



Council for Quality Assurance in
General and Further Education and Training

**Report on the
2011 National Senior Certificate Examination
Post-Examination Analysis
Department of Basic Education**

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INTRODUCTION

Background

Umalusi has conducted the analysis of the National Senior Certificate (NSC) examination question papers for the past three years as part of the Maintaining Standards research project. The 2009 exam analysis was an attempt at benchmarking the second year of the NSC examinations. For 2009, the previous (Maintaining Standards 2008) analyses of the 2005 to 2007 NATED and the 2008 NSC examination papers were used, and compared with the 2009 NSC Department of Basic Education (DBE) examinations. In the same way the 2010 question papers were analysed and compared with the 2008 and 2009 question papers. The Independent Examination Board (IEB) and ERCO (Eksamenraad vir Christelike Onderwys) question papers have been included in the analysis since 2009 and 2010 respectively.

To date, question papers of the following examinations have been analysed:

2008 NSC Final Paper 1 and 2 (or P1 only in applicable subjects)

2009 NSC Final Paper 1 and 2 (or P1 only in applicable subjects)

2010 NSC Final Paper 1 and 2 (or P1 only in applicable subjects)

For the 2011 project, question papers of following subjects were analysed: English First Additional Language (EFAL), Mathematics, Mathematical Literacy, Physical Sciences, Life Sciences, Geography, Accounting, Business Studies, Economics and History.

The question papers were analysed with regard to the following:

coverage of the Learning Outcomes (LOs) and Assessment Standards (ASs)

the cognitive demand of the question papers, and

the level of difficulty of the questions.

The findings in this report are presented by subject in line with the three areas indicated above.

Purpose of the post-exam analysis

The purpose of the post-exam analysis project is primarily to inform the Umalusi standardisation process on the standard of the question papers with regard to the cognitive demand, level of difficulty and coverage of the LOs and ASs. The analysis also provides a comparison of the current year's examination paper with the past years' examination papers. It is for this reason that Umalusi has maintained the use of the same taxonomies through the years – to enable the horizontal comparison of the question papers. This report is one of the qualitative reports that are used to inform the decisions taken when standardising the NSC results.

Method of analysis

Generally, the teams used the exam analysis instrument developed by Umalusi. This instrument has been used since 2008 when the first analysis was conducted. Using an MS Excel spreadsheet, each question was analysed according to type of cognitive demand, level of difficulty, content/skill/topic and LOs and ASs (as described in the relevant curricula).

The teams used different taxonomies to analyse the cognitive demand of the question papers. These taxonomies were used because they have proven to be appropriate and useful in the analysis of the specific subjects. In some subjects the taxonomies are exactly the same as those used in the DBE Subject Assessment Guidelines, whereas in other subjects there are slight variations.

ENGLISH FIRST ADDITIONAL LANGUAGE (EFAL)

1.1 Evaluators

Mr MJ de Jager (Team leader), Ms N Nonkwelo and Ms P Voller

1.2 Introduction

As part of Umalusi's Maintaining Standards Project, the above evaluators were tasked with analysing the final 2011 National Senior Certificate (NSC) examination papers for English First Additional Language (EFAL).

In the post-exam analysis the following examination papers were considered:

English First Additional Language papers 1, 2 and 3 of the Department of Basic Education (DBE)

The method used in the examination paper analysis is presented below.

1.3 Method of analysis

The examination papers mentioned above were analysed by using an exam analysis instrument developed by Umalusi (table 1). Using an MS Excel spreadsheet, each question was analysed according to type of cognitive demand, level of difficulty, content/skill/topic, learning outcomes (LOs) and assessment standards (ASs) (as described in the relevant curricula). This tool was used because it has been proven to be appropriate and useful in the analysis of language exam papers, and provides meaningful data.

Decisions about the type of cognitive demand and level of difficulty of the questions were made according to a typology closely linked to the revised version of Bloom's Taxonomy (2001). Questions were classified in one of five categories or types of cognitive demand. Within this category, each question was also classified according to level of difficulty, that is, easy, moderate or difficult. The typology according to which the questions were analysed is presented in table 1.

