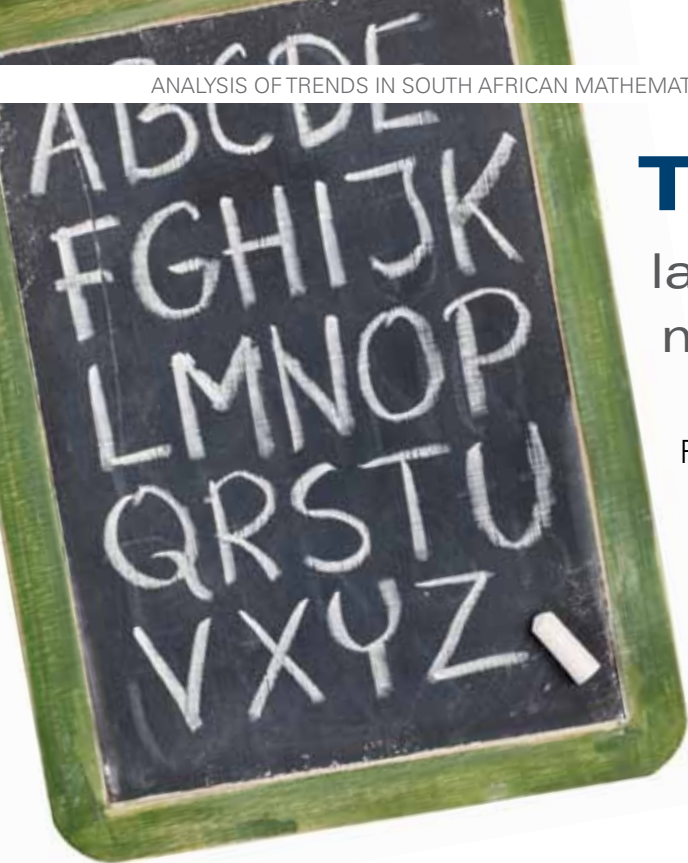
Teachers with a strong sense of personal ability to organise and execute teaching are more open to new ideas and less likely to experience emotional burnout.

themselves to be well prepared to teach mathematics and science topics; were confident in teaching their respective subjects; and were well satisfied with their profession. While all the teacher ingredients that were needed for good learner outcomes were present in South African TIMSS schools, they did not translate into these outcomes for students.

The analysis showed the importance of teachers having pedagogic training, and although there was a focus on professional development, not enough emphasis was placed on mathematics and science pedagogy/instruction.

Further analysis is required to ascertain why teaching, which is arguably the strongest school-level determinant of student achievement, does not sufficiently contribute to higher learner mathematics and science achievement. ■

Author: Fabian Arends, Senior Research Manager, Education and Skills Development research programme, HSRC.

The missing link:
language skills crucial to mathematics and science

Research shows that inadequate language development contributes to weak performance at school, and in later life. *Cas Prinsloo* and *Shawn Rogers* explored the relationship between language and achievement in mathematics and science, as revealed in an initial analysis of the 2011 Trends in International Mathematics and Science Study (TIMSS).

A number of items in TIMSS dealt with language. We undertook an initial analysis to establish whether there were possible associations between language factors and mathematics and science achievement. This article refers to only some of the findings in this regard. Complex modelling and analysis will take place at a later stage.

Proficiency in home languages

Those learners that switch at some point from their home language to a different language at school appear to have greater challenges to achieve in mathematics and science. Learners were grouped according to the categories and combinations of languages they spoke at home, and the language in which they were taught (test or instructional language). The learners largely comprised three groups:

- English-speaking learners, who were taught in English and who completed the 2011 TIMSS assessment in their home language;
- Afrikaans learners in Afrikaans schools, who were assessed in Afrikaans;
- African home-language speakers who are taught in either English or Afrikaans at school. English and Afrikaans are the only official languages of learning and teaching after grade 3.

When the learners' home and test (instructional) languages were similar, they achieved much higher scores compared to learners whose home and school languages were different. The score difference was 120 points for science, which meant the latter group performed three grades below the standard, while for mathematics the difference was 80 points, or two grades below the standard.
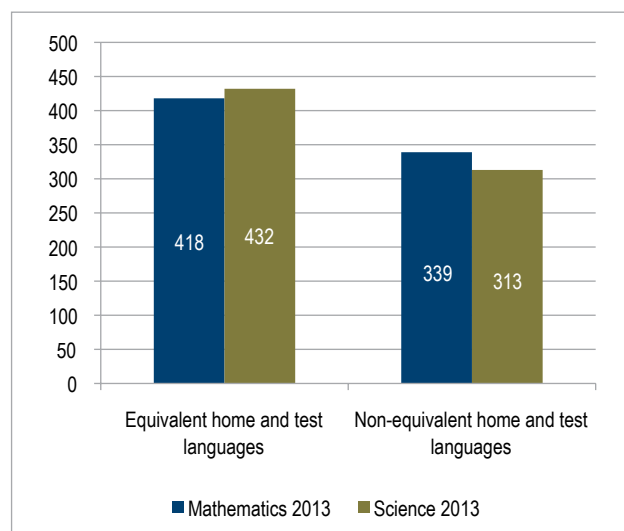
These observations confirmed the importance of learning and being tested in one's home language, but also the likelihood that the effect in performance was language related. This could be seen in the fact that the effect on scores for science, which is more language dependent than mathematics, was much higher. Figure 1 depicts this potential language influence.

