

Management & Leadership

POLICY ■ LEADERSHIP ■ MANAGEMENT ■ GOVERNANCE FOR SOUTH AFRICAN SCHOOLS

The maths question

In the main feature article of this issue we examine the findings of a recently released report published by the Centre for Development Enterprise (CDE), which is a review of the research findings from the past few years on learner performance in mathematics. If one were to try and draw a single conclusion from this report it would be that the majority of teachers who teach mathematics are not properly equipped to do so and that very little is being done to address what is and will remain a massive problem, both now and in the future, if nothing is done about it.

Coincidentally the book we have chosen to review for this edition is Prof. Jonathan Jansen's recently released book *We Need to Act*, which is a collection of the weekly columns that he writes for *The Times* and which includes an article with the title 'How to add for success: The more school the less maths?' In the article he highlights the issue of the poor performance of learners in the 2012 ANA tests but while berating the Minister of Education and 'the entire class of politicians engaged in this game of mass delusion of the people' for their response to these results he also takes aim at the citizenry of this country for our willingness to swallow 'nonsense of this kind 18 years into a democracy that promised a better education for all of our citizens'. More important in our view than his criticism of politicians and citizens are his suggestions on what needs to be done to address this problem and these focus on strategies directed at improving the content knowledge and pedagogy of teachers who are required to teach mathematics. We have deliberately refrained from describing everyone who is required to teach mathematics as a mathematics teacher because most are not. Prof. Jansen's proposals include the following:

- Test teachers, not learners, in every grade to determine their base levels of mathematical competence for the grades that they teach.
- Use the test data to design mass-based training for all primary school teachers on the basics of mathematics.
- Close all schools for a month at the start of each year and use this time for intensive training of teachers in both content knowledge and pedagogy.
- Remove teachers from the classroom who are still not able to teach basic mathematics despite the intensive training and place them elsewhere in the system.
- Design learning materials that allow for repetitive practice (drill). He goes on to write 'drill in other words and to hell with the constructivists and other fancy theorists who believe the answer must be "discovered"'.
- Give Mathematics homework every day and give feedback on that homework every morning.

From my own perspective I couldn't agree with him more and I have seen real progress in improving mathematics outcomes in the schools that I work with where several of Prof. Jansen's suggestions have been implemented.

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SM&L

Is published five times a year by Ednews. It seeks to provide the leaders of South African schools with current and relevant information on issues of policy, leadership, management and governance.

What's to be done? Tackling the challenge of our poor mathematics results

Following the release of a report by the Centre for Development Enterprise (CDE), which painted a dire picture of learner performance in Mathematics across the schooling system, there was the usual flurry of stories in the popular press about the poor state on our public school system and the perceived intransigence of teachers and their political allies. Very few of these news items provided much detail on the specifics of the CDE report or sought to provide answers or possible solutions to the issues that were raised. Given the nature and purpose of SM&L, we set out to see if we could unpack the problems that the CDE report had identified a little more systematically, and while doing so reflect on the kinds of strategies that would be needed to address what is probably the most pressing and significant challenge of our school system; the problem of teaching quality.

School leadership and teaching quality are two topics that we tend to cover fairly regularly and extensively in this publication. This should not be surprising given the fact that these two have been consistently identified by research as the within-school factors, that is the factors over which schools have some level of control, that have the greatest influence on learner performance and school success. It is important therefore when looking for answers to questions relating to poor learner performance in our public schools, particularly in relation to learner performance in mathematics, that we start our quest by examining the issues of school leadership and teaching quality. Equally important is the need to ask the right kinds of question and it is helpful in this regard to remember the story from Douglas Adams' *The Hitchhiker's Guide to the Galaxy* in which 'Deep Thought', the most powerful computer ever built, was asked by the travellers who built it to answer the questions that they posed and for which it was designed to provide answers. It is worth quoting Douglas Adam's text of the dialogue in relation to the questions that were posed and Deep Thought's response to these questions because of the thoughts that it provokes about the expectations of those posing the questions about the kinds of answers that will be provided.

'We want you to tell us ...' he paused, 'The Answer.'

'The Answer?' said Deep Thought. 'The Answer to what?'

'Life!' urged Fook.

'The Universe!' said Lunkwill.

'Everything!' they said in chorus.

Deep Thought paused for a moment's reflection.

'Tricky,' he said finally.

'But can you do it?'

Again a significant pause.

'Yes,' said Deep Thought, 'I can do it.'

'There is an answer?' said Fook with breathless excitement.

'Yes,' said Deep Thought. 'Life, the Universe, and Everything. There is an answer. But I'll have to think about it.'

Fook glanced impatiently at his watch.

'How long?' he said.

'Seven and a half million years,' said Deep Thought.

Seven and a half million years later when the progeny of these travellers finally get to hear the answer, this is the dialogue that follows:

'All right,' said the computer, and settled into silence again. The two men fidgeted.

The tension was unbearable.

'You're really not going to like it,' observed Deep Thought.

'Tell us!'

'All right,' said Deep Thought. 'The Answer to the Great Question ...'

'Yes ...!'

'Is ...' said Deep Thought, and paused.

'Yes ...!'

'Is ...'

'Yes ...!!! ...?'

‘Forty-two,’ said Deep Thought, with infinite majesty and calm.

Deep Thought’s response to the duo’s confusion about the kind of answer that it had provided is telling:

‘I think the problem, to be quite honest with you, is that you’ve never actually known what the question is.’

This is really the challenge that we face when we look for reasons and answers to questions that we all pose about the persistent poor performance of the majority of learners in our public schools, and more particularly their poor performance in languages and mathematics relative to other countries at similar stages of development.

The research report by Nicholas Spaull, which was commissioned by the CDE and released in October this year, has as its title ‘South Africa’s Education Crisis: The quality of education in South Africa 1994–2011’. The aim of the report as set out in the Executive Summary is to ‘provide an empirical overview of the quality of education in South Africa since the transition to democracy and, in doing so, comment on the state of the country’s education system’. Spaull also expresses the view in the Executive Summary that if our schooling system is evaluated on the basis of educational outcomes South Africa has ‘the worst education system of all middle-income countries that participate in cross-national assessments of educational achievement’ and that ‘we perform worse than many low-income African countries’. He does, however, concede that there have been some recent improvement in learner outcomes and some important policy ‘innovations’.

The data that Spaull uses as the basis of his evaluation of the current state of education is mostly drawn from learner performance in the three main international tests of educational achievement in which South Africa has participated. These tests make it possible to track changes in learner performance over time and between participating countries. The three international testing programmes are the Trends in International Mathematics and Science Study (TIMSS), the Progress in International Reading and Literacy Studies (PIRLS) and the Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ). We have reported on the findings of these three studies fairly regularly over the past few years.

In the 2007 SACMEQ III study, which tested the mathematics and reading skills of Grade 6 learners,

the teachers of the learners were also tested using the same test. Analysis of this data showed that many of the teachers did not have a good grasp of the subject content knowledge that they needed to teach at this level and that a significant number were not able to answer the questions that were set for their learners. Findings from this study include the following:

- SACMEQ (2000) and SACMEQ (2007) showed that there was no improvement in South African Grade 6 literacy and numeracy performance over the seven-year period.
- In relation to the 14 other southern and eastern African countries participating in the 2007 study, South African learners were ranked tenth for reading and eighth for mathematics.
- 27% of South African Grade 6 learners were found to be illiterate based on the finding that these learners were not able to read a short and simple text and extract meaning.
- There were significant differences in the performance of learners between provinces. This was well illustrated by the relative literacy levels of learners in Limpopo with an illiteracy level of 49% and those of the Western Cape where just 5% of learners were classified as being illiterate.

The findings of the TIMSS study, which tests the performance of Grade 8 learners in mathematics and science, provided evidence of a similar pattern of poor performance and little progress.

- The results of tests carried out in 1995 and 2002 showed no improvement in the mathematics and sciences results of South African learners.
- Because the tests in 1995 and 2002 were deemed to be too difficult for South African learners (as well as the learners from some other countries), it was decided to test learners from both Grades 8 and 9 in 2002. South Africa next participated in 2011 and in that year only Grade 9 learners were tested. The good news was that the results showed that some improvements had been made and that these were quite significant – equivalent to one and a half grade levels of learning. This improvement was, however, off a very low base with 32% of the 2011 test group performing worse than guessing in the multiple-choice items and 76% of these Grade 9 learners being found to still lack a proper basic understanding of whole numbers, decimals, basic mathematical operations and basic graphs.

One of the useful elements of the 2007 SACMEQ study was that the teachers of the Grade 6 learner sample group were also tested. The results of the teachers’ tests indicated that many of the teachers who teach Grade 6 learners have poor content

knowledge, with many unable to answer the questions that were set for their learners. In fact the results showed that the top 5% of learners did better than the bottom 20% of teachers.

Analysis of the 2011 TIMSS data set on the basis of factors such as wealth, socio-economic status, geographical location and language makes it possible to determine the extent to which each of these factors and/or a combination of these factors may influence learner performance. This analysis showed that each of these individually and collectively has some influence on learner performance and that this influence is significant. Examples of these cited in the article include a difference of 2,5 years worth of science learning between learners in KwaZulu-Natal and those of the Western Cape and a difference of 1,8 years worth of learning between learners in Gauteng and those in the Eastern Cape. Other research has shown that these learning deficits grow as learners move through school. Learners in the Eastern Cape are 1,8 years behind the benchmark for the grade by the end of Grade 3 and by Grade 9 they are 2,8 years behind the benchmark for the grade. In the report, Spauld suggests that 'effective remediation in this higher grade (is) improbable'.

Spauld makes some suggestions in the report while also acknowledging that a number of the DBE policy initiatives should help to address some of the causes of the chronic underperformance of learners. Initiatives that he believes will contribute to improved results included:

- the DBE workbook initiative
- the Curriculum Assessment Policy Statement (CAPS)
- the implementation of the ANA
- the DBE's Action Plan to 2030.

Spauld's recommendations include:

- increasing the managerial, administrative and technical capacity of national and provincial bureaucracies
- increasing levels of accountability within the education system by formulating coherent and systematic implementation plans
- the implementation of a nation-wide system of diagnostic teacher testing and training
- an external evaluation of the ANA for one primary school grade, possibly Grade 6

It is important when looking for answers to questions relating to poor learner performance in our public schools, particularly in relation to learner performance in mathematics, that we start our quest by examining the issues of school leadership and teaching quality.

- a clear articulation of who is responsible for learner learning, to whom they are accountable for this learning and the consequences that will follow from non-performance.
- The identification of the most dysfunctional schools on the basis of their performance in the externally evaluated ANAs and, once identified, providing them with the support that they need to improve.

In his conclusion, Spauld lists eight important findings from his research. We have reproduced these in full on the adjacent page because of the insight we believe they provide.

Let us return to the question that we posed in the title of this article 'What's to be done?' and to our suggestion that perhaps we were asking the wrong questions and

that like the travellers in *The Hitchhiker's Guide to the Galaxy* the answers that are forthcoming will be meaningless. We have changed the curriculum – several times! And it hasn't produced improvement. We have changed how subjects are assessed and it hasn't produced any improvement. We have changed the pass requirements for subjects and for progression from grade to grade and it hasn't produced any improvement. We have changed the funding model of schools and it hasn't produced any improvement. We have produced and distributed learner workbooks for all subjects at a cost of billions of rand, and it hasn't produced any improvement. We closed the teacher training colleges and it hasn't produced any improvement. We could go on and on but the one thing that is missing from all of these changes is the question of teacher competence.

