

Looking for the needle in a haystack

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Abstract

External assessment at Grade 9 in South Africa continues to be viewed by high-performing independent schools as an imposition on their teaching programmes and unnecessary in that it adds nothing to their current internal assessment programmes. It is difficult to argue against their position.

The IEB is exploring an alternate external assessment model whereby the focus is not on subject-based assessment but rather on a Core Skills Test and International Benchmarking Tests in English and Mathematics. The motivation for such exploring and alternate model and why this model in particular will be discussed together with the results from a pilot project run in 2008.

The paper will discuss the diverse needs facing education policy makers in South Africa and the effect of this diversity on attitudes. The strength of the alternate model is that it provides a meaningful assessment option for schools whose needs differ from mainstream education in South Africa. Besides providing independent schools with an international comparison of their standards at the Grade 9 level in 2 key learning areas, it also provides an insight into learner performance in questions that assess skills that may have been developed within a subject area but the questions are asked in a context that is not curriculum-based.

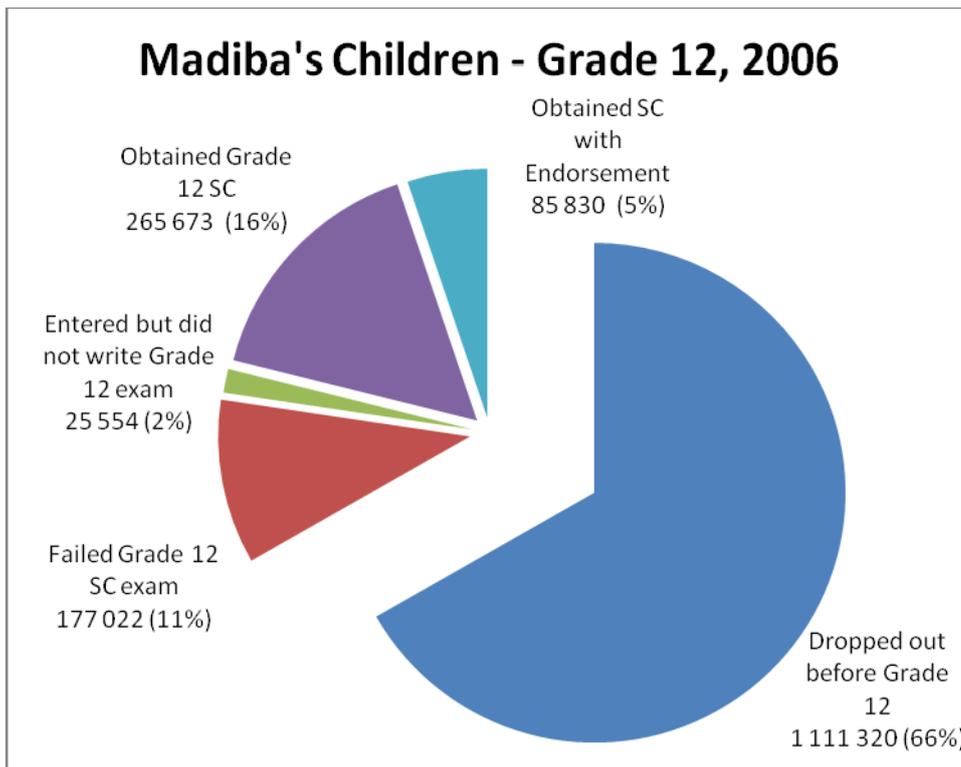
Preliminary findings and the way forward in this project will be discussed.

Background to the project

History of the GETC

When new government came into power in 1994, a major concern was the poor state of education of most learners in South Africa. It was clear that some strategic interventions were required to address the following issues:

- Poor pass rates at Grade 12: the first common examination i.e. across all race groups, after the democratic government came into power in the 1994 elections, was in 1995. The pass rate was 53.4%. There was considerable fluctuation in results with a steady upward climb until 2003 where the pass rate was 73.3%. The popular view is that these fluctuations reflected political interference in the face of declining pass rates and the need for the new government to increase access to higher education. However, sanity prevailed and by 2007 the pass rate seemed settled at about 65%. The endorsement rate also settled at 15.6% in 2007. While these figures are not necessarily reflective of government's intentions, they are reliable. (various EMIS reports; OECD, 2008)
- High drop out rates prior to Grade 12
The following is a graph of what is popularly known as Madiba's children i.e. learners who started school in 1995, the start of the first school year of the new democratic government. These learners would have reached Grade 12 in 2006, assuming they passed each year. (EMIS figures, DoE, Report on Senior Certificate 2006)



This is evidence of the wastage in the system – for this cohort in the region of 79% of learners who started in 1995 did not complete Grade 12 successfully. This percentage is steadily improving but there is still much to be done. While throughput rates in the schooling system are improving, more recent debates are focussing on the quality of the successful students.

The greatest drop out of learners is at the interface between the General and the Further Education and Training (FET) phases and during the FET phase i.e. between Grade 9 and Grade 12. For example, the number of learners in Grade 9 in 1999 was 917 239; by the time that cohort of learners was in Grade 12 in 2002, only 471 309 remained. This indicates a drop out of 445 930 learners or 49% of the Grade 9 cohort. (DoE, Report on Senior Certificate 2004).