This observation was further substantiated by the finding that the science scores of learners with the same home and test languages were higher than their mathematics scores. However, in instances where the home and test languages were different, learners' mathematics scores were higher than their science scores.

Using the same home language at home and in the test applied only to the first two groups identified earlier, while the impact on children in the third group (that speak an African language at home) was negative – and this applied to just over 80% of learners who were assessed. At least part of this language effect originates in primary school, or even before, when a great deal of conceptual and cognitive development takes place.

Figure 1: Learner achievement in mathematics and science on the basis of equivalence between learners' home and test languages

Learners who always or almost always spoke the test language at home outperformed those learners who never did by 141 points for science and 84 points for mathematics respectively, confirming the importance of exposure to the test language outside of school.

Speaking test languages at home

Irrespective of the equivalence between learners' home and test languages, some learners have greater opportunity to speak the test language at home. This would have great benefit for learners with African home languages. Findings revealed that learners that always or almost always spoke the test language at home, outperformed those learners who never did by 141 points for science and by 84 points for mathematics respectively. This observation confirmed the importance of exposure to the test language outside of school – and this applied to only 25% of learners. The percentage included the 5% of children who spoke an African language, but who were also exposed to English or Afrikaans outside school.

Homework was assumed to expose learners to extended writing opportunities. Therefore, learners that did more homework were expected to achieve higher marks. This was not the case. A small effect was found for mathematics only. Learners that did mathematics homework three or more times per week for 15 to 60 minutes at a time achieved at most 40 points more than those learners doing no, or very little, homework.

Also noteworthy was that the higher the level of education of learners' parents or caregivers, the better they performed. There was as much as a 90-points difference in mathematics scores and a 120-points difference in science scores between pupils whose parents had the highest qualification and those with the lowest qualifications. This suggested that children growing up in a culture of learning, reading and writing, surrounded by books, harvested rich school achievement dividends.

Finally, some indications showed the influence of access, support and constraints of how learners' exposure to language could enhance their mathematics and science achievement. Ratings provided by principals and teachers strongly confirmed the impact that instructional material and textbook shortages and inadequacies have on instruction.

A range of commodities at home also seemed to have played a moderate part compared to home- and test-language equivalence. These included the number of books in learner homes and access to computers (for only 35% of learners), the internet (31%) and television (88%); the latter especially in relation to their science scores. Access to the language basis of the mentioned commodities should therefore not be underestimated with regards to preparing learners further for their school work, especially when it comes to test languages.

Conclusion

It has become a platitude that language development is crucial for all other learning to take place, and this brief analysis again confirmed this. It also indicated where some crucial and concrete interventions should be implemented, for example, aligning learners' home and school languages much more strongly, right from the start, and for a much longer period. This has to be based on the premise that language teaching and learning in both learners' first and additional languages have to be fully competent. This not only applies to the contents taught in the two subjects, but also to how these contents are conveyed by skilled teachers (didactics). In addition, our country has to do all in its power to ensure that all learners have access to the conditions and commodities conducive to providing them with broad language exposure and proficiency. ∎

Authors: Dr Cas Prinsloo, Chief Research Specialist, Education and Skills Development (ESD) research programme, HSRC, and Shawn Rogers, PhD intern, ESD, HSRC.

When the learners' home and test (instructional) languages were similar, they achieved much higher scores compared to learners whose home and school languages were different.

I ♥ maths and science:

exploring the views of learners

While external factors such as home and school environment are important in understanding learner performance, attitudes and beliefs towards mathematics and science can also contribute to learners' performance. *Andrea Juan* and *Menzi Mthethwa* analysed the learner questionnaire in the 2011 Trends in International Mathematics and Science Study and found that motivation to perform as well as approaches to education also played a role in performance.

The questionnaire asked a range of questions relating to attitudes towards mathematics and science, grouped into themes. These included learners' enjoyment of, appreciation for the value of, and self-confidence towards the subjects concerned. In addition to these insights, we were also able to examine how learner attitudes had changed over time.

General attitudes to mathematics and science

The 2011 overall attitudes towards mathematics and science were grouped into high, medium and low levels of each attitudinal theme. All three attitudinal themes (enjoyment, appreciating the value of and self-confidence) revealed similar patterns for both mathematics and science (Figure 1).