The questions we need to be asking are questions linked to teacher competence and the quality of classroom teaching. Why is it that we don't pose questions about teacher competence and the quality of classroom teaching when evidence from research shows that the quality of classroom teaching – that is what a teacher does in the classroom – is the within-school factor that has the greatest influence on learner achievement. Spauld's research provides ample evidence not only of the extent of the problem but also how the problem is exacerbated by the inability of these same teachers to recognise their own incompetence. This combination of incompetence and ignorance reminds me of a saying that was often repeated by

The conclusions of Spaull's study

The eight most important findings Spaull makes in the report 'South Africa's Education Crisis: The quality of education in South Africa 1994–2011' are as follows:

1. Irrespective of which subject or grade one chooses to test, most South African children are performing significantly below the curriculum, often failing to acquire functional numeracy and literacy skills. Apart from 25% of schools that are functional, South African schools as they currently stand do not, and arguably cannot, impart to learners the foundational knowledge and skills that they should be acquiring at school.
2. The severe inequalities of educational outcomes in South Africa can be seen along a number of correlated dimensions, most notably: wealth, school location, language and province. In each case the difference between the top and bottom categories is at least two grade-levels worth of learning and sometimes as large as four grade-levels.
3. The learning deficits that children acquire in their primary school career grow over time to the extent that they become insurmountable and preclude learners from following the curriculum at higher grades, especially in subjects that are vertically demarcated such as mathematics and science. Intervening early to prevent, diagnose and correct these learning deficits is the only appropriate response.
4. While the NSC pass rate has been increasing in recent years, this measure should not be seen as an accurate indication of the quality of education in the country. It is flawed because it only reflects the performance of the best performing 50% of a cohort, i.e. those who make Grade 12, and it does not take into account subject combinations and the fact that more learners are opting for easier subjects such as mathematical literacy, compared to more challenging subjects such as mathematics.
5. There are large differences in the provincial rates of retention-to-matriculation. The ratio of Grade 2 enrolments in 2001 to Grade 12 in 2011 was only two in ten in the Eastern Cape, but six in ten in Gauteng.
6. South Africa has some of the least-knowledgeable primary school mathematics teachers in sub-Saharan Africa. Many of these teachers, especially those who serve poor rural communities, have below-basic levels of content knowledge. In many instances these teachers cannot answer questions their learners are required to answer according to the curriculum.
7. Although the Annual National Assessments (ANAs) are one of the most important and needed policy innovations since the transition, given the way these tests are currently implemented – including the formulation, marking, invigilation and moderation procedures – they cannot be used as reliable indicators of progress.
8. The sub-standard quality of education provided to most South African youth has severe economic consequences for those affected. Furthermore, the economic prospects of the youth appear to be deteriorating over time. The percentage of 18–24-year-olds who are not in education, employment or training (NEET) has increased from about 30% in 1995 to 45% in 2011, while the percentage enrolled in education has decreased from 50% to 36% over the same period. The unemployment rate for youth has also increased from 36% in 1995 to 50% in 2011, standing at twice the national employment rate in 2011. Furthermore, of those unemployed in 2011, more than 70% have never been employed before. Perhaps most disconcertingly for the youth, completing Grade 12 does not markedly increase one's chances of finding employment relative to 18–24-year-olds with less than the NSC qualification. Rather, the value of matric lies in opening up opportunities to acquire some form of tertiary education, an opportunity available to only a small minority.

my maths teacher when I was a schoolboy, which went something like this: 'He who knows not and knows that he knows not is ignorant; teach him. He who knows not and knows not that he knows not is a fool; leave him.'

If one were to look for reasons for the Government's unwillingness to tackle the issue of ignorant and foolish teachers one need look no further than the

refusal of SADTU members who apply for positions as NSC markers to submit to competency testing in the subject they are to mark. The majority union is unwilling to expose the incompetence of its members to the public gaze and until the Government shows some willingness to grasp this nettle, the majority of the nation's children will leave the schooling system without the basic skills that they need to further their studies or even to become gainfully employed. ■

The Khan Academy – free online mathematics support for learners and teachers

We were first introduced to the Khan Academy and its wonderful array of online resources by a non-profit organisation (NPO) called Numeric, which uses the Khan Academy's online Mathematics resources to provide additional Mathematics tuition to learners at a number of schools in the greater Cape Town area at a minimal cost.

The concept of the Khan Academy grew out of the willingness of its founder Salman Khan to help his school-going cousins with their mathematics homework despite the fact that they lived in another city. They initially simply called him when they had a problem and he would then attempt to help them solve it and better understand the mathematics behind it so that they could solve similar problems in the future. At some point in this process he decided to record and post some of his explanations on Youtube, only to discover that his cousins preferred the Youtube explanations to those that he provided in person. The reason behind their seemingly uncharitable choice had nothing to do with his live explanations, but rather to do with the fact that the Youtube versions could be played repeatedly, stopped and rewound, or returned to in the future, without the need to further trouble their cousin with requests for further help on the same topic.

As time went by he posted more and more of these Youtube explanations, some of which his cousins shared with their friends. Then one day the inevitable happened and some of them went viral. The success of the videos made Sal rethink his life and he left his job as a hedge fund analyst and set about the process of creating the Khan Academy, an organisation with a goal of 'changing education for the better by providing a free world-class education for anyone anywhere'.

Supporters of the Khan Academy include the Bill & Melinda Gates Foundation, Google and the Bank of America among others.

We are convinced that the Khan Academy website, if properly utilised, has the potential to dramatically improve the mathematical competency of under-qualified mathematics teachers and the performance of the learners that they teach.

The great value of the Khan Academy as a teaching resource is in part due to the comprehensive package of resources it provides both for teachers and for individual learners. Log on as an individual learner and you have immediate access to a set of online tests that you can use to assess your current mathematical competence across a range of mathematical skills. The tests are carefully graded and start with the most basic arithmetic process beginning with one-digit addition. Your results for each test are automatically recorded as is the time you spend on each skill or topic together with the number of tests you attempt, your test scores and the explanatory videos you viewed before you achieved the proficiency sufficient to be classified as having mastered a particular skill. To master a skill you need to provide the correct answer to five consecutive problems/questions. If you are not sure of the answer you can request help in the form of a hint and if you are stuck you can click to watch an explanatory video. Depending on your performance you are categorised as fitting in one of the following groups: 'Struggling', 'Needs practice', 'Practiced', 'Level one', 'Level Two' or 'Mastered'. The topics covered in the Mathematics series start with the basics of Arithmetic



This group of Intermediate and Senior Phase teachers from Mitchell's Plain and Khayelitsha attended one of the 10-session workshops organised by the Principals Academy Trust. The workshops were presented by Numeric, an NPO that provides additional mathematics tuition programmes for learners in the afternoons and on Saturday mornings using the Khan Academy's online resources. The purpose of these teacher workshops was two-fold: they served as an introduction to the Khan Academy materials for the teachers involved and they exposed them to a variety of teaching resources and methodologies.

and Pre-algebra but go on to cover Algebra, Geometry, Trigonometry and precalculus, Calculus, Probability and statistics, Differential equations, Linear algebra, Applied mathematics, Recreational mathematics, Test preparation and Mathematical contests. A simple click of the mouse is all that is required to pull down a full list of all of the topics/skills that you have attempted grouped according to your level of performance in each skill. The list provides further data, including the number of tests that you have attempted in your effort to master the skill, your progress in mastering the skill and the time in minutes that you have devoted to that particular skill.

One of the special features of the website is the Knowledge Map of the Mathematical concepts that it provides, which illustrates how different mathematical concepts relate to one other. A great value of the map as a teaching resource is that it demonstrates in a visual way the necessity of mastering basic mathematical concepts and how more complex concepts and calculations are derived from these fundamentals.

If you choose to log on as a coach (teacher), there is the facility to record the names of each of the learners in your class or coaching group together with their

user name (e-mail address or Khan Academy user name). Every time one of your learners logs onto the website and uses its features his or her progress is tracked, recorded and analysed, providing you as their teacher with the same comprehensive view of his or her progress and performance that we have already described. The teacher can also quickly move from viewing the performance of an individual learner to the performance of the class as a group. It is also possible to download this information quickly and easily into an Excel spreadsheet, making the task of transferring marks from the website to any school-based mark capturing system a relatively simple task.

The website also makes use of some of elements of the online gaming industry to encourage learners to improve their scores. To encourage the learners to persist with the efforts to master topics they earn points for good progress and badges when they have achieved certain significant milestones. A facility is provided that makes it possible for the teacher to make recommendations in the form of a simple text message to an individual learner for each of the topics he or she has attempted and to include a due date for the completion of the identified task.

Our first experience of observing the use of the programme in a class setting came about when working with a group of primary school teachers, mostly from township schools, who were being introduced to the programme by facilitators from Numeric. The facilitators logged on as the coach for the group who were then taught how to log on and use the programme as if they were her students. Although most of the teachers had little practical experience in the use of computers, most quickly grasped what was involved and once logged on became intensely involved in the workings of the programme before settling down to attempt the first few tests and in watching the supporting videos when they were unsure of a topic or struggled to master a skill. Because bandwidth is a problem in most of the

To encourage the learners to persist with the efforts to master topics they earn points for good progress and badges when they have achieved certain significant milestones.




schools that Numeric works in, downloading the Youtube video tutorials can be a time-consuming process and one that can create its own set of challenges in a classroom setting. Numeric has been able to overcome this problem by downloading all of the Youtube video tutorials onto a flash drive and then transferring them

to the network server of the schools where they are working. This system seemed to work well in the two schools in which we saw them operate.

We are convinced that the Khan Academy website, if properly utilised, has the potential to dramatically improve the mathematical competency of under-qualified mathematics teachers and the performance of the learners that they teach.

The screenshot shows the Khan Academy interface for the 'Adding and subtracting fractions' section. At the top, there are navigation links for 'LEARN' and 'COACH', the 'KHANACADE' logo with a search bar, and 'KHANTEACHERTRAINING'. The main content area is divided into a left sidebar and a main workspace. The sidebar lists various topics under 'ARITHMETIC AND PRE-ALGEBRA' and 'FRACTIONS', with 'Adding and subtracting fractions' selected. The main workspace displays the title 'Adding and subtracting fractions' and a progress indicator 'Get 5 correct in a row' with five checkmarks. Below this, a math problem is presented: $-\frac{7}{6} - \frac{3}{7} = ?$. To the right of the problem is an 'Answer' input field with a 'Check Answer' button. Below the input field is a 'Show me how' button and a 'Stuck? Watch a video' section with a video player showing a fraction problem.