- Low enrolments of black students at university
In 1993, just 9% of black learners of an age to participate in higher education did so, in comparison with 70% of white learners. Black students constituted 52% of those attending higher education (African students were 40%) while white students constituted 48% of the total enrolment of 473 000 (Badat, 2008).

Black students attending higher education institutions rose from 52% in 1993 to 74% in 2007, the black component made up as follows: Africans 61%, Coloured 7%, Asian 6%. Total enrolments increased from 473 000 in 1993 to 474 600 in 2007 (EMIS, 2007).

The following comment from Scott et. al in 2007 indicates that despite improved access, pass rates of black students was still below the aspirations of the new government. "The gains made in widening access to higher education are being neutralised by high attrition, and in particular, by lack of equity of outcomes . For example in the various CESMs* analysed by ITLS* in under-graduate degree programmes, the absolute number of black graduates was consistently lower than

that of whites, even where the majority of enrolment was black. “ (Scott, Yeld, Hendry 2007)¹

- There are many anecdotal commentaries and newspaper articles as well as more substantial research reports that paint a less than complimentary picture of the quality of teaching that the majority of learners experienced. As observed by Van der Westhuizen and Maree, referring to research by Sarah Howie (2001), the system was characterised by “on the whole, a poor quality of teachers and teaching (including poor subject knowledge and poor motivation)”. One of the more problematic observations was the poor quality of assessment at school level. This aspect is explored fully in a study by Van Der Berg and Shepherd released in 2008 but based on research on 2005 Grade 12 examination data.

Initiatives of government

The new government was keen to address, and be seen to address, these shortfalls as speedily as possible. Among the ideas they considered was the identification of poor performing schools at a stage earlier than Grade 12. They also determined that if the end of compulsory schooling were at the end of Grade 9, more learners could leave the system with a certificate that gave them access to a vibrant FET college sector, or a well developed skills development program in the workplace. This led to the notion of life-long learning and a National Qualifications Framework and its attendant structures and initiatives. While there have been some successes, the failure to ensure that the FET colleges become a vibrant contributor to meaningful skills development has meant that many learners still drop out of formal education completely, with little to show for the time they spent there.

Finally, much attention has been given to trying to improve the quality of teaching through the introduction of exemplars of good assessment tools across the grades. To identify poor performing schools earlier than Grade 12, compulsory exit assessment was introduced at Grade 9 in 2003. The long term aim was to certify learners at the end of Grade 9, enabling them to leave formal schooling with some indicator of an acceptable level of achievement.

The compulsory formal assessment at the end of Grade 9 consisted of:

- Common tasks of assessment (CTAs) – a rich task (5 hours) followed by a ‘test’ to enable learners to reflect upon the learning of Part A (2 hours);
- The latter has changed over time to be a 2-hour examination.

Systemic problems

Despite the good intentions and theoretical support for the idea, there were some systemic problems that undermined the government’s efforts at introducing meaningful external assessment at Grade 9.

These included:

- An under-estimation on the part of education policy makers of the adverse response of the majority of people in the country to the notion of a school-leaving exit point at Grade 9. Many parents, denied the option of pursuing further education and higher education under the previous dispensation, simply did not buy into the idea that their children should leave school at Grade 9.

¹ CESMs: subject-related degrees e.g. Business Management, Life and Physical Sciences, Mathematical Sciences, Social Sciences and Languages, ITLS: Improving teaching and Learning for Success

- A lack of a clear plan for re-vitalising the FET colleges, which has led to substantial delays in getting this sector of the education system operational in a manner acceptable to learners;
- Conducting Grade 9 external assessment at the same time as the main school leaving examination at Grade 12. The capacity of the examinations system in particular to manage 2 major examinations at the same time is questionable. Coupled with the implementation of a new Grade 12 examination, introduced in 2008, the strains on the system are evident. Teachers too were unhappy about the additional record-keeping and administration attached to a major external assessment process at this level.
- The costs of conducting an examination, almost twice the size of the Grade 12 examination, are substantial. The jury is still out on a cost-benefit analysis of the exercise.

For the IEB, a key issue is the fact of the diversity in the system and the appropriateness of this assessment regime for the system as a whole. The independent school community generally does not face the same issues as mainstream education and as such has a very low, if any, drop-out of learners from the commencement of their school career to its conclusion at Grade 12. The same trend is evident in many of the state schools, particularly the so-called ex-Model C schools i.e. schools that were previously run by the white provincial education departments. However there are a number of schools previously catering for other race groups where there is scepticism among teachers and parents about Grade 9 being an appropriate exit point from schooling. This reality largely affects the attitude of teachers and parents to the need for certification at the end of the General Education and Training phase (GET) i.e. Grade 9. In fact, enrolments at independent schools tend to increase from Grade 9 onwards. In 2007 at Grade 12, learners at independent schools numbered about 5.1% of the total school population, some 1,5% more than the average across the system, which is 2.8% of the total population.

The drop-out rate in the broader state education sector is far more substantial and hence the problem of no certification earlier than Grade 12 has a much more significant impact on further opportunities for those who leave school with no credible statement of their educational achievements. Thus the significance of compulsory external assessment resulting in certification at Grade 9 is not appreciated as fully by the IEB school community, independent schools that are registered with the state and the ex-Model C schools.