Although the majority of learners exhibited high levels of appreciating the value of both subject areas, learners seem to value mathematics (72%) more than science (58%). This may indicate that learners are able to better relate mathematics to their everyday lives or career aspirations than science.

The responses to the question on whether learners enjoyed mathematics and science were almost identical. What was alarming, however, was that confidence in mathematics and science received the lowest scores among the three themes. These findings suggested that learners felt they lacked the capacity to convert the enjoyment and value of mathematics and science into confidence in these learning areas. They also suggested that learners were conscious of what they were capable of, what they knew, and what they did not know.

Changes from 2002 to 2011

To draw comparisons and measure changes in attitudes over time, results from the 2002 TIMSS were compared with those of the 2011 TIMSS. Figure 2 shows that the percentage of learners reporting a high value of mathematics remained relatively high over the period, dropping only slightly from 77% in 2002 to 72% 2011.

While the value attributed to mathematics remained constant, learners' high level of enjoyment of the subject dropped. This was met with a corresponding growth in those scoring at the medium level of enjoyment, from 24% in 2002 to 44% in 2011.

The changes in the levels of valuing science were similar to those exhibited for mathematics (Figure 3); there was a marked decrease in the percentage of learners exhibiting high levels of appreciating the value of science. There was a substantial increase in the low levels of value ascribed to this subject from 5% in 2002 to 16% in 2011. This is of great concern, as a disregard for the value of science may affect a learner's relationship with science post-school.

There was a substantial drop of 31% in those learners who had a high level of self-confidence in learning science. This was similar to the findings for self-confidence in mathematics. The greater increase was found at the low level, which changed from 10% in 2002 to 24% in 2011.

Implications

Fostering positive attitudes in learners towards mathematics is still highly valued, by both policy makers and academics. It is considered a crucial component in developing learners' mathematics and science ability. These findings may be the stepping stone towards a better understanding of how the development of positive attitudes toward science and mathematics can motivate learner interest in science education and science-related careers. ■

Authors: Andrea Juan, Researcher, and Menzi Mthethwa, Junior Researcher, Education and Skills Development (ESD) research programme, HSRC.

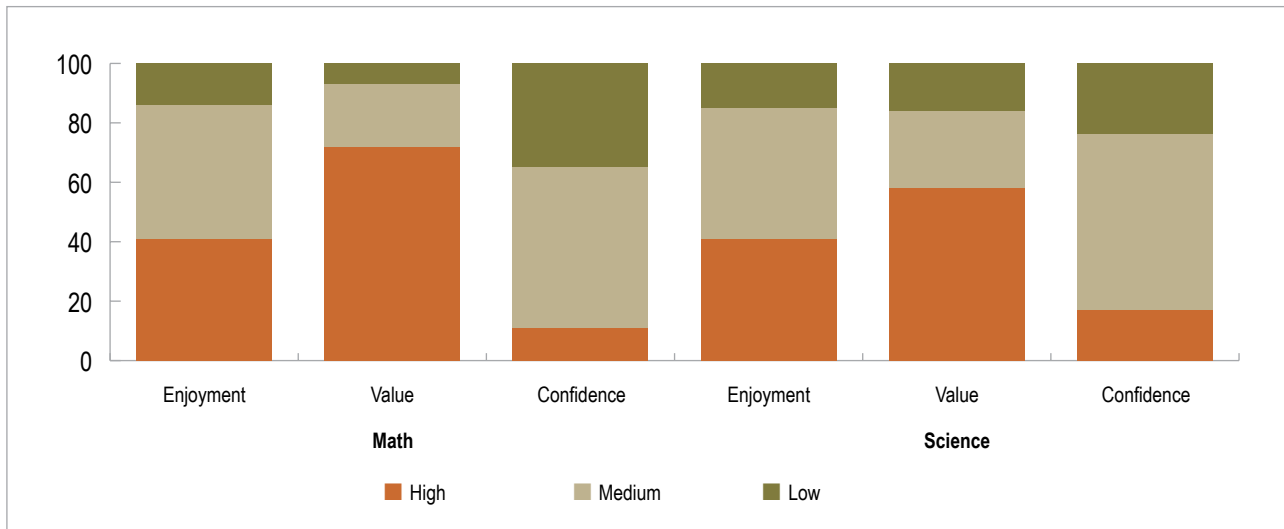Figure 1: Enjoyment, value and confidence in mathematics and science