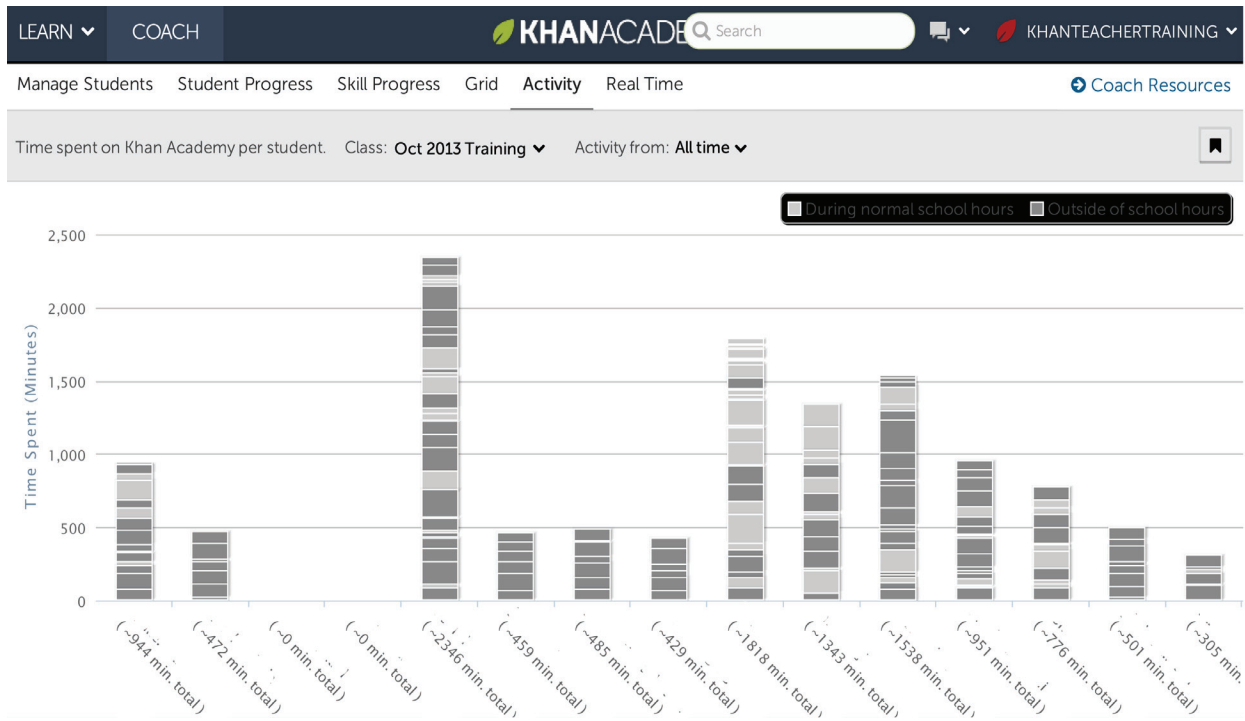
This is the screen students will see when they take a test. In this instance, the topic being tested is the adding and subtracting of fractions. The student is presented with a problem, in this case $-\frac{7}{6} - \frac{3}{7} = ?$ and must type the answer in the space provided under the heading 'Answer'. If it is correct, a second problem is presented and the process is repeated until the student has scored five consecutive correct answers. If the student is stuck or unsure about how to answer the problem he or she can select the option 'Show me how', which provides some hints on how the answer can be calculated or they can elect to click on the video link and watch a Youtube clip that explains the mathematics behind the problem and how it can be solved.

LEARN ▾		COACH			
Manage Students		Student Progress		Skill Progress	
Class: Oct 2013 Training ▾		Filter: Find topics or skills ▾		Act	
Student Name				▾ Points	
sherman.marcus	1,159	0	262	295,831	
fabrahams	1,352	11	133	178,737	
mushfield1	1,076	7	101	175,174	
mxolisi.maweni	711	1	157	152,022	
alfreds	1,034	3	129	148,433	
m.bruintjies	845	0	116	121,710	
rosy.engel	533	1	115	117,425	
jon.ross1	308	0	131	95,575	
andile.kilani	696	5	120	91,879	
zamuxolo.langa	411	1	45	61,189	
Josephat.muchatuta	300	1	66	49,523	
mxoliswa.dyantyi	280	1	55	46,561	
pheliswa.hlakula	321	0	55	46,336	
nomfundo.xaso	352	3	16	41,063	
fulani.matore	255	0	28	35,861	
razaan.metabo	225	0	37	23,370	
asanda.ndzala	263	2	46	22,643	
julius.maganga	267	1	16	19,045	

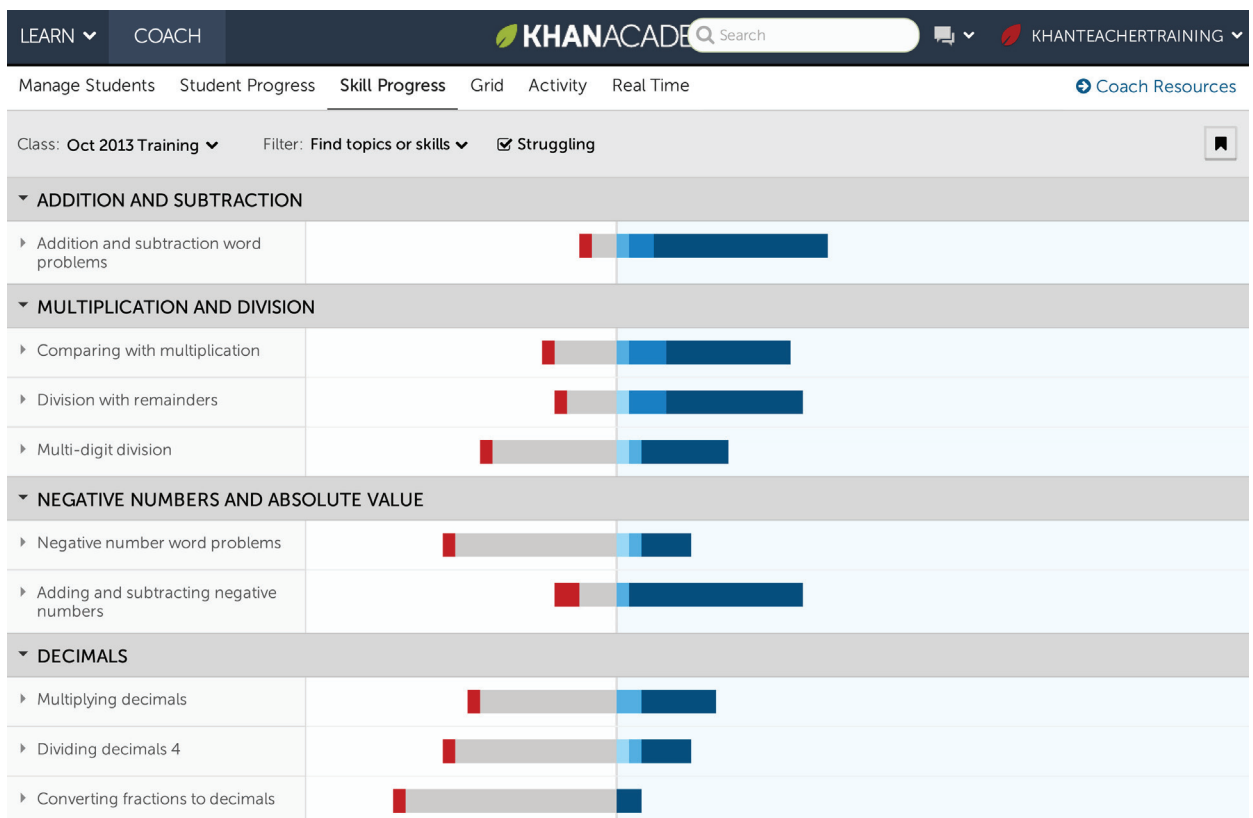
This is part of a screen grab that illustrates the kind of student performance data that the programme captures and analyses for their teacher. We have obscured the names of the students to protect their identities. The first column is a record of the total time that each student has spent on the website. This can be filtered for any particular period of time (for example for the past hour, day or week), which makes it possible to obtain an accurate picture of exactly how much time each student has devoted to this work. The second column, with a small red square at the top, lists the number of topics that each student has struggled with and the third column, with a dark blue square at the top, lists the number of topics that each student has mastered. The fourth column lists the total points each student has scored during the selected period.

We have had first-hand experience of the initial impact of this free resource on two groups of teachers who attended 10 two-hour workshops over five weeks that were presented by facilitators from Numeric as part of an initiative by the Principals Academy Trust to improve the mathematical skills of teachers from the schools in which it is operating. The programme

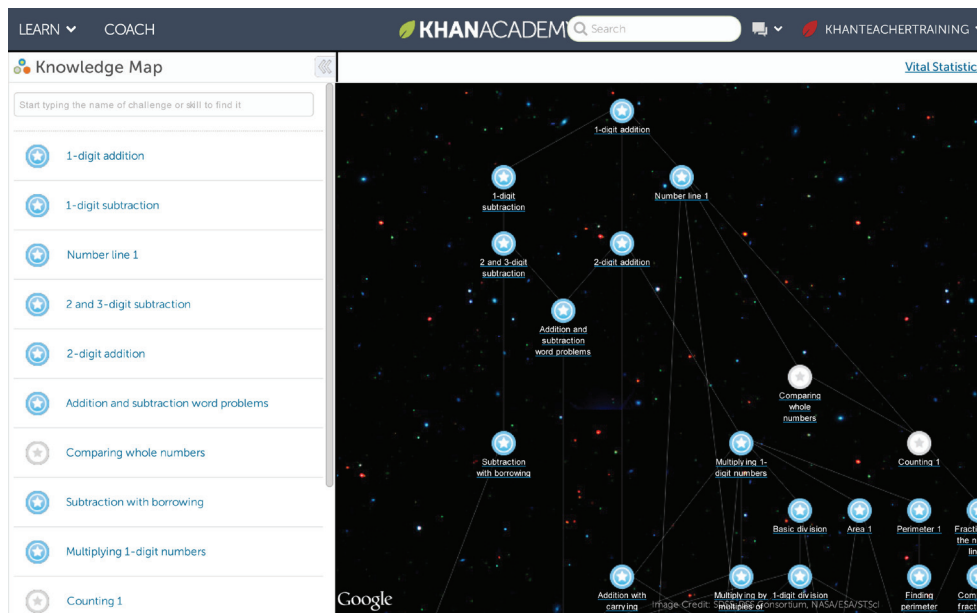
was voluntary and took place on weekday afternoons outside of school hours and attendance was excellent. Several of the teachers from each group also spent significant additional time logged onto the site and surpassed the goal of 90 mastered topics that the Numeric facilitator set for them at the start of the programme.



This screen grab is another example of the kind of data that the programme provides on each student. In this case the height of the stacked bar represents the amount of time that individual students have spent on the programme with the smaller individual stripes representing the time spent on each specific topic. If you click on that topic, more detailed data is provided on the student's performance on that specific topic.



This screen grab is a further example of class data that the programme provides automatically for the teacher. In this instance, the various colours on the horizontal bar represent the proportion of students that have performed in each of the six categories of performance (Struggling, Needs practice, Practiced, Level 1, Level 2 and Mastered), in each of the topics that they have tried.



This screen grab illustrates a small portion of the Knowledge Map for Mathematics. The knowledge map is a visual representation of how various mathematics concepts and topics are linked to each other and helps explain the importance of mastering certain topics if a student is to fully understand and master other more complex concepts.

We plan on tracking the potential impact of the work of Numeric in those of its schools to which we have access as part of our work in support of the Principals Academy Trust and will report on our findings in future editions of SM&L. We captured the screen shots shown on the previous pages from the Khan Academy website and the data presented is a product of one of the five-week programmes for teachers facilitated by Numeric. ■

Notes

1. For a fuller explanation of how Sal Khan came to establish the Khan Academy that he gave in his own words at the March 2011 Ted Conference go to http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html.
2. TED is a non-profit devoted to Ideas Worth Spreading. It started out in 1984 as a conference bringing together people from three worlds: Technology, Entertainment, Design. Since then its scope has become ever broader. Along with two annual conferences – the TED Conference and TEDGlobal – TED includes the award-winning TED Talks video site, the Open Translation Project and TED Conversations, the inspiring TED Fellows and TEDx programs, and the annual TED Prize. (Copied directly from the TED website, Ed.)