Indeed, rumours abound about the extent to which there is non-compliance with policy at these schools. The IEB's efforts to comply with policy are exacerbated by little or no reliable data about the extent to which state schools comply with policy requirements at the Grade 9 level, especially in respect of the implementation of CTAs.

Schools offer a variety of other reasons for their dissatisfaction with compulsory external assessment at Grade 9 as well as their scepticism about the CTAs as assessment instruments.

A number of schools have indicated that because the CTAs now include an examination-like assessment in November, they have an assessment overload in the Grade 9 year. This is because a significant number of schools conduct their own internal examinations in addition to the CTA Part B. Further interrogation of this practice reveals that in the opinion of teachers, the Grade 9 Learning Area Statements (curriculum) do not provide a direct match between the outcomes expected in Grade 9 and what learners in specific disciplines in Grade 10 require.

For example, teachers indicated that the skills and knowledge of the Grade 9 curriculum in Economic Management Sciences (EMS) do not necessarily develop the discipline specific requirements for the study of Accounting (as opposed to Business Studies), a specific discipline-based subject in the FET phase. Hence assessment in Part B of the EMS CTA, despite being a good assessment of the Grade 9 curriculum requirements for EMS, does not necessarily emphasise the skills and knowledge specific to Accounting. In such an instance then, schools generally set an additional assessment for learners in Grade 9 to assist them to see whether they have sufficient subject specific skills and knowledge to make a sensible choice in respect of offering Accounting at Grade 12.

This is particularly the case in those Learning Areas that combine disciplines e.g. Human and Social Studies (History and Geography), Economic Management Sciences (Accounting and Business Studies) and Natural Sciences (Life Science and Physical Sciences). The additional assessments provide schools and learners with the information they believe is necessary to make informed subject choices. The importance of informed decision-making in the choice of subjects for the FET is critical not only for success at Grade 12 but for a learner's self-esteem and motivation during the FET phase. They also believe more discipline-specific assessments prepare learners better for the more focused and intensive study expected in the FET phase.

These difficulties with the curriculum fuelled resentment in some schools towards the CTAs as an assessment instrument. The key issue was that the CTAs were time consuming and the information gained from the process was not sufficiently useful to justify the time spent on them to complete, mark and record results.

In 2005 and in 2007 the IEB conducted surveys among teachers at IEB schools to determine their attitudes to compulsory external assessment in the form of CTAs at Grade 9.

- 62.5% of teachers canvassed in the IEB survey agree that the system requires an assessment intervention at the end of the GET phase to identify problem areas e.g. poor performing schools, curriculum deficiencies. They also agree that it is useful even in schools where there is little or no drop-out of learners for schools to participate in some form of external assessment at Grade 9 (and other critical points) to ensure that they are on track and that their internal standards are appropriate. For this reason some schools are happy to continue with CTAs and Learning Area assessment.
- In their expanded comments, teachers noted that because of the minimal (if any) drop-out rate of learners in their schools at the end of Grade 9, they felt that:
 - The time spent on the external assessment programme, rather than teaching, was excessive. Some commented that the CTAs are not incorporated into the teaching and learning programme and are viewed as an add-on in their programme. 61.8% of teachers surveyed indicated that the CTAs are carried out in addition to the normal learning and assessment programme of the school;
 - The value of information from the CTA assessment process was inadequate. Only 51.6% of surveyed teachers indicated that the results in Part 2 of the CTA i.e. the examination-type assessment, is a good indicator of a learner's competence in the discipline. 57.6% indicated that the learner results in the CTA differ from what they get in school-based assessment, which tends to be more focused on the subjects available for choice of study in the FET phase. In other words, the Grade 9 assessments are not specific enough to provide useful information about potential to study specific disciplines e.g. Physical Science, Mathematics (as opposed to Mathematical Literacy).

The IEB found the following responses to questions about the Grade 9 external assessment process:

The purpose of CTAs is to		No Respon	s Disagree	Agree
1	Provide teachers with examples of how they might assess the achievement of outcomes at Grade 9	5.6	18.1	76.3
2	Provide a common task against which schools can compare the standards demanded by their own SBA against a common standard	4.9	12.9	82.1
3	Provide learners with an indication of the standard they should be attaining if they are to achieve successfully in the FET	7.8	30.6	61.6
4	Broaden the types of assessment tasks used in schools	5.1	20.1	74.8
5	Provide information about the state of the education system at the Grade 9 level	10	21.7	68.3

* ratings are expressed as a percentage of the total number of teachers who responded to the questionnaire

While most teachers could identify reasons for having Grade 9 external assessment, many commented that the CTAs were not necessarily the best way to achieve the desired ends. It must be noted that these are responses from teachers in independent schools that offer the IEB Grade 12 NSC examination and hence are not representative of opinions of all teachers across state and independent schools in South Africa.

Many noted that they were satisfied with the reliability and validity of their internal school-based assessment. They indicated that the good pass rates at Grade 12 suggest that their school-based assessment at Grade 9 is up to standard. This perception is verified by the IEB research, reported on later in this paper.