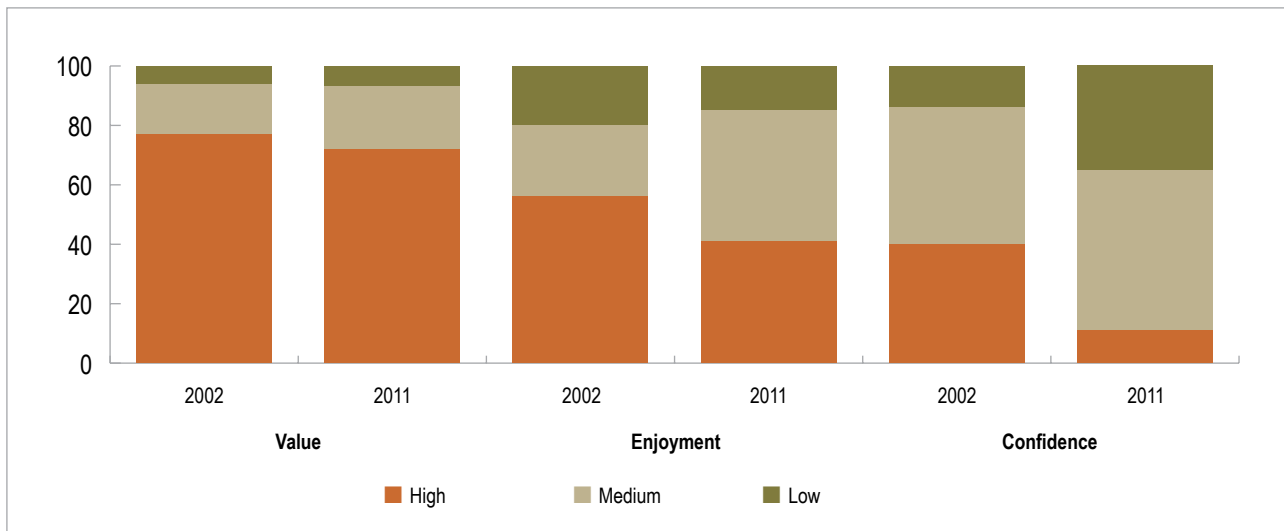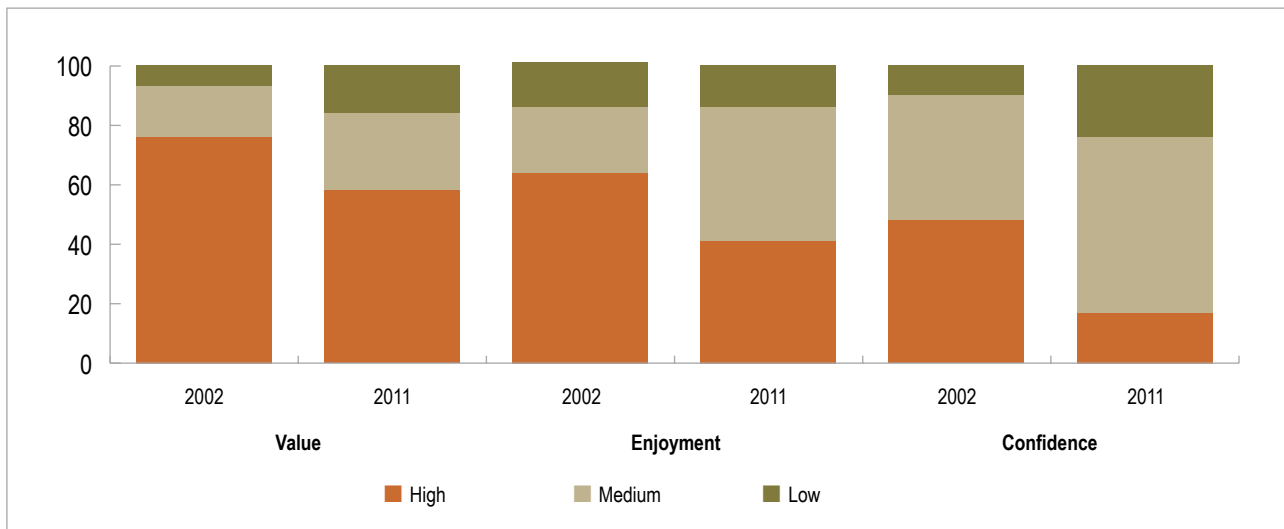Figure 2: Changes in enjoyment, value and confidence in mathematics in 2002 and 2011

Figure 3: Changes in enjoyment, value and confidence in Science in 2002 and 2011

The responses to the question on whether learners enjoyed mathematics and science were almost identical.

Moving from reproductive choice to reproductive justice

Why, despite the progress South Africa has made in the area of sexual and reproductive health rights are there still unacceptable rates of maternal mortality? Why have increases in contraceptive usage, a decline in teenage fertility, and improved access to skilled caregivers not translated into improvements in many women's SRH? *Tracy Morison* reviews the approach to SRH thus far.