... Continued from page 1

This edition also includes an article about a very useful online resource – the Khan Academy – which I was introduced to by an NGO called Numeric, which provides additional Mathematics coaching for learners in the afternoons at their schools. The quality and value of the material available from the Khan Academy website is excellent and I would recommend all schools who are struggling to improve their learners' mathematics results to avail themselves of this resource.

It would have been remiss of us not to include something on the Annual National Assessment (ANA) tests that were written by learners from all South African public schools towards the end of the third term, so this edition includes an article on how some schools have used the results of these tests to help them to better understand the extent to which learner performance data can be linked to inadequate classroom practice.

Regular columnist Erich Cloete has contributed two articles. The first looks at the extent to which recent findings from research in neuroscience can help us to understand why people sometimes behave as they do together with advice on how to get the best out of employees.

In his second article, Erich discusses the Continuing Professional Teacher Development system, which will be implemented in 2014.

This is the last edition for 2013 and readers can expect some changes to the format of SM&L in 2014, the most noticeable of which will be a move from the current model that is designed to accommodate the publication of five 32-page editions per year to four 40-page editions per year, published quarterly.

Finally, we would like to wish you, our readers, a safe, restful and joy-filled festive season and a successful and prosperous 2014. ■

Getting the most from your school's ANA results

We look at how schools can use the results of the Annual National Assessment (ANA) tests to help them to better understand the extent to which learner performance data can be linked to classroom practice.



Language is key to school success. Insisting that every child in your school does some reading, writing and calculating every day, is a simple yet effective method of improving their language and numeracy skills.

Because the ANA tests are designed to assess the performance of learners relative to the prescribed curriculum for their grade by examiners who one must assume are experts in their field they provide schools with a rich source of data that would otherwise not be available to them. Properly collated and analysed, the results provide valuable information on:

- the overall level of performance of individual learners, which is given by the total mark or percentage for the test

- the performance of each individual learner based on the mark they score in individual questions
- the average level of performance of class groups together with the strengths and weaknesses of the group as a whole
- the overall performance of class groups based on the average marks scored in each question
- the teaching quality of individual teachers, which can be derived from both the overall performance of the learners in the class groups that they teach as well as the performance of learners from these classes in particular sections of work
- the overall performance of learners as a grade group based on both the group average and the mark distribution of the group
- the overall performance of the learners in the grade relative to learners from the same circuit, district, province or nationally, once this data is released by the DBE and provincial education departments.

It is important to remember that the data itself has no intrinsic value. Its value is derived from the extent to which the data is used to understand the factors that contributed to the marks scored on individual questions, remembering always that the two within-school factors that have the greatest influence on learner performance are teaching quality (what the teacher does in the classroom) and the quality of school leadership. The quality of school leadership is indirect but does have a strong influence on the motivation of teachers and how they perform their duties.

The following charts are derived from the 2013 results of learners from real schools and are used to illustrate the kinds of useful information that can be gleaned from a detailed analysis of learner performance.

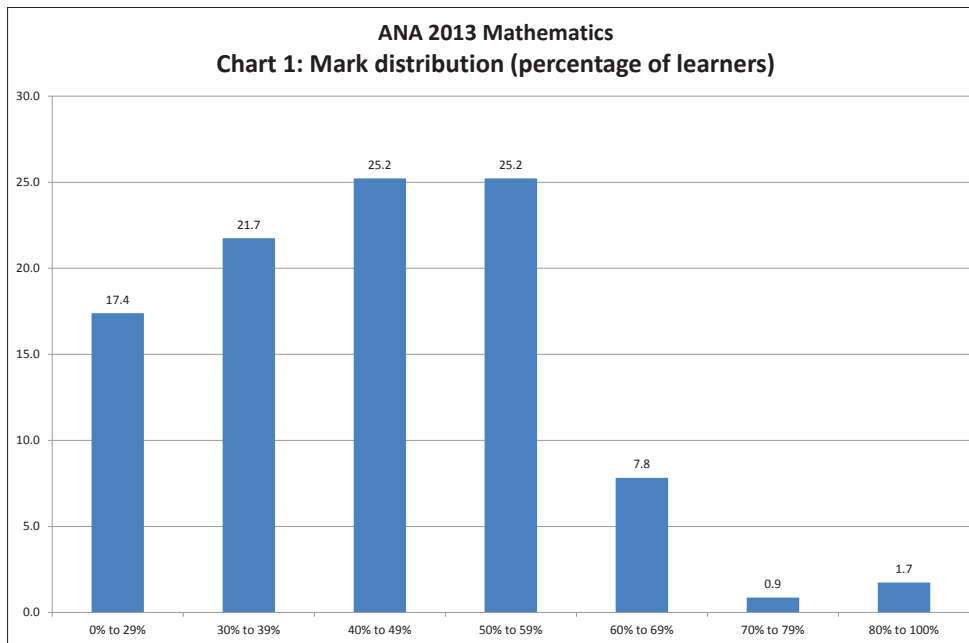


Chart 1: Mark distribution (percentage of learners)

This chart illustrates how the marks of learners are distributed with each bar representing the percentage of learners who fell into each category or code. This school normally performs exceptionally well in the NSC examinations and all learners are required to take both Mathematics and Physical Sciences in Grades 10 to 12. The school should have two concerns:

1. A total of 17,4% of the learners failed (scored less than 30%) in the ANA test.
2. Just over 10% of the learners scored 60% and above in the test.

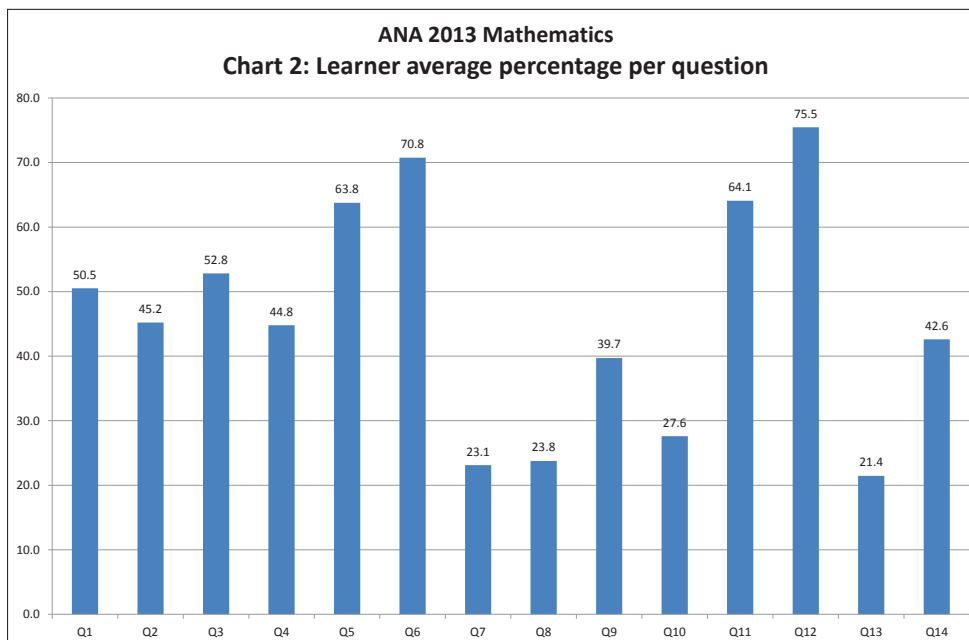


Chart 2: Learner average percentage per question

This chart illustrates the average score of learners (as a percentage) for each of the 14 questions on the test paper. Question 1 consisted of 10 multiple-choice questions with the questions covering most of the curriculum. Each of the other questions covered a specific mathematical topic. The chart provides clear evidence of the questions that the majority of learners have mostly mastered as well as those in which they performed poorly. Poor performance may be a consequence of work not having been covered because the ANA tests were written at the end of the third term and not at the end of the academic year.

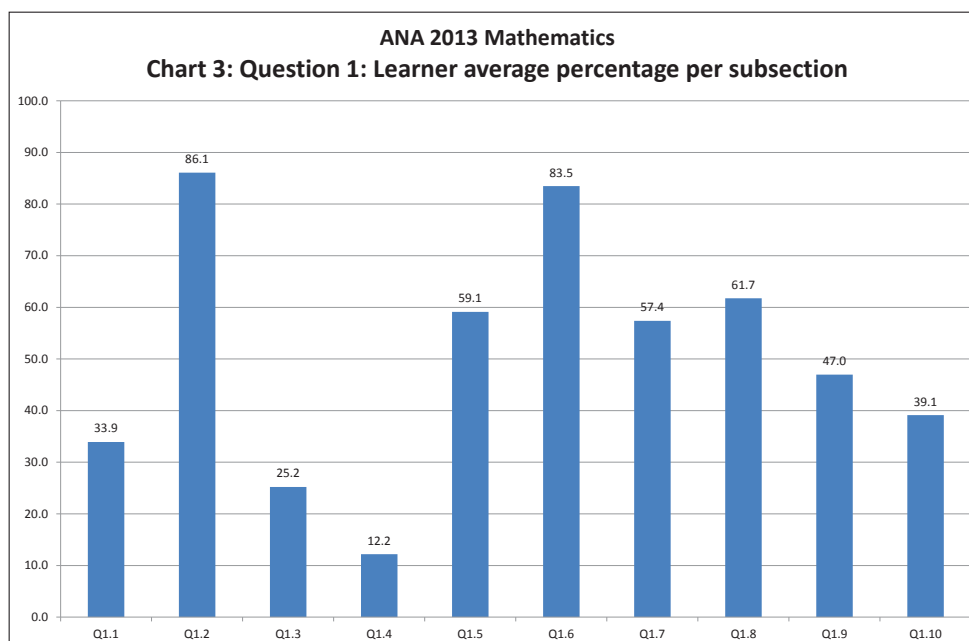


Chart 3: Question 1: Learner average percentage per subsection

This chart shows the learner average for each of the 10 multiple-choice questions that formed part of Question 1. Questions 1.1, 1.3, 1.4 and 1.10 are clearly topics or concepts the learners struggled with and which should be the focus of remedial teaching for all learners.

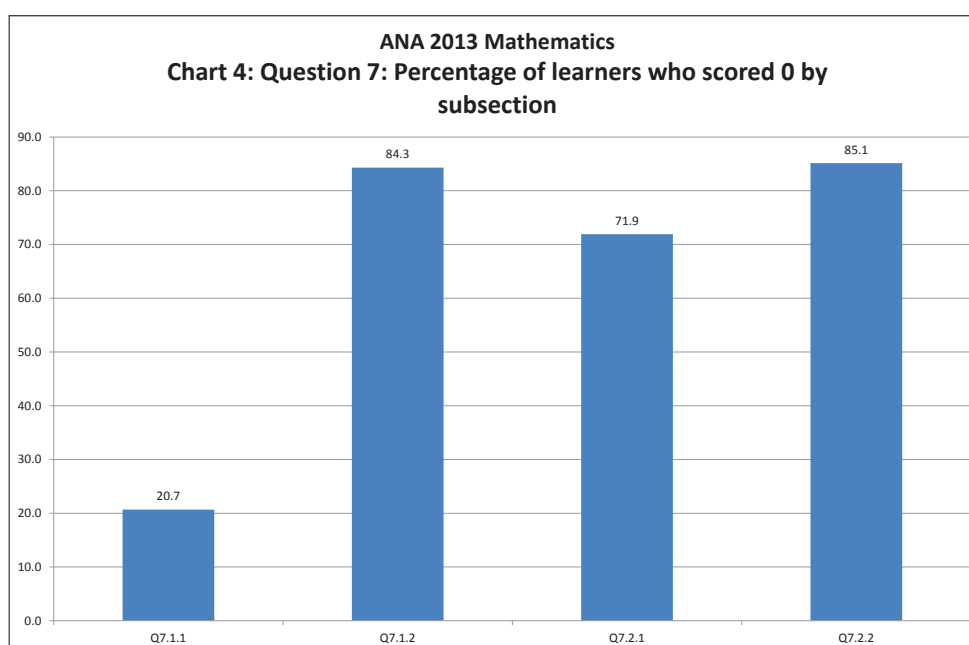


Chart 4: Question 7: Percentage of learners who scored 0 by subsection

This chart provides the same kind of information as Chart 3 but in this case provides an analysis of a group of questions that were related. The question deals with functions and graphs and is one of the questions in which the majority of learners performed poorly (the learner average for this question was 23,1%). The analysis of the four subsections of the question shows that although the majority of learners could do Question 7.1.1, very few of them had any idea about the other three subsections. The data once again provides clear direction to their teachers about what they can or cannot do.