The Pilot Project

Realising that an alternate approach which accommodated the diversity of schools operating at this level, the IEB approached Umalusi² for permission to explore such a model for external assessment at Grade 9, for two years i.e. 2008 and 2009. 40 schools with a total of 2836 learners were selected on a representative sample model from IEB schools across the country that indicated that they wanted to be part of the project. The representative sample took into account geographical area, school size as well as learner gender.

All schools in the project were required to follow the National Curriculum Statements for Grade 9 in all learning areas and complete the portfolio assessment program as outlined in the IEB Learning Area Guidelines. In addition the schools were required to set their own internal examinations in each learning area for the end of the year in Grade 9. The portfolios were moderated at cluster level as is the case at Grade 12.

² Umalusi is the Council for Quality Assurance in General and Further Education and Training. They quality assurance assessment at exit points in the schooling system.

In considering the question of what value can be added by external assessment at this level, the IEB identified the following:

- international benchmarking
- the extent to which skills and to a lesser extent, knowledge studied within a curriculum-based context can be transferred by learners to a non-curriculum context – core skills assessment.

International benchmark tests

It is generally accepted that proficiency in Home Language and in Mathematics is key for successful engagement in other learning areas. These primary disciplines develop the essential skills required for further learning - they are generally considered to be the fundamental areas of learning and a thorough foundation in these learning areas underpin successful engagement in most other learning areas.

In schools whose performance is considered and accepted locally to be very good, participation in an assessment process that provides an international benchmark for comparison of standards is very useful. The necessity for South African schools to remain in touch with global standards is clear and the benefits of having an opportunity for South African schools to assess the extent to which their provisioning matches international standards in key learning areas is invaluable. For these schools, the international benchmarking tests provide an opportunity for them to see whether they are indeed offering a world-class education to their learners or whether this is just perception.

International benchmarking tests are normally carried out in a representative sample of learners from a substantial number of countries across the world. One of the more well-known tests of this nature is the Trends in International Mathematics and Science Study (TIMSS), a large-scale international study of Science and Mathematics at Grades 4 and 8 which includes 46 countries. Accessibility to assessment that is comparable to international tests of this nature is not normally available to individual schools per se. The Australian Council for Educational Research (ACER) is a partner in TIMSS and other international testing environments and hence has substantial experience in assessing the generic skills that underpin the teaching of Mathematics and English and placing these on a continuous scale that matches questions to the international performance expected at a particular level and also enables comparison of performance of a learner over time. For such a comparison clearly the learner needs to participate in the IBTs for at least two consecutive years.

The English test is based on reasoning and thinking skills which underpin the subject specific content domain. In English the skills assessed are: locating information, inferring, predicting drawing conclusions and reasoning. The strands in the English tests are:

- Reading comprehension
- Spelling
- Punctuation
- Grammar
- Vocabulary

The Mathematics test is based on problem solving skills and thinking skills which underpin the subject specific content domain. In Mathematics these skills include interpreting data, inferring, predicting, drawing conclusions, reasoning and problem solving. The strands in Mathematics are:

- Number
- Measurement
- Space
- Chance and data

The diagnostic reports that accompany the results of learners in these tests are substantial and provide teachers with sufficient information to identify and correct aspects of their teaching e.g. concepts that might require a different approach in teaching, a particular child's weaknesses and strengths. At Grade 9 ACER provides a comparison between a school's performance in Mathematics and a selection of countries that participated in the TIMSS.

While there is some debate about the usefulness of international benchmarking tests (e.g. direct alignment with the South African curriculum) the IEB was sufficiently comfortable that the alignment is sufficient for the International Benchmarking Tests of ACER in English and Mathematics as a fundamental part of the assessment in the Grade 9 Pilot Project. The key factor in coming to that decision is the comprehensive diagnostic nature of the feedback as well as the quality of the tests themselves.

Core Skills Test

The IEB has offered a Core Skills Test for schools at Grade 6 and Grade 9 for a number of years. In the Core Skills Test the IEB aims to produce an assessment instrument that focuses on the assessment of skills and knowledge that are developed within one or more specific learning areas of the national curriculum but aims at assessing how they are applied in a non-learning area specific context. It is not the specific the learning area statements that are being assessed i.e. it does not assess content of the curriculum at Grade 9. The focus of the test is on assessing a learner's ability to apply the skills and knowledge learnt within the known and experienced contexts of the curriculum, in unknown and possibly unfamiliar contexts. The key focus then is on the skills required for effective operation in life and society outside of the formal learning environment. The skills assessed include the critical reading and evaluation of texts, acquiring information from a variety of sources including text, graphs, pictures and diagrams and understanding and applying number and mathematical concepts in context.

The test is also designed to assess these learners across different levels of assessment. For example, at the lowest level it assesses whether a learner can extract or recall information. However there will also be questions at a very high level e.g. assessing whether the learner is able to make informed choices based on reasoned arguments using information at hand.

Furthermore, questions are allocated across four focus areas as follows:

- Language thinking: questions that require analysis, synthesis and evaluation of texts as well as a facility in the use of language in order to determine or create meaning;
- Mathematical thinking: questions that require an understanding of numbers and patterns, abstraction of the concrete and application of symbolism;
- Visual Literacy: questions that require the inference of meaning from images, including pictures, graphs, diagrams, maps
- Complex thinking: questions that require a combination of different thinking skills or cross-disciplinary skills, knowledge and understanding; questions requiring multi-steps in solution across or within the three given ways of seeing.