South Africa has a long way to go to ensure that women can prevent unintended and unwanted pregnancies and carry out our fertility preferences safely and with dignity, as women. As it stands, the country is unlikely to meet its sexual and reproductive health (SRH) related development targets, which is not only a development imperative, but also a transformation goal, since SRH rights, enshrined in section 27 of the constitution, contribute directly to women's empowerment.

The limits of "choice"

To date, research and policy has generally focused on reproductive *rights*: protecting women's freedom to make reproductive choices, accessing contraception, as well as their legal rights to abortion.

Underlying this rights-based approach is the idea of individual *choice*. Researchers and policy makers often speak of reproductive *choice* or decision making, and rights are generally viewed as afforded to and exercised by independent, choice making individuals. However, it seems that possessing SRH rights does not always translate into women's ability to exercise them. It is not enough to grant women choices; we need to consider what prevents us from exercising our rights and making decisions that are in line with our fertility preferences and desires.

Real life obstacles stop women from exercising SRH rights. One example is the causes of avoidable "maternal" deaths[1]. Well over a third (38,4%) of reported maternal deaths (between 2005 and 2007) were avoidable, according to the DoH. The causes of these deaths point to systemic and socioeconomic factors, as well as lack of SRH information. Of these deaths, 27% (Figure 1) were attributable to one of the top five avoidable causes, namely, unsafe (illegal) termination of pregnancy (ToP). ToP has been legal for almost two decades, yet the DoH reports that mortalities associated with unsafe induced abortions have none the less risen.

Why is this? Besides the fact that most of the designated sites for ToP are not offering services, research shows that many people do not even know that ToP is legal. In addition

to lack of information, stigma also plays a role. Women, those who are unable to afford private healthcare, turn to clandestine "backstreet" practitioners to avoid punitive treatment at designated facilities and public criticism. Thus, a combination of social, cultural, economic, and systemic factors makes it difficult for women to safely terminate *unsupportable pregnancies*[2].

Many women may not even be able to avoid unwanted/unintended pregnancies in the first place. Approximately 215 million women worldwide want to prevent pregnancy, but cannot access reliable, modern contraceptives. Violence and sexual coercion are significant barriers to women having the ability to exercise SRH choices.

Many young women are coerced or forced into their first sexual encounter. In a study in KwaZulu-Natal, for instance, 46% of the participants reported that their first sexual encounter was forced. These women were more likely to experience unintended pregnancies and sexually transmitted infections. Unintended pregnancies are also more common among victims of intimate partner violence.

Problems with the language of choice

There are, as mentioned, numerous socio-economic factors that differently shape the context of sexuality and reproduction for women: inadequate information, poverty, inaccessibility of medical care, sexism, and so on. Yet, when we think of SRH issues in terms of reproductive choice, these factors are obscured. The problem then is that individual women are held responsible for poor SRH outcomes; the results of their poor choices. For instance, the reproductive choices of HIV-positive people (especially women) have often come under scrutiny, without considering factors such as the importance of sociocultural meaning of motherhood for social status.

A further problem is that individual women may also be blamed for social problems, as is often the case with teenaged mothers. Though many young women do not have a real say about sex (as discussed), they are often blamed for entrenching poverty and the moral decline of society.

This was evident in the debate that followed the baseless assertion that the Child Support Grant acts as a perverse

[1] This is the official term, but we must realise that not all of these women are mothers, especially those who choose not to see a pregnancy to term.

[2] Pregnancy occurs where there is a lack of material or emotional resources to see it to term and/or to care for a child (Macleod et al., *Critical Studies in Sexualities and Reproduction*, Rhodes University).

incentive. In many ways this debate was a red herring, drawing attention away from the important concerns of how to make contraception available to young women or to reduce disruption of pregnant learners' schooling and livelihoods.

Another problem with seeing SRH issues solely in terms of choice is that it overlooks fundamental societal inequities. Most obvious is the public-private divide in healthcare. Though the majority of South Africans (85%) accesses public healthcare, the bulk of the private sector enjoys the core of the financial and human resources (Figures 2 and 3). Choice is clearly a luxury for those able to afford it: those who can pay for quality health services, fertility treatment, or discreet ToP services. Social inequities undermine women's SRH outcomes and decision making at the personal, familial and community levels, with very real health implications.

The concept of reproductive choice clearly has limitations and problems. In contrast, the concept of reproductive justice extends beyond "choice" to include inequities and disempowerment as significant factors in SRH outcomes.

Reproductive justice: an alternative guiding concept

The concept of reproductive justice foregrounds the interconnection of reproductive and social justice concerns. This concept illuminates the real-life connections between SRH and interrelated socioeconomic and political issues, like poverty, access to care and insurance, gender-based/intimate partner violence, and stigma. Thus, when we look through the lens of reproductive justice, we see the crisscrossing of race, class, and gender that creates different issues for different women according to their particular context. Inequities are seen as linked to discrimination on the basis of several identity markers (e.g., age, religion, sexuality, race, socioeconomic status, culture, gender, immigrant status).