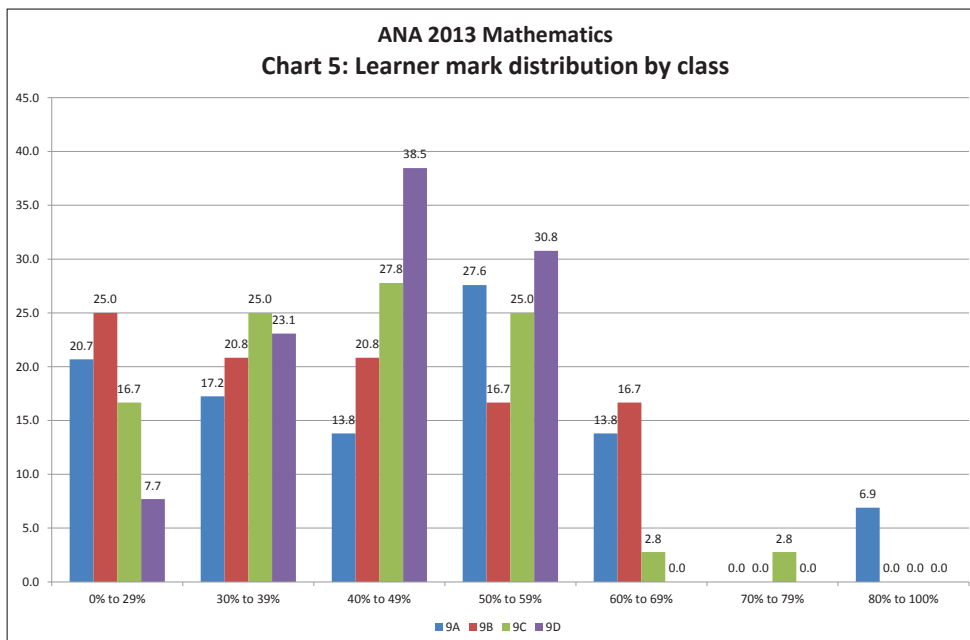


Chart 5: Learner mark distribution by class

Teaching quality may clearly have an influence on learner performance, so it is important to analyse the performance of learners on a class-by-class basis in instances where more than one teacher is responsible for teaching the various classes. If classes are streamed this needs to be taken into account when evaluating the performance of each class group and the quality of the teaching that they may have experienced.

Evidence from this chart suggests that there may be a problem with 9B, which has the highest proportion of failures of the four classes but interestingly also the second-highest proportion of learners scoring 60% and above. 9D on the other hand has the fewest failures but is also the only class with no learners who scored more than 60%.

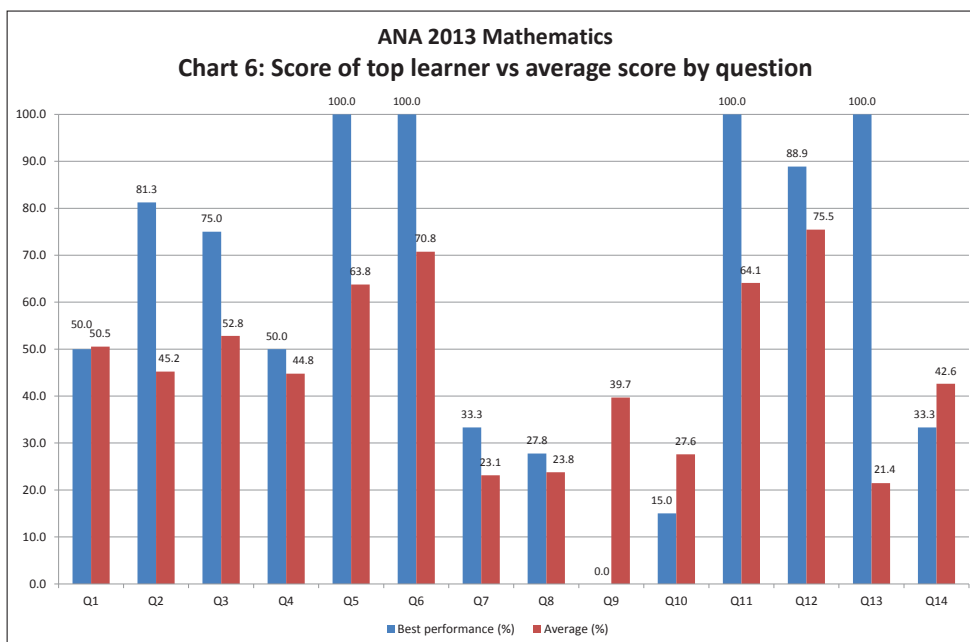


Chart 6: Score (percentage) of top learner vs. average score (percentage) by question

This chart compares the results of the learner who performed best on the tests with the average for the grade. What is interesting about this comparison is that the top learner scored 100% in one question that the rest of the class group struggled with (Question 13) but only performed just above the class average in several other questions (Questions 7, 8 and 14) and scored less than the class average in two questions (Questions 9 and 14). This may indicate that the teachers' ability to explain the topics dealt with in Question 13 was inadequate and/or that the teachers themselves are not completely confident in their own content knowledge of the topic.

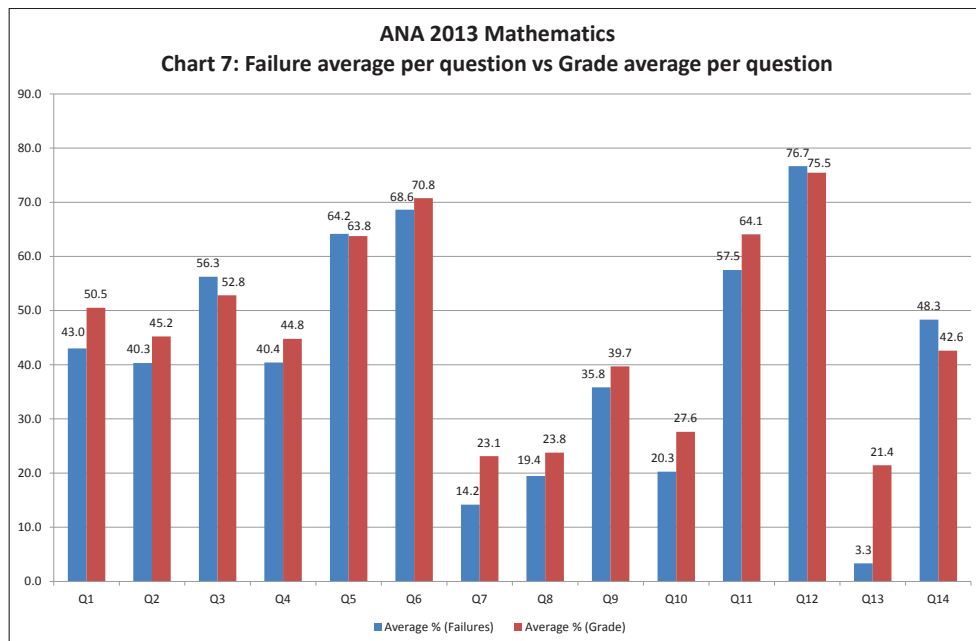


Chart 7: Failure average (percentage) per question vs. grade average (percentage) per question

This chart compares the average percentage for each question of the learners who scored less than 30% overall for the test with the grade average percentage for each question. The chart suggests that the weaker learners struggled particularly with Questions 3, 4, 7, 8, 10 and 13. The next chart unpacks this a bit further in the case of question 2.

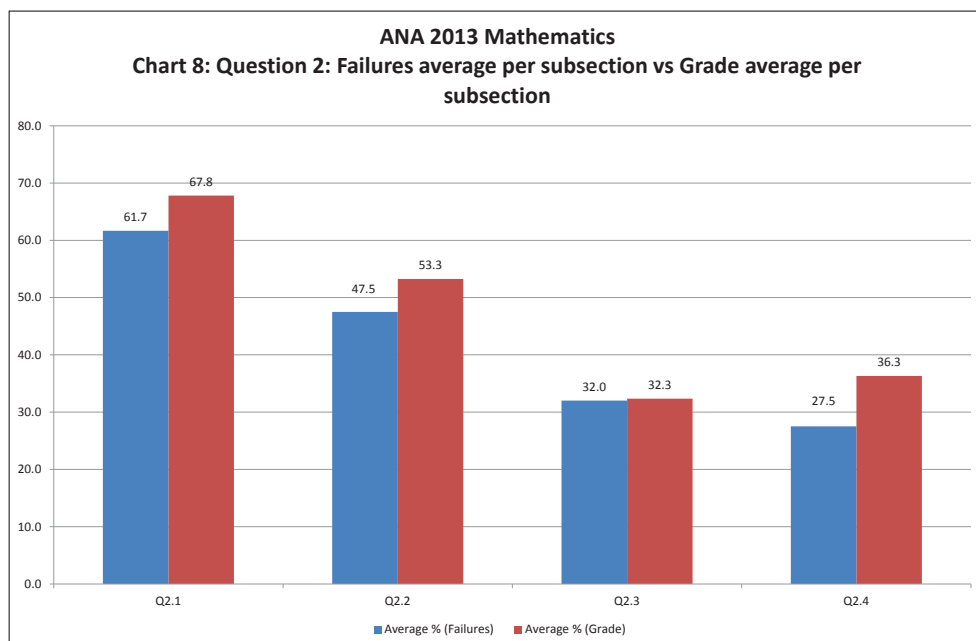


Chart 8: Question 2: Failures average per subsection vs. Grade average per subsection

Although the pattern of performance across the four subsections of Question 2 is similar for the grade and the failing learners it is clear that their main difficulties lie in questions 2.2, 2.3 and 2.4 and that their teachers need to devote more time to explaining and providing more examples for practice of questions of this type for their weaker learners.

All of the charts are rather formal examples of formative assessment, which is the form of assessment teachers use to better understand what learners have learned and understood rather than as a measure of progress (summative assessment). For good teachers, formative assessment is an ongoing process that takes place throughout the teaching and learning process. Probably the simplest type of formative assessment are the questions teachers ask

during class in an effort to determine whether individual learners in the class have understood what they have been taught or are able to demonstrate in a practical way that they have mastered the skills they have practised and use knowledge that they have learned. Formative assessment makes it possible for the teacher to assess the effectiveness of their teaching and to use this knowledge to guide their future practice.