The CST provides insight into learner performance in areas not assessed within the formal learning area assessment. The adjustments that this should prompt in teaching is of overall benefit to learners who are more directly prepared to deal with unfamiliar contexts that require an appropriate transfer and application of skills developed within the curriculum. Feedback from such an assessment process provides teachers with a more reliable idea of whether their teaching within a discipline is in fact actively encouraging a transfer of the discipline-specific skills and knowledge into more generic contexts. Given that employers constantly comment on the reluctance or inability of new recruits to transfer academic and

theoretical skills and knowledge into the practical work environment, it is appropriate that schools give focused consideration to this aspect of learner development.

Information from this test also has the potential for teacher development as it provides a diagnostic assessment of learners on non-traditional subject-based information by identifying potential gaps in the teaching and learning process in addressing the transfer of skills and knowledge across contexts and in uncovering areas that may require additional attention in specific learners or even within a school. This provides opportunities for taking corrective action timeously.

Project schools were required to participate in this assessment as well as the benchmarking tests in English and Mathematics.

Analysis of data

In the project, the following data was gathered and analysed:

- Examination results and school-based assessments of the project schools at Grade 12. Of specific interest was the relationship between the internally derived school-based assessment results and their external examination results;
- The school-based assessment for each learner in each learning area at Grade 9, their results in the International Benchmarking Tests and the Core Skills Tests. Of specific interest was the relationship between the three sets of results.

Performance of project schools at Grade 12

An analysis of the 2008 NSC results of project schools indicated the following:

- 39 out of 40 schools achieved a pass rate over 90% i.e. 97.5% of schools in the sample
- 38 of the 40 achieving a pass rate of over 95% i.e. 95% of schools in the sample
- 29 schools achieved a pass rate of 100% i.e. 72.5% of schools in the sample.

Only 2 schools achieved a pass rate below 95%, one at 94% and one at 81%. The latter was a school that wrote the IEB for the first time in 2008 and hence could be viewed as still in the process of understanding the demands of the IEB examination.

In respect of passes with entry to degree studies (as opposed to diploma and higher certificate study) i.e. the top range of learners:

- 25 schools had a percentage of over 80% of learners achieving the NSC with entry to degree study i.e. 62.5% of schools in the sample;
- 15 schools had a percentage of over 90% of learners achieving the NSC with entry to degree study i.e. 37.5% of schools in the sample;
- 11 schools had between 50 and 80% of learners achieving the NSC with entry to degree study i.e. 27.5%
- Just 4 had less than 50% of learners passing the NSC with entry to degree study i.e. 10%.

Given a national average of approximately 20,2% of learners achieving the NSC with entry to degree studies, these statistics suggest that in these schools, there is very good preparation of Grade 9 learners for the FET phase, which ensures commendable pass rates and a high percentage of learners that achieve passes that allow entry to degree study.

Reliability of school based assessments of project schools in Grade 12 in 2008

An important indicator of whether a school is providing learners with a clear indication of their competence in relation to what they could expect in the final examination, is the

reliability of their school-based assessment in Grade 12. The IEB considered the following in respect of the project schools' school-based assessment (SBA) at Grade 12:

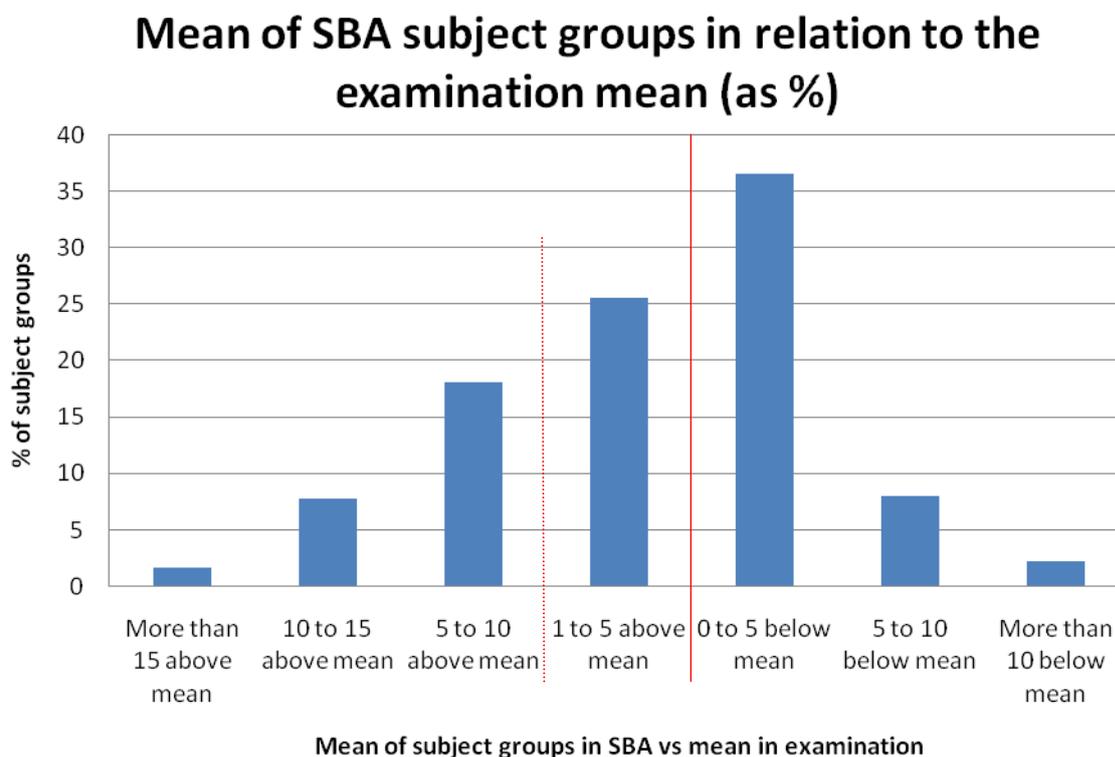
- Correlation
- The closeness of the mean of SBA to the mean of the examination