Adopting a reproductive justice framework in South Africa would require researchers and practitioners to address fundamental inequities so that all people are able to reproduce, or not, and to manage their fertility safely and with dignity. In order to ensure that people are able to access information, resources and services, the reproductive justice agenda charges us to:

- Advocate for policies and practices that allow marginalised populations to access SRH care, including the reduction of linguistic and cultural barriers;
- Promote policies that expand coverage to people without medical aid – such as the new proposed National Health Insurance;
- Address the role of stigma and shame in accessing ToP services
- Address the intersection of violence and SRH;
- Remove the barriers that limit contraceptive and reproductive care/access to women with disabilities;
- Promote increased investment in comprehensive SRH education that includes HIV and STI prevention, contraception, pregnancy planning, fertility, ToP, and intimate partner violence.

Reproductive justice, unlike "choice or decision-making", provides a complex understanding, suitable to our multifaceted country, of ways that women's SRH experiences and needs are differently shaped by their circumstances, as well as the obstacles and challenges that they face in exercising their SRH rights. ∎

Author: Dr Tracy Morison is a post-doctoral fellow, Human and Social Development programme, HSRC.

This research forms part of the Critical Studies in Sexualities and Reproduction *at Rhodes. Read more on www.ru.ac.za/research/researchfocusareas/*
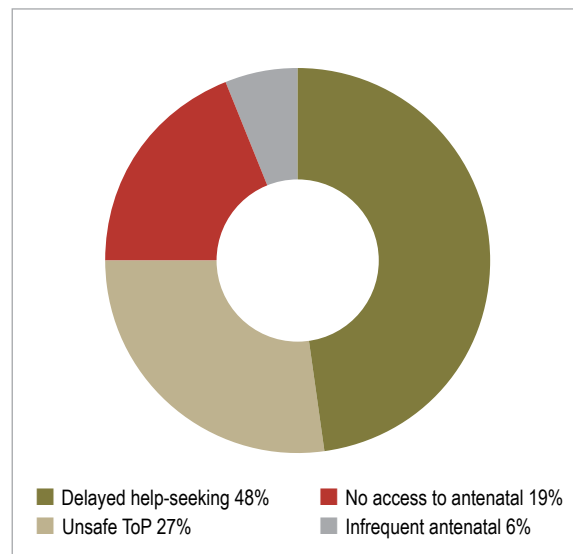
Figure 1: Causes of avoidable maternal deaths

- Delayed help-seeking 48%
- No access to antenatal 19%
- Unsafe ToP 27%
- Infrequent antenatal 6%

Figure 2: Distribution of funds

- Public 45%
- Private 55%

Figure 3: Distribution of GPs

- Public 27%
- Private 73%
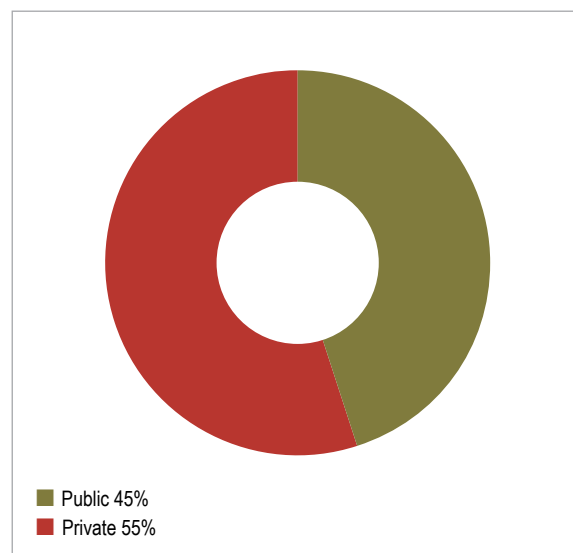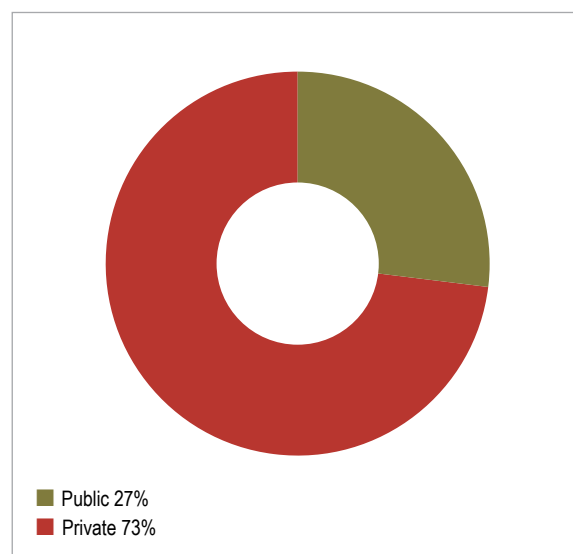
Meeting points:

the roles of Chinese associations in Pretoria, South Africa

The growing Chinese presence in Africa and South Africa is most often described in economic and political terms. Exploring the social aspects of Chinese migration and activities within receiving countries provides insight into the challenges and strategies of this largely heterogeneous group. *Elmé Vivier, Dr Ke Yu, Marie Wentzel* and *Dr Greg Houston* report on findings from a pilot study examining the roles of Chinese associations, in particular, in mediating social interactions and the sense of belonging among Chinese immigrants living in Pretoria.