One of the biggest challenges that high schools face, particularly in relation to the teaching of mathematics, is that the majority of learners enter high school at the start of Grade 8 with a severe mathematical deficit. These learners will not have mastered many of the most basic computational skills and many will never have encountered some forms of mathematical knowledge that are fundamental to their progress. Schools would therefore be well advised to test the fundamental mathematical and literacy skills (using the schools language of learning and teaching, or LoLT) at the very start of the school year, preferably in the first week, and to use the results of these tests to design a series of remedial interventions for implementation during the course of the first term. This should be done before the commencement of any new work in the languages and mathematics. An example of the performance of Grade 8 learners from one school is a series of tests designed to assess their basic competencies in the following areas. The test questions were taken from the 1995 Trends in International Mathematics and Sciences Study (TIMSS) for learners in their fourth year of schooling. The TIMSS tests are used to compare the performance of learners in their fourth and eighth year of schooling, from different countries across the world, in mathematics and science. Each of the questions in the tests for learners in their fourth year of schooling is designed to test the competence of the learners from one of the following domains:

- whole numbers (T1)
- fractions and proportionality (T2)
- measurement, estimation and number sense (T3)
- data representation, analysis and probability (T4)
- patterns, relations and functions (T5)
- geometry (T6).

The following charts show how the Grade 8 learners from one school performed in these test. They were tested during January of 2013. Note: this is not the same school from which the ANA data was drawn.

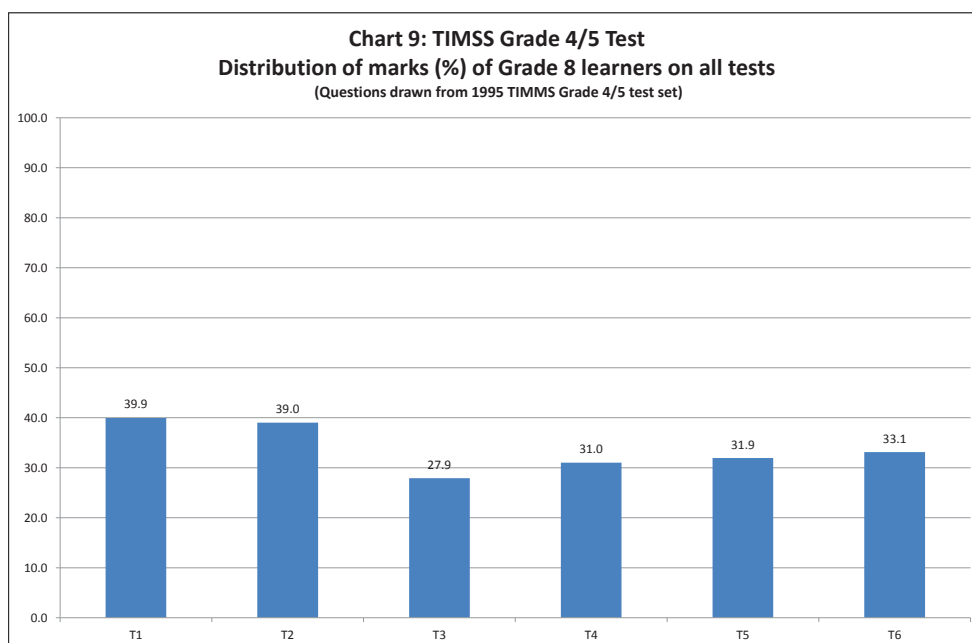


Chart 9: Distribution of marks (percentages) of Grade 8 learners in all tests

The chart shows the average marks scored by learners (n = 173) in each of the six tests. The designation T1 to T6 refers to the domains of each of the tests as listed above.

The poor performance of these learners in what is essentially a Grade 4 test is clearly evident from this chart and, given the nature of the questions, demonstrates quite clearly how weak they are as a group.

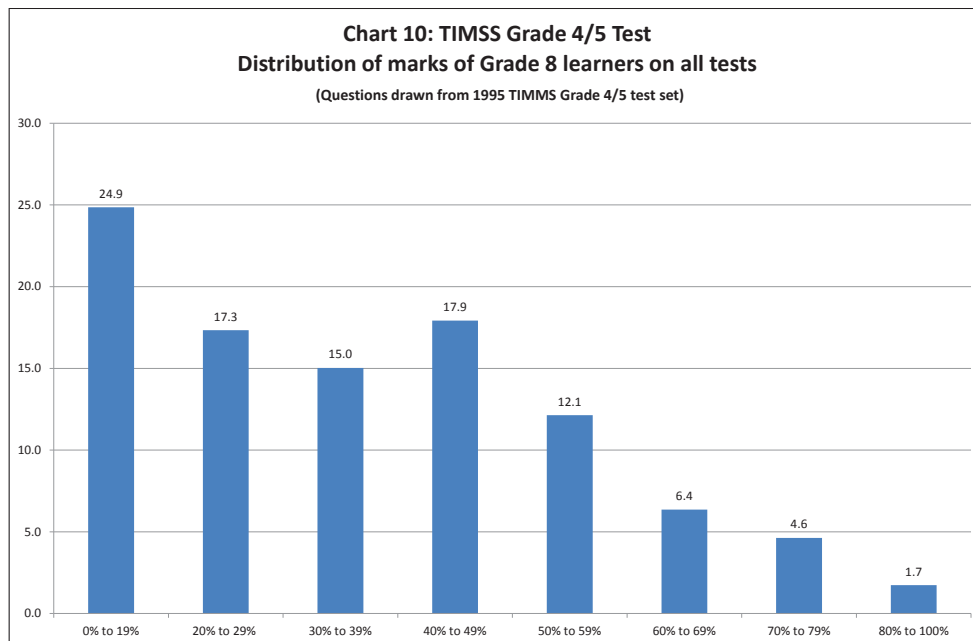


Chart 10: Distribution of marks of Grade 8 learners in all tests

This chart confirms the analysis provided in Chart 9 and provides further evidence that the majority of the Grade 8 learners at this particular school have not yet mastered the most basic mathematical concepts and why, if they are to make progress, this shortcoming needs to be addressed

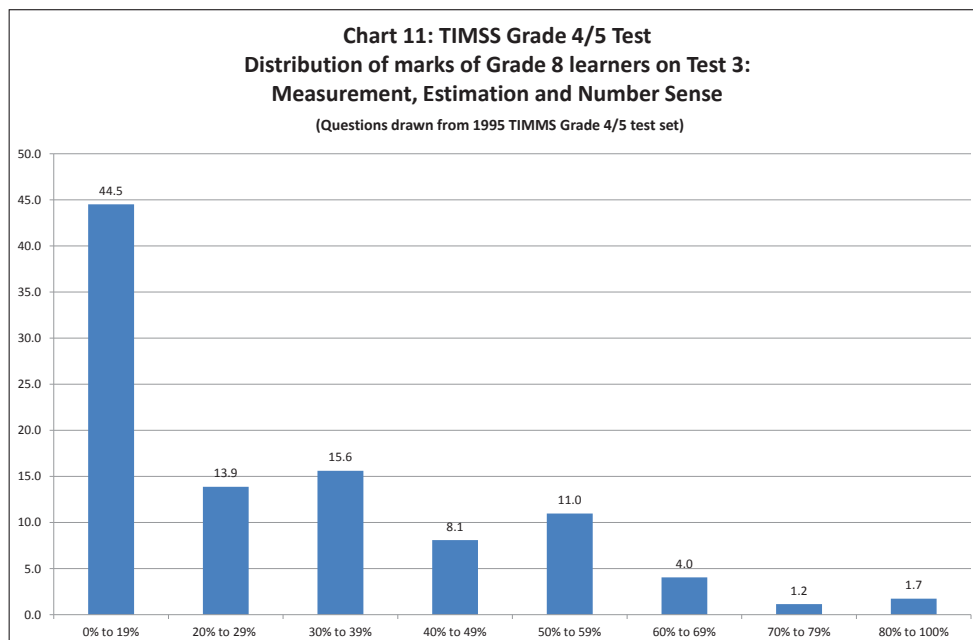


Chart 11: Distribution of marks of Grade 8 learners in Test 3: Measurement, Estimation and Number Sense

Measurement, estimation and number sense are the foundation on which virtually all other mathematical concepts are built and children who do not master the concepts and skills associated with these concepts are essentially innumerate. Mastery of these three concepts requires proper teaching of the fundamental arithmetic processes of addition and subtraction and the use of these to develop the individual learners' understanding of multiplication and division, together with a good understanding of the number line. Practice and drill are key and teachers need to ensure that all of the learners whom they teach know their tables and are able to add, subtract, multiply and divide numbers of up to three digits without the use of a calculator.

Some improvement strategies

1. Make sure that all learners have a good grasp of the basics and work to improve these by constant practice, including mental maths drills. Do not allow learners to use calculators for these activities, as it is in practising these skills that they hone their number sense.
2. Ensure that mathematics homework is set, completed and marked every day. The process of setting homework, checking that it has been done and then marking it in order to assess whether learners have understood what has been taught needs to be a ritual that is performed every day in every mathematics class.
3. Test learners regularly using formal class tests to assess progress and to identify those learners who may be struggling. Ensure that the test questions include items that test the learners' basic understanding and skills as well as those that are more challenging and that require the learners to apply what they have learned in new circumstances. This helps the more able learners to stretch their thinking about what they have learned.
4. Use the results of both informal assessment tasks such as homework, as well as formal tests to monitor learner performance and to identify those learners who are struggling and who may need additional support.
5. When learners make mistakes it is important to interrogate their thinking. This is best done by asking them to explain the process that they followed to reach their answer. The 'unpacking' process helps learners to think about their thinking and often helps identify misconceptions that learners may have about a particular mathematical operation. Clearing the misconception helps learners to gain a better grasp of the concept and to master its use in practice.
6. In mathematics, like in most things, regular practice in performing the tasks that will be tested is key. Give learners plenty of graded examples – they need to leave the mathematics classroom exhausted from the hard work that they have been doing with their minds, not bored from listening to long explanations from their teachers. ■

Breaking news

ANA 2013 results released by DBE

Just before this edition was due to go to press Education Minister Motshekga released her department's report of the 2013 Annual National Assessment results. We will provide a full summary and comment on this report in the next edition of SM&L, but have included the following brief summary of the

results because we believe it provides an additional perspective to the article 'Getting the most from your school's ANA results', which we carry in this issue. The following table lists the national average in each grade for each of the subjects listed in 2012 and in 2013 for purposes of comparison.

Grade	Maths 2012 Nat. Av. (%)	Maths 2013 Nat. Av. (%)	Home Language 2012 Nat. Av. (%)	Home Language 2013 Nat. Av. (%)	First Additional Language 2012 Nat. Av. (%)	First Additional Language 2013 Nat. Av. (%)
1	68	60	58	60	Learners in Grades 1 to 3 are only tested in their Home Language	
2	57	59	55	57		
3	41	53	52	51		
4	37	37	43	49	34	39
5	30	33	40	46	30	37
6	27	39	43	59	36	46
9	13	14	43	43	35	33

In the executive summary, the Department acknowledges that increases in performance need to be monitored to confirm the validity of these improvements. This is a valid point and the Department's cautious approach is to be commended given the fact that virtually the entire assessment process, including the marking of scripts, is administered at school level. One pair of figures stands out, the importance of

which cannot be ignored: the average percentages for Mathematics in Grade 9 for 2012 and 2013. They expose the critical weakness in Mathematics teaching in the Intermediate and Senior Phases of our public schools. It is a challenge that is unlikely to go away in the short term and one that is likely to remain with us for a long, long time if immediate steps, in the form of intensive teacher training, are not taken to address it. ■

Workplace engagement

Erich Cloete

We look at workplace engagement through the lens of neuroscience, to gain a deeper understanding of how it impacts on human performance.