The subjects at each school in the sample that has 8 or more candidates offering a subject at Grade 12 were analysed. 8 candidates is the Umalusi cut-off for the statistical adjustment of school based assessment results i.e. subjects in which the number of candidates makes comparisons between means and standard deviations of the examination and the school-based assessment are more reliable.

The following table records the difference between the examination mean for each subject group and the mean of the SBA submitted for the same learners by the school.

Subject groups where the SBA mean is (in percentages):	Number of subject groups – Total 476	Number of subject groups as a percentage of the total
More than 15% above the exam mean	8	1.7
10 to 15% above the exam mean	37	7.8
5 to 10% above the exam mean	86	18.1
1 to 5% above the exam mean	122	25.6
0 to 5% below the exam mean	174	36.6
5 to 10% below the exam mean	38	8
More than 10% below the exam mean	11	2.3

This data is presented in a graph as follows:



Across the sample, there were 476 subject groups in 2008 in which there are 8 or more candidates.

In a total of just 56 subject groups (11.8%), the SBA mean differed from the exam mean for the group by more than 10%.

The Umalusi tolerance level where no adjustments are made to SBA is when the SBA mean is between 5 and 10% above the exam mean. The 37 subject groups in the category 10 to 15% above the mean could be explained by the more sophisticated schools attempting to reach the tolerance level, and above, and in the process over-estimating the quality of learners. In other words if they used the 5% above the examination mean as the target (rather than the examination mean itself) their marks would have been adjusted by less than 10 marks.

This comparison of the means in school based assessment and the examination indicates that in most instances i.e. 88.3% of subjects, the level of difficulty that learners experience in their school based assessments is within 10% of what they can expect in the external examinations. A similar analysis of the total IEB cohort in 2008 indicated that this is the case in 86.3% of subject groups.

The 2008 SBA adjustments required at Grade 12 reflect the general trend of upward adjustments. In other words if teachers are not assessing at the level of the examination, they are generally assessing at a higher level than the examination is demanding. If a teacher is to err in school based assessment, it is better for learners that teachers set a higher level than the level demanded by the examination than for teachers to assess at a level that is substantially lower than that demanded by the examination. The latter provides learners with an inflated impression of their knowledge which inevitably leads to under-preparation and hence under-performance in the examination.

Correlation co-efficients between school based assessment and examination results were not calculated for project schools. However the correlation co-efficient between SBA and examination scores across all IEB schools in the more populous subjects area as follows:

Subject	Number of Candidates	Correlation co-efficient (r)	Mean difference between SBA and exam mean
English Home	7776	0.866175	1.23
Afrikaans FAL	6453	0.892137	3.43
Maths P1,P2	5569	0.860489	5.72
Physical Sciences	4188	0.834977	3.99
Life Sciences	3905	0.827305	4.20
Geography	2816	0.842643	-2.99
Business Studies	2444	0.727298	10.34
Accounting	2332	0.862523	3.14
History	2144	0.768527	-1.90

A study by Van Der Berg and Shepherd released in 2008 but based on research on 2005 Grade 12 examination data and school-based assessments (SBA) in state schools concluded that a correlation of 0.6 is 'too lax a yardstick for assessment accuracy. Far higher correlations should hold in a system that assesses well.' (Pg 17).

This table suggests that the ranking of learners is accurate, the lowest correlation being 0.727298 in Business Studies³ and the only statistic below 0.75 (generally accepted as a reasonable cut-off). The low mean difference between SBAs and examination results confirm results from the earlier analysis.

Given the accuracy of school based assessment at Grade 12 there is no reason to believe that the level of assessment at Grade 9 is anything other than accurate. The conclusion we came to in the project is as follows: if a school understands the level required at Grade 12, it is reasonable to assume that they understand the level required at Grade 9. It follows then that their internal assessment programme is sufficient to determine subject- or learning area-based competence.

Analysis of other assessment results

The results in each aspect of the external assessment as well as the school based assessment results from schools across the Grade 9 learning areas were gathered. Descriptive statistics including the correlation co-efficients across all aspects of the assessment process were calculated and analysed.