Forming associations is a common way through which diasporas establish communities in order to preserve identity and culture, support the arrival of new immigrants, and promote social and economic opportunities.

The Chinese in South Africa are no exception. South Africa hosts the earliest settlement and largest population of Chinese on the African continent (approximately 350 000 to 500 000), and the first Chinese associations were established as early as 1906.

In a 2010 publication, Huynh, Park and Anna Ying Chen estimated that there might have been more than 120 different Chinese associations throughout South Africa and Lesotho. These included associations of the earliest immigrants that have been maintained by their descendants, as well as various associations established by and for the Taiwanese community, and groups formed by the most recent (post-2000) immigrants from the People's Republic of China (PRC). The latter organisations are often based on village or province of origin, such as the Fujian association, which boasts a membership of nearly 70 000 across southern Africa.

Three Chinese communities in South Africa
The Chinese in South Africa comprise three broad groups based primarily on place of origin and period of migration. These include Chinese whose ancestors arrived in the late 1870s and now comprise third or fourth generation South African-born Chinese; Taiwanese who began immigrating in the late 1970s and 1980s under the apartheid government's industrial development policy; and the newer migrants that

have been arriving since the mid-1990s, and especially after 2000, mainly from the PRC. This latter group consists of middle managers, professionals and small traders.

One of the major obstacles of interaction among these three groups is language. The oldest group speaks Cantonese, English and Afrikaans, but not Mandarin. Many of the Taiwanese speak Mandarin and English and the new migrants speak Mandarin and some speak minimal English.

Chinese associations in greater Pretoria
Pretoria has a well-established yet scattered Chinese community that has not received much attention in the prevailing literature. This pilot study focused on select religious, educational, political and cultural associations and the social roles they played in the lives of the Chinese living in the Pretoria region. The study comprised the South African component of a collaborative project between the HSRC and the Chinese Academy of Social Science (CASS).

In-depth interviews were conducted with key stakeholders from, and members of, various local Chinese associations, as well as with unaffiliated Chinese individuals such as traders, university students and lecturers.

The associations in Pretoria vary according to origin, function and membership, and thus reflect the diversity of Chinese communities and interests, and the roles of associations therein. However, many of the institutions' histories, activities and memberships also overlap, suggesting that identities and interests do not necessarily allow for straightforward categorisation. Throughout the Pretoria region, the majority of respondents among the oldest generation of

The new immigrants appeared to rely much more on informal social networks, although sometimes temporarily tapped into the established community networks for specific purposes.

Chinese and among the Taiwanese indicated some form of participation in the activities of associations. These ranged from being board members or employees to volunteering for functions, attending annual events or festivals, organising fundraisers and being members of sports clubs. This was to be expected, as these two groups were relatively well-established within South African society.

The new immigrants, on the other hand, appeared to rely much more on informal social networks, sometimes temporarily tapped into the established community networks for specific purposes. For instance, new migrants sometimes approached established associations in order to get advice and assistance on issues such as how to purchase a house or how to register a business. These engagements rarely resulted in the formation of long-term friendships, however, and seemed to reinforce the space between the old and new immigrants rather than bridge their differences.

Of course there are numerous differences even within the three groups, and especially at the individual level. Individual strategies of adjustment and social engagement in Pretoria illustrate the many kinds of perceived benefits and primary motivations of participating in Chinese or local associations.

The benefits of participation
Participation in associations is motivated by a range of apparent benefits, including new social and economic networks, employment opportunities, religious fulfilment, education, Chinese/English language learning, preservation of culture and identity, belonging to a community, etc.

The benefits that motivate participation often do not coincide with the primary functions of the associations, thus many associations serve multiple purposes for the Chinese communities. This is also true of local South African institutions. For instance, new immigrants from the PRC predominantly make use of local English churches and schools in order to improve their English-speaking skills.

Use of such local institutions (especially religious and educational) suggests that modes of engagement and adjustment are not necessarily motivated by a sense of Chinese identity and community belonging, but rather by pragmatic concerns. Many of the Chinese institutions organise annual cultural events and functions, for example, yet the benefit of attendance at such events appears to be about social and business networking opportunities rather than preservation of culture and identity. These events also provide a platform for engagement between organisations, as well as between members of the different Chinese communities.