In SM&L volume 7, number 2 (The Scarf model, page 15) we introduced neuroleadership as an emerging field of study that focused on bringing neuroscientific knowledge into the areas of leadership and management. In that article we discussed the valuable SCARF model as a tool for school leaders to improve their leadership and management practices. As neuroscience is currently quickly becoming a new buzz word, we decided to do some more research on this topic in order to provide our school leaders with some valuable and practical strategies to enhance performance in our schools.

Over the years, a lot of research has been done on the topic of motivation and also on strategies leaders can implement to achieve a more motivated workforce. It is a common belief that when staff are motivated, they perform better, are more productive, show more initiative and are happier overall than their counterparts. We therefore decided to investigate what research tells us about the connection between motivation and neuroscience (the SCARF model) to see if and how they relate to each other. What we have found is that the SCARF model, as summarised in the adjacent box, is not tied to motivation, but to workplace engagement. According to neuroscience, the question school leaders should ask themselves, is not how motivated their staff are but how engaged they are. Engagement refers here to a heightened, measurable emotional connection that employees feel for their organisation that influences them to exert greater discretionary effort to their work. It goes beyond job satisfaction and is much more than motivation. Engagement is something the employee has to offer and it cannot be required as part of the employment contract.

The neural basis of disengagement can be defined by the average levels of activation of the brain's threat circuitry, which is not just fear but includes anything that induces an avoid response such as sadness, anxiety, lack of safety, depression or any other negative emotion.

Current research into the workings of the brain emphasises two important things. The first one is that the organising principle of the brain is to minimise danger and maximise reward. The second one is that the neural basis of engagement is closely linked to the threat/reward function of the brain.

The SCARF model summarises a wide range of social cognitive and neuroscience findings into five domains. These five domains are environmental factors that people keep track of in a similar way to tracking levels of food and water. In the reward state, there is a positive experience of feelings towards Status, Certainty, Autonomy, Relatedness and Fairness (SCARF), which result in people:

- experiencing increased cognitive resources
- being generally more creative
- solving more problems
- coming up with more ideas for actions
- having a wider field of perceptual view.

These findings are consistent with definitions of engagement, where people are more capable, overall, of making decisions and solving problems. On the other hand, research indicates that the neural basis of disengagement can be defined by the average levels of activation of the brain's threat circuitry. It is important to note that the threat circuitry is not just fear. It includes anything that induces an avoid response such as sadness, anxiety, lack of safety, depression or any other negative emotion. Research suggests that engagement as well as disengagement can be measured across an entire job, or within a specific task. This means that it is possible that an employee could be disengaged overall but have one specific task that they find engaging.

Perhaps a teacher doesn't like to deal with administrative work or challenging disciplinary matters in the classroom, but is engaged when he or she deals with learners and is able to help them solve their curriculum matters. Such a teacher would then experience high levels of activation of their reward and

self-regulation circuitry when busy with curriculum support, but not when doing administrative work or dealing with matters of discipline. Research suggests there are various levels of engagement, ranging from actively disengaged to deeply engaged, as shown in the following table.

Actively disengaged	Disengaged	Neutral	Engaged	Actively engaged
A high average threat state	An average threat state	Midway between threat and reward states	An average reward state	A strong average reward state
-100	-50	0	50	100

The SCARF model: a brief summary

The SCARF model involves five domains of human social experience: Status, Certainty, Autonomy, Relatedness and Fairness. It's really a summary of what motivates us. The things we feel most passionately about, both positively and negatively, are driving our behaviour all the time. They're almost like the primary colours of intrinsic motivation. Status is about relative importance to others. Certainty concerns being able to predict the future. Autonomy provides a sense of control over events. Relatedness is a sense of safety with others, of friend rather than foe. Fairness is a perception of fair exchanges between people.

Simply put, the brain categorises everything into one of two categories: threat or reward. We're driven unconsciously to stay away from threat. We're driven unconsciously to go toward reward. This decision about threat or reward happens five times every second. It's very subtle. We're making this decision about everything good or bad all the time. These five domains activate either the

'primary reward' or 'primary threat' circuitry (and associated networks) of the brain.

There has been extensive research in the last 10 years or so that shows that things that create the strongest threats and rewards are social. Social threats and rewards activate what's called the brain's primary threat-and-reward centre, which is actually the pain-and-pleasure centre. For example, a perceived threat to one's status activates similar brain networks to a threat to one's life. In the same way, a perceived increase in fairness activates the same reward circuitry as receiving a monetary reward.

Leaders should realise that every action they take, every decision they make, either supports or undermines the perceived level of status, certainty, autonomy, relatedness and fairness. Their focus should therefore be on improving the level of status, certainty, autonomy, relatedness and fairness of employees.

Current research proposes that deep engagement is an experience that occurs when people experience rewards from all five domains of SCARF. One way to do this is to ensure that people are undertaking tasks that they perceive to improve the greater good, by improving some kind of social condition. This is consistent with the research done in management 2.0, where it is indicated that work or tasks must serve a higher purpose, be defined and understood. When this

happens people are improving their status in their own eyes and in those of others. Uncertainty is decreasing as people are proactively solving some kind of social or other problem that did not previously have a solution. By solving a problem people are acting autonomously, making choices instead of complaining about the problem. In this process people are connecting with others to facilitate change and reduce, in some way, unfairness in the world. These social problems can be

as simple as improving the way people communicate in the staffroom, such that people start to share and connect more. Or they can be related to teaching that deeply affects the wellbeing of communities, schools and our world. Schools committed to improving the world through education achieve more than those with a vision of simply beating the competition or a neighbouring school.

Research suggests that it is the level of workplace engagement of an individual, a team and a school that can have a positive and tangible impact on performance. One's level of engagement has a real impact on one's ability to solve problems and make decisions, stay cool under pressure, collaborate with others, and deal with change, all four domains of neuroleadership. Research also indicates that schools with engaged employees will have a lower absenteeism rate, lower turnover, higher productivity, less safety incidents and better relationships with parents and other role players.

What is your school's engagement ratio?

The Q12 Index can be used to measure the engagement of your employees. The Gallup Q12 is a survey designed to measure employee engagement. The instrument was the result of hundreds of focus groups and interviews. Researchers found that there were 12 key expectations, that when satisfied, form the foundation of strong feelings of engagement. So far 87 000 work units and 1,5 million employees have participated in the Q12 instrument. To illustrate the relevance of the survey for neuroscience, we put the survey into SCARF categories, shown in the questionnaire alongside:

Schools with engaged employees will have a lower absenteeism rate, lower turnover, higher productivity, less safety incidents and better relationships with parents and other role players.

The complete survey score needs to be calculated as follows:

The 12 engagement questions should be answered by employees on a scale of one to five, based on their weak or strong agreement. If they strongly disagree, they write 1 in the 'strongly disagree' column next to the applicable statement. If they agree with the statement, they write 3 in the 'agree' column next to the statement. If they strongly agree with the statement, they write 5 in the 'strongly agree' column next to the statement. Respondents should choose the number 2 and 4 columns when they are a bit uncertain whether they strongly disagree, agree or strongly agree with the statement, as they feel fit. Add up the numbers in each column of the completed

questionnaire and then calculate the total of all the columns added together, divided by 12 to get the average score. An average score of 4 or more (80%) indicates a highly engaged employee or workforce. Comparisons of engagement scores reveal that those with average 4+ scores exhibit lower turnover, better productivity and other manifestations of superior performance. Anything lower indicates an opportunity for improvement and the results should be analysed to see if there are any particular areas for improvement.

The challenge for our education system is to create a workplace that encourages engagement. Awareness precedes change but engagement precedes performance. This is also applicable to education in South Africa and we need everyone involved in education to be engaged to give us the best possible chance of success. However, improving engagement goes beyond simply asking the right questions. Engaging employees requires a year-round focus on changing behaviour, processes and systems to anticipate and respond to your department or school's needs. ■

References

- Neuroleadership journal, www.neuroleadership.org
- Engagement at work: Its effect on performance continues in tough economic times – key findings from Gallup's Q12 meta-analysis of 1,4 million employees
- Petroleum Human Resources Council of Canada

Status	1 Strongly disagree	2	3 Agree	4	5 Strongly agree
1. In the last seven days, have you received recognition or praise for doing good work?					
2. At work do you have the opportunity to do what you do best every day?					
3. Does the mission/purpose of your company make you feel your job is important?					
4. In the last six months, has someone at work talked to you about your progress?					
5. In the last year, have you had opportunities at work to learn and grow?					
6. At work, do your opinions seem to count?					
Certainty	1 Strongly disagree	2	3 Agree	4	5 Strongly agree
1. Do you know what is expected of you at work?					
Autonomy	1 Strongly disagree	2	3 Agree	4	5 Strongly agree
1. Do you have the materials and equipment to do your work?					
Relatedness	1 Strongly disagree	2	3 Agree	4	5 Strongly agree
1. Does your supervisor, or someone at work, seem to care about you as a person?					
2. Is there someone at work who encourages your development?					
3. Do you have a best friend at work?					
Fairness	1 Strongly disagree	2	3 Agree	4	5 Strongly agree
1. Are your colleagues committed to doing quality work?					

Growth is never by mere chance

Erich Cloete

The implementation of the long-overdue Continuing Professional Teacher Development (CPTD) system in 2014 will surely be a challenge to many educators in South Africa, even principals and deputy principals.

How many of us have ever heard educators say they can't wait to attend an afternoon's professional development workshop at the school or district office and they are so excited about it? I'd suggest that the answer is very few.

With the CPTD introductory workshops many principals indicated that they could not see how the engagement in professional development (PD) activities would improve learner performance in their schools. It was clear that some of them regarded it as just another activity that will contribute to their already overloaded programme, which will leave less time for their actual work. It was also noted that principals in the age group between 56 and 60, who are nearing retirement, more openly questioned the value of CPTD activities. These comments raised the concern in my mind that these principals and deputy principals won't necessarily see their ongoing professional development as an investment in their future and that it would be easy for other activities to take precedence. It also raised the question of how inspired our educators will be with regard to the CPTD system if our school management teams are not able to recognise the value of professional development. I realised that we need to ensure that principals and deputies truly understand what the advantages of educators' professional development could be for their schools.

It is clear to me that for the CPTD system to be effective it should operate from a place of inspiration, not desperation, and this would require a growth mindset as opposed to a fixed mindset from everyone involved. It needs to be made clear that professional development activities are not solely deficit-based and necessary only when there is a lack of skills. We need to get the message across that professional development should be seen as an asset-based positive activity,

and we should approach professional development activities as a way to build upon our strengths, to grow and expand. We also need to look at how to create the most supportive and inspirational development environment possible for ourselves so that we can find ways to have more of what we want.

A brief introduction to the CPTD management system

The CPTD system will be managed by the South African Council for Educators (SACE), recognising all useful educator development activities. It is a new way in which the system will encourage and recognise what educators do on their own to develop themselves and improve learning. It will also recognise what they do as part of the school collective to develop themselves and improve teaching, learning, assessment and services to the community. Its aim is, further, to revitalise the teaching profession, give recognition to educators who develop themselves and improve teaching by taking advantage of good-quality services provided by employers, unions, professional associations and others.