Comparison of mean scores (as percentages) across the various assessment types

The means of each learning area calculated from the school based assessment results that were submitted by the schools in the sample are as follows:

English Home Language:	66%
Afrikaans First Additional Language (FAL):	61%
Zulu FAL:	68%
French Second Additional Language (SAL):	73%
Mathematics:	65%
Arts and Culture:	67%
Economic and Management Sciences	68%
Human and Social Sciences	66%
Natural Sciences	65%
Technology	68%

There is a consistency in performance across learning areas as indicated by the means for each learning area. This is expected as in the sample it is the same learners that offer all learning areas except for FAL and SAL subjects. The higher mean in French SAL is expected as this is a highly selective group, usually offered only by the top stream learners or learners with a background in French. Similarly Zulu FAL is often offered by Zulu Home Language speakers in institutions where the language of learning and teaching is English. It has been claimed that the demand of the Afrikaans FAL curriculum statements for FET have resulted in schools assessing Afrikaans FAL at Grade 9 at a higher level, raising the expectation of learner performance. This would explain the relatively low mean for Afrikaans First Additional Language. However this has not been researched and hence cannot be claimed as an established trend.

The means for the CST and its component parts for the sample of IEB schools are as follows:

Core Skills Test – overall result	52%
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³ Many teachers viewed Business Studies as having the same requirements as Business Economics, a subject in the previous qualification. It is however quite different and this could explain why teachers did not assess as accurately as is evident in the other subjects.

Language thinking	46%
Mathematical thinking	46%
Visual Literacy	58%
Complex thinking	35%

Results in this assessment and its component parts are lower than the school based assessments within learning areas. This is to be expected. The CST is intentionally assessing application of skills and knowledge outside of known contexts and hence it is not assessing learning area specific skills and knowledge that can be studied beforehand or for which teachers can specifically prepare learners beforehand.

The mean in the language thinking component is 46% while the mean for English Home Language is 66%. Clearly learners are comfortable with the skills and knowledge assessed formally in English Home Language but appear to be less comfortable when asked to transfer these skills to different contexts as required in the CST. However if one compares this with the mean score of the IBTs in English (69%), the IBT mean corresponds more closely to the mean of the school based assessments. This could suggest that learners are comfortable with learning area specific requirements in English Home Language but are less so when asked to apply language reasoning e.g. substantiate an argument, analyse different points of view, follow logic in an argument.

The mean in the mathematical thinking component of the CST is also 46% while the mean for the school based assessment of Mathematics is 65%. Clearly learners are comfortable with the skills and knowledge assessed formally at school in Mathematics but appear to be less comfortable with the mathematical thinking skills demanded in the CST. However if one compares this with the mean score of the IBTs in Mathematics (45%), the IBT mean corresponds more closely to the mean of the mathematical thinking component in the CST. Further research would be needed to confirm whether this indicates that the formal assessment of Mathematics does not assess mathematical concepts in context or mathematical thinking skills as rigorously as the mathematical thinking component of the CST or the IBT does. The extensive practice of “drill and practice” in Mathematics assessment tends to underplay the importance of mathematical thinking and problem solving. This is an issue that has been raised by universities about assessment of Mathematics at the Grade 12 level in 2008.

It is interesting to consider this information about the means in different components of assessment together with the correlation co-efficients of the various components. The Pearson’s R correlation co-efficient was calculated in each instance. Comments have been made only on those correlations that are considered worthy of comment.

Assessments in English and Mathematics

The correlation co-efficients between language thinking, mathematical thinking and complex thinking components of the CST, the IBTs in English and Mathematics and the school based assessments for English Home Language and Mathematics are as follows:

Correlations	CST Total score	Language thinking	Maths thinking	Complex Thinking	Maths IBT as %	English IBT as %	ENGH as %
CST Total score	1.000						
Language thinking	0.950	1.000					

Correlations	CST Total score	Language thinking	Maths thinking	Complex Thinking	Maths IBT as %	English IBT as %	ENGH as %
Maths thinking	0.889	0.749	1.000				
Complex Thinking	0.930	0.936	0.799	1.000			
Maths IBT as %	0.659	0.569	0.699	0.592	1.000		
English IBT as %	0.622	0.588	0.538	0.562	0.549	1.000	
ENGH (SBA) as %	0.598	0.563	0.516	0.535	0.499	0.613	1.000
MATH (SBA) as %	0.632	0.559	0.630	0.548	0.641	0.536	0.623

A correlation of over 0.6 is evident between English Home Language and the English IBTs. This is expected; in fact one might have expected a higher correlation. However given that the two assessments are located within the same learning area, they are not based on the same programme of study. However the correlation of 0.563 between the CST language thinking component and the English Home Language SBA, and 0.588 between the CST language thinking component and the English IBTs, are indicative of the fact that the CST language thinking component intentionally assesses more than just competence in the use English as a language of communication.

There is also a correlation of over 0.6 between school based assessment in English Home Language (ENGH SBA) and school based assessment in Mathematics (MATH SBA) - 0.623. This lends credence to the popular belief that competence in Mathematics is closely aligned to competence in home language. What is interesting is that the correlation between the Mathematics IBT and the English IBT is 0.549, between MATH SBA and the English IBT is 0.536, and finally between Mathematics IBT and ENGH SBA is 0.499. These correlations are all slightly lower than the correlation between the SBA in each of these two learning areas. The relationship between competence in the language of learning and teaching and/or home language and mathematical competence is an interesting question that has important significance for South Africa, especially in the respect of the debate about the importance of mother-tongue instruction.