Generational gaps and notions of Chineseness
Strong generational differences appear among the South African-born Chinese, who express a strong Chinese identity and sense of Chinese culture, while the younger generation purports to be entirely South African. These differences may

in large part be attributed to the impact of apartheid, which forced the local Chinese at the time to create their own spaces for social and other activities. Many members of the younger generation, however, often do not attend the local Chinese school, do not speak Mandarin (some instead speak Afrikaans), and describe their social activities as typically normal South African pastimes.

Interestingly, many of the older Chinese, including the SABCs and Taiwanese, believe that they have a much stronger sense of what it means to be Chinese than the recent immigrants from the PRC. New immigrants are thus criticised for what is perceived to be their ruthless commitment to and conduct of business. Such sentiments appear to be common among older or more established members of Chinese migrant communities in general.

The use of local institutions suggests that modes of engagement and adjustment are not necessarily motivated by a sense of Chinese identity and community belonging, but rather by pragmatic concerns.

Conclusions and further research
Although associations are integral in fostering communities and shared practices, the activities of the Chinese communities in Pretoria are evidence of how people make use of associations for their particular needs, and the multiple distinct ways in which people find their own places of community and modes of interaction. Indeed, the modes of adjustment and engagement employed by the Chinese living in Pretoria generally seem to utilise informal social networks for those purposes rather than formal associations.

Key observations in related thematic areas indicate that further research is necessary to explore these issues more deeply. These issues include the migration history of Chinese immigrants, family linkages facilitating migration and migration patterns, the immigrants' integration in South Africa, the main challenges faced in South Africa by Chinese immigrants, perceptions of South Africa, future migration plans and links with China. ■

Authors: Elmé Vivier, Researcher; Dr Ke Yu, post-doctoral fellow; Marie Wentzel, Chief Researchers; and Dr Greg Houston, Hier Research Specialist, Democracy, Governance and Service Delivery programme, HSRC.

From HSRC Press

www.hsrcpress.ac.za

Finding place and keeping pace

Editors:	Shireen Motala, Veerle Dieltiens and Yusuf Sayed
Pub month, year:	January 2013
ISBN (soft cover):	978-0-7969-2401-8
Format:	240 x 168 mm
Extent:	240 pages
Price:	R280.00 ($30.95; €26.00)
Rights:	World Rights

Getting access to, and completing basic education in South Africa, is the focus of *Finding Place and Keeping Pace*. It is based on research conducted for the Consortium on Research in Education Access, Transition and Equity (CREATE), an international study funded by the United Kingdom's Department for International Development, which was led by Professor Keith Lewin of Sussex University.

The book showcases a rich body of research dealing with educational access, inclusion and exclusion and provides a critical appraisal of how far South Africa has come in terms of achieving the Millennium Development and Education For All goals in terms of access and quality indicators.

'… *essential reading for South Africans who wish to change the system*'. Crain Soudien (Deputy Vice Chancellor, University of Cape Town)

Governing cities in Africa

Editors:	Simon Bekker and Laurent Fourchard
Pub month, year:	January 2013
ISBN (soft cover):	978-0-7969-2416-2
Format:	240 x 168 mm
Extent:	224 pages
Price:	R220.00 ($24.95; €21.00)
Rights:	World Rights

Rather than chapters focussing on single cities, *Governing Cities in Africa* employs a novel approach: cities in sub-Saharan Africa provide the pivot around which issues of policy and practice, planning and service delivery turn, at different scales and both from the top down as well as from the bottom up. Party politics, for example, is discussed at city level and urban security both within a state and a non-state context. An invaluable opening section offers brief yet insightful profiles of the 18 cities as well as detailed maps.

' … *a rare kind of book, based on deep empirical knowledge and complex theoretical reflection*'. Jennifer Robinson (Professor of Geography, University College, London)

Academic interaction with social partners

Authors:	Glenda Kruss, Genevieve Haupt, Mariette Visser, Mogau Aphane
Pub month, year:	October 2012
ISBN (soft cover):	978-0-7969-2389-9
Format:	240 x 168 mm
Extent:	312 pages
Price:	R220.00 ($25.95; €22.00)
Rights:	World Rights

A lively debate is emerging, centering on the relationship between the university and society in a developing country like South Africa. *Academic Interaction with Social Partners* looks at the main results of a research study on university interaction with external social partners conducted by the Human Sciences Research Council (HSRC) on behalf of the National Research Foundation (NRF). *Academic Interaction with Social Partners* focuses on issues such as whether engagement requires new forms of knowledge that differ from traditional academic modes, as well as asking who is defined as "the community" – at local, regional, national or international levels. There is general agreement that the field is conceptually under-specified and theoretically thin and the book is therefore a welcome contribution.