The South African Council of Educators, which is responsible for the implementation, will be assisted by the Department of Basic Education (DBE) and the nine provincial education departments (PEDs). Section 5(b) of the SACE Act no. 31 of 2000, as amended by the Basic Education Laws Amendment Act (2011), provides SACE with a direct CPTD mandate. In addition, the National Policy Framework for Teacher Education and Development, which was promulgated on 26 April 2007, states that SACE as statutory body for professional educators will have overall responsibility for the implementation, management and quality assurance of the CPTD system. The CPTD implementation plan was approved

Educators will benefit from this system in the sense that their developmental activities will be intentional, focused and have the necessary support and recognition.

in November 2012. This followed various national and provincial meetings that took place with stakeholders and unions to share the implementation plan, get buy in, clarify roles and responsibilities and identify areas of collaboration.

The CPTD will be phased-in, as indicated below, to all educators from January 2014 according to the three identified cohorts and participation will be mandatory for all educators.

- January–December 2014
 - First cohort: Principals and deputy principals (first CPTD cycle starts from January 2014 to December 2016 and thereafter every three years). Principals and deputies must take note that registration must be completed by 6 December 2013. Visit the SACE website for more information at www.sace.org.
 - Second cohort engages in the CPTD orientation and sign-up processes.
 - Ongoing monitoring and evaluation.
- January–December 2015
 - First cohort starts second year of the three-year CPTD cycle.
 - Second cohort: HOD (first CPTD cycle starts from January 2015 to December 2017 and thereafter every three years).
 - Third cohort engages in the CPTD orientation and sign-up processes.
 - Ongoing monitoring and evaluation.
- January–December 2016
 - First cohort starts third year of the three-year CPTD cycle.
 - Second cohort starts second year of the first three-year cycle.
 - Third cohort: Teachers (first CPTD cycle starts from January 2016 to December 2018 and thereafter every three years).

It is believed that the teachers' entrance into the CPTD system will be enhanced since their seniors have gone through the process already. However, if members of the school management team go through all the actions and processes just because it is something that needs to be done, it may well be a lost opportunity to get their schools' teachers involved and engaged in the process. Principals, deputies and HODs therefore will have to think carefully about their own beliefs with regard to professional development. They must not expect others to become anything more than they are willing to become themselves.

What is professional development and how will the CPTD management system benefit educators?

Teachers, like all professionals need to grow their knowledge and skills throughout their careers. As for all professions, teaching requires deep knowledge, which should be continuously updated and widened. As

educators are entrusted with profound responsibilities by parents, they need to continuously strengthen their capacity to help and support learners along the path of learning, understanding and development. Educators further need to renew their commitment to their profession on an ongoing basis, express their pride in its deals of service, their dedication to the learners' development and their determination to contribute to the development of our education system. To simplify, we can say that the main purpose is to encourage educators to become better educators and to encourage school communities to become better centres of teaching and learning. Educators will benefit from this system in the sense that their developmental activities will be intentional, focused and have the necessary support and recognition. As providers will need to be declared fit by SACE to offer quality PD activities, educators will also be protected against fraudulent providers.

What will be expected from educators and what type of activities will they need to engage in to enhance their professional growth?

In terms of the National Policy Framework for Teacher Education and Development in South Africa (NPFTEd, 2007) the CPTD Management System will be made available to all school-based educators (principals, deputy principals, HODs and teachers), whether state employed, employed by school governing bodies or employed by independent schools. These educators will be expected to have a personal Professional Development Portfolio (PDP) according to SACE guidelines. The PDP will be a personal resource document to assist educators' professional growth. It will contain various kinds of information such as an analysis of professional development needs and guidance on how educators can undertake or access professional development activities on the CPTD management system. In addition, it will contain a record and evidence of the educators' personal development (PD) activities. Each educator will be expected to achieve at least 150 PD points in every three-year cycle. Although no penalty will be imposed on educators (from 2014–2019) who do not achieve the PD points target, educators who make a deliberate decision not to engage in the CPTD system will be dealt with through section 7 of the SACE Code of Professional Ethics. The following certificates will be awarded after a three-year cycle:

- a bronze certificate of achievement to each educator who achieves 150 PD points within three years
- a silver certificate of achievement to each educator who achieves 151–300 PD points within three years
- a gold certificate of achievement to each educator who achieves 300+ PD points within the three years.

The indication is that educators will be able to accumulate PD points by engaging in three types of professional activities: type 1 activities initiated by the educator, type 2 activities initiated by the school and type 3 activities initiated by external service providers. Type 1 and 2 activities will be available to all educators at any time but type 3 activities may be available only from time to time. It is a big concern that I was unable to track down any relevant information or documentation outlining specific examples of type 1 and type 2 activities and explaining how points will be credited to these activities. The process starts from 1 January 2014 and I would have expected the information to have been available, at the latest, by the end of November 2013. It is a concern that a silence set in after the initial information session that I attended with regard to the implementation of the CPTD system. However, despite information not being available it is quite possible that type 1 and 2 activities will be guided by the professional development activities outlined in the current integrated quality management system (IQMS). Current IQMS professional development activities include the following, which I believe may be utilised to constitute type 1 and type 2 activities:

- self-study (ACE, BEd, BEd Hons, PGCE, PGDE, MEd, DEd/PhD and various other accredited courses)
- the reading of journal articles on general education literature, and literature specific to learning areas
- writing and publishing articles
- conducting workshops and seminars
- presenting conference papers
- developing learning material
- participating in various conferences and seminars
- mentoring novice educators
- participating in collaborative research
- coaching sports and cultural activities
- attending workshops, seminars and/or forums.

The way in which educators will be expected to record points will put the values of integrity and honesty solidly into the spotlight as they will be expected to record their own points for type 1 and 2 activities in their PDPs. Type 3 PD points will, however, be reported online to SACE by each SACE approved service provider, whereafter educators will record their type 3 points in their PDP.

A catalogue of approved CPTD providers and endorsed activities has been published and is available for download from the SACE website. I am assuming,

although this is not indicated in the catalogue, that this is a list of type 3 activities provided by service providers. I found the information given in the catalogue to be very limited and basic. Although it stipulates the name of the service provider, title of activity, duration and number of points that can be obtained, no indication is given of dates and places when the training would take place. This would make it very difficult, especially for principals and deputies with their already busy schedules to do proper planning in this regard.

Also of concern in the catalogue is the correlation between the indicated duration of activities and PD points to be obtained. The same number of PD points (10 PD points) is awarded to a number of different activities of varying lengths, some as short as two days, others that are five or six days long and even one that is shown as being over three months. A quick look at the form that prospective providers of teacher development activities/programmes need to submit to SACE for provider approval and activity/programme endorsement showed that service providers have to select one of the following categories to indicate the duration of their activity: half a day (0–4 hours), full day (5–8 hours), week (5–7 full days), month (20–30 full days), 6 months, 1 year, 2 years and 3 years. With this in mind, it does not make sense to allocate the same number of points to activities that vary so much in duration.

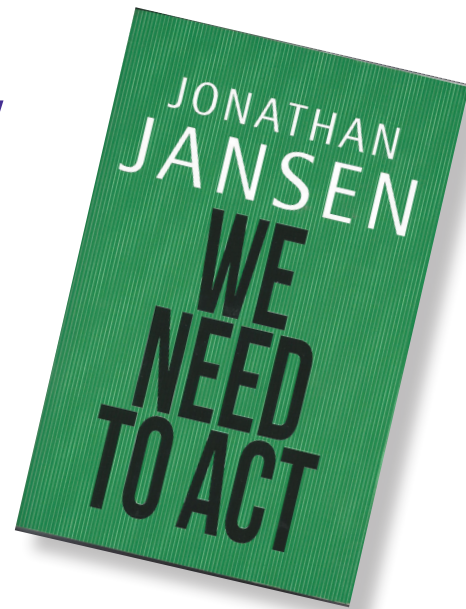
Nevertheless, in spite of the perceived problems with the implementation of the system, as long as we are living we should be learning. If we are not learning we are dead. Therefore we need to make professional development as important as eating our breakfast, lunch and supper. Our ultimate aim should be to benefit not only ourselves, but the learners, our schools, and the entire education system. ■

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Book review



We Need to Act

Author: Jonathan Jansen

Published jointly by Bookstorm and

Pan Macmillan South Africa, 2013

320 pages

ISBN: 978-1-920434-58-8

Author Jonathan Jansen, the vice-chancellor of the University of the Free State, is well known for his outspoken, thought-provoking and often controversial views on the current political landscape in this country. This selection of his weekly feature articles from *The Times* presents some of his perspectives of the real and imaginary demons that haunt us as we battle to create a new order and one that will do justice to the vision of those who brought us together in 1994.

As its title suggest the book is about the need to act and Prof. Jansen uses his wonderful ability to draw moral stories from his daily engagements with the people he meets, whether in person or through his Facebook and Twitter accounts, to build his case for the need for a more active citizenry in this country. And the case that he builds is a very compelling one.

A good example of his ability to tell stories in a way that invites us to action can be found in the very first of the pieces in the book, which has as its title 'A feline dilemma' and which forms part of the introduction to the book. The story concerns an animal biology student at the UFS who contacted him about her concern over the number of stray cats that roamed the campus. In an effort to control the problem the student took it upon herself to catch and sterilise as many of the cats as she could manage to catch but was not able to cope with the numbers involved and decided to approach her university principal for help. The campus 'cat problem' was not something that Prof. Jansen was even aware of and he uses this example of his lack of awareness about this particular problem, despite the fact that he and his student lived and worked on the same campus, to draw parallels with the many individuals and organisations from across the country who work selflessly to address one of more of the many socio-economic issues that are a blight to our country but which the state appears blind to.

The content of the book is divided into four sections each of which includes about 20 of his *The Times* articles grouped under the headings 'We need to act for education', 'We need to act for the future', 'We need to act for service delivery' and 'We need to act in hope'. There is also an introduction, in which he sets out his case for the need for citizen action, and an epilogue, which is a piece with the title 'Embracing the enemy – put yourself in the shoes of the man working to have Nelson Mandela killed'.

One of the things that I most enjoy about Prof. Jansen's writing in this genre – we must not forget that he is also a highly respected academic with a long list of published academic papers – is the forthright way in which he expresses his opinion about the matter under discussion and, like most of his admirers, I delight in his willingness to speak truth to power. This is a book to keep on your bedside table or to share with friends. If you are interested in the future of this country and in the work that needs to be done to help put to right the many wrongs that currently afflict it, you need to read it and to take to heart its central message of the need to act. ■

Jonathan Jansen's *We Need to Act* is published jointly by Bookstorm (Pty) Ltd and Pan Macmillan South Africa (Pty) Ltd, and is distributed by Pan Macmillan South Africa (Pty) Ltd. The book is available at all good bookstores and the price is approximately R175.

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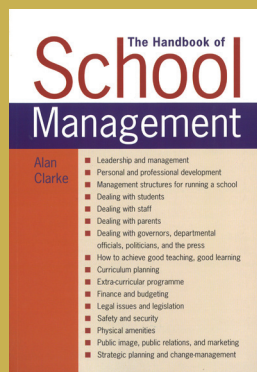
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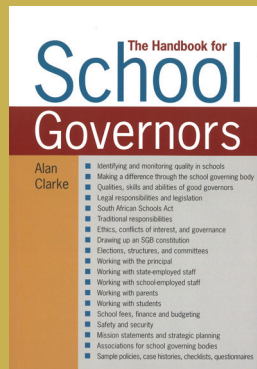
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