A correlation of over 0.6 is evident between Mathematics SBA and the CST Total (0.632), the CST Mathematical thinking component (0.630) and the Mathematics IBT (0.641). This is not surprising given that all are assessing mathematical competence. .

What is surprising is the fact that the correlations between different kinds of assessment (the SBA, the CST and its specific components and the IBTs) rooted in the same learning area are not much higher i.e. none are above 0.75. This could suggest that the assessments, while rooted in broadly the same learning area, are not all assessing the same skills, knowledge or application. If that were the case one could expect higher correlations.

Lack of correlation: Visual Literacy

It is informative to consider other correlations, or more appropriately the lack of them. The following is the set of correlations of the Visual Literacy component of the CST and all other assessments:

Correlations	CST - Visual
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	Literacy
CST Total as %	0.671
CST Lang.	0.680
CST Math.	0.457
Math IBT as %	0.354
Eng. IBT as %	0.420
ENGH as %	0.406
AFRF as %	0.260
ZULF as %	0.100
FRES as %	0.292
MATH as %	0.347
ARTS as %	0.235
EMS as %	0.376
HSS as %	0.374
LIFO as %	0.207
Nat Sc. as %	0.382
TECH as %	0.302

The correlation co-efficients between the Visual Literacy component of the CST and all learning areas as well as the IBTs are all low, the highest being 0.420. This suggests possibly that the skills and knowledge assessed in the Visual Literacy questions of the CST are not overtly assessed (possibly not even taught) in any of the learning areas or IBTs, as there are no high positive correlations between the learners' scores in the Visual Literacy component of the CST and any other aspect of the Grade 9 assessment. There is little doubt that the kinds of issues addressed in the Visual Literacy questions in the CST, namely the inference of meaning from images, including pictures, graphs, diagrams and maps, are key skills required when learners leave school. While these skills form part of study in learning areas such as Mathematics, the Geography aspect of Human and Social Sciences and Natural Sciences, they do not seem to form a sufficiently substantial part or are not emphasized sufficiently to affect the correlations between results in the Visual Literacy component and these learning areas.

Lack of correlation: other learning areas

There are relatively low correlations between Arts and Culture and other learning areas as well as between FAL and SAL and other learning areas. It could be argued that the skills in these languages and in Arts and Culture are specific to the learning area and hence are not developed as generic skills across learning areas. For example, success in a FAL or SAL depends to a substantial extent on one's vocabulary knowledge within the language and hence low achievement does not necessarily indicate that a learner's language skills per se are poor. A similar case can be made for Arts and Culture where the emphasis of assessment might not be on generic skills but either practical or learning area specific talents.

Given that results in the other external assessments do not correlate well with results in these learning areas, it is clear that if the alternate model were to be employed, the reliability of school assessments is a key issue in these learning areas. Certainly, for certification purposes, a more learning area specific assessment would be required.

Discussion and the way forward

From the first year of implementation of the Grade 9 Project, the IEB has identified two key considerations for the future. These are:

- Accommodation of Afrikaans Home Language learners in the IBTs;
- Marking and moderation of the CST.

The IEB has presented a proposal to ACER to consider how Afrikaans Home Language speakers can be accommodated in this model, given that the IBT language assessment is English. ACER has agreed to co-operate with the IEB in this investigation. Results will be available early next year.

In 2009 the IEB will approach the marking and moderation of the CST marking process slightly differently. The IEB will arrange for a small committee of teachers to meet soon after the CST has been written to review the marking guidelines, amend them and accommodate various interpretations that may not have been included in the original. Then a revised marking guideline will be sent to schools. Teachers will mark all their scripts and return them together with the mark sheets to the IEB. On a weekend in October the IEB will host a moderation committee that will moderate the marking of 10% of scripts from each centre and where necessary, remark the scripts and revise the mark sheets of the centre accordingly. The IEB is adopting this approach not because the 2008 process was problematic in respect of the reliability of marking and results but rather because the proposed system is logistically easier to arrange. It will have the added benefit of improved reliability through a post-marking moderation process. In order to ensure that the professional development benefit that standardization of marking provides, where necessary, the IEB will conduct workshops for teachers who are unfamiliar with the approach of the CST.

An analysis of the results suggests a mis-match between the results obtained in the Mathematics, as assessed at school level, the scores in the IBTs in Mathematics and the Mathematical thinking strand of the Core Skills Test. The IEB assessment specialist will hold workshops with IEB teachers to explore the extent to which expectations in the classroom are different from the expectations in the IBTs and the CST Mathematical thinking strand.

Conclusion

Recent statements by the new Minister for Basic Education indicate that external assessment at the end of Grade 9 will not result in certification. This raises a number of questions about the compulsory nature then of CTA assessments and whether this will free up the system to allow for more diversity in assessment practices. Such an attitude certainly will be welcomed by independent schools.

The IEB intends to offer the traditional assessment format at Grade 9 for those schools who wish to do them as well as the alternate forms of assessment. We believe that schools are sufficiently competent and professional to be able to choose the assessment process that best meets their needs.

The IEB would be keen to broaden the offering of this option to schools within the state system. This would require a preliminary discussion with provincial heads to discuss financing the project and logistics for conducting the assessments.

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