Table 1: Typology used for analysis of questions

Category	Level	Description
Basic factual or conceptual knowledge (CK) <ul style="list-style-type: none"> Recall, recite and remember facts Define and describe basic facts Identify, label, select, locate information Know and use appropriate vocabulary 	Easy	Very simple recall; identify specific data; tell; recite; list For example, identify parts of speech; match known words with definitions
	Moderate	Medium content, read and locate, briefly define a term, name and match For example, identify answers to wh- (equivalent) questions from a text; explain what synonyms are; learnt diagrams
	Difficult	Recall complex content For example, correct spelling and use of vocabulary; dictation of unfamiliar text; find synonyms or antonyms for words used in a text
Comprehension (C) <ul style="list-style-type: none"> Understanding of previously acquired information in a familiar context Change or match information Distinguish between aspects, compare and predict, defend and explain 	Easy	Simple relationships; simple explanations For example, convert active to passive forms; identify main and supporting ideas; identify cause, result or reason from a text
	Moderate	More complex reasoning; motivate inferences For example, explain; briefly summarise; translate; interpret realistic visuals; draw inferences from a text; make a prediction
	Difficult	Identify principles which apply in a novel context; more complex reasoning; motivate inferences or predications For example, use information from the text to support a position
Application (A) <ul style="list-style-type: none"> Interpret and apply knowledge Choose, collect and do basic classification of information Modify by using existing knowledge Using well-known procedures (not immediately obvious) Decide on most appropriate procedure to use Select the most appropriate data Decide on the best way to represent data 	Easy	Perform well-known procedures in familiar contexts. All of the information required is immediately available. For example, write texts related to familiar contexts; draft a friendly letter, basic business letter, invitation; provide the necessary information; organise information in a presentable poster or table to promote comprehension
	Moderate	Draw information from a given text; illustrate in words; construct ideas; propose a course of action based on a straightforward case study
	Difficult	Collect information from available texts to support a particular position/opinion; re-present the position in own text; undertake guided research to collect the information needed for a task; organise information into suitable form (report, memo, visual presentation)



<p>Analysis & problem solving (AP)</p> <ul style="list-style-type: none"> • Analysis of information in a new or unfamiliar context • Examine and differentiate • Distinguish to find the most appropriate • Research and investigate information • Solve non-routine, unseen problems through higher level of understanding and cognitive processes • Use higher-level cognitive skills and reasoning to solve non-routine problems • Break down problems into constituent parts – then solve using appropriate method • Non-routine problems based on real contexts 	Easy	Simple process in known or practised context; drafting an invitation; writing a letter of thanks or condolence – not simply formulaic
	Moderate	Investigate; classify; categorise; compare; contact; solve; relate; distinguish; write a persuasive essay; take minutes of a straightforward meeting; deal with more complex case studies; propose course of action, e.g. in report form
	Difficult	Interpret; report on; sort; debate; prepare a speech and/or presentation; use higher-level cognitive skills and reasoning, in developing, for example, proposal to solve a problem, use appropriate methods in problem solving
<p>Evaluation & synthesis (ES)</p> <ul style="list-style-type: none"> • Making judgements (evaluate), critique, and recommend by considering all material available • Weigh possibilities and make recommendations • Construct new • Synthesise, create or find innovative solutions • Formulate new ideas 	Easy	Make judgements; critique on fairly straightforward topics; recommend by considering all available material; weigh possibilities and make recommendations; give opinion
	Moderate	Substantiate an opinion; critique statements about situations made by others; synthesis, critical argument; novel or abstract contexts; create poetry/a narrative
	Difficult	Generalise patterns observed in situations; work with complex problems involving insight and leaps of logic; create new solutions to problems; redesign; write or critique complex issues; rewrite for a new context and/or setting; construct or formulate new ideas

It is important to note that the analysis process was a subjective one and that decisions on type of cognitive demand and level of difficulty were reached by consensus among the evaluators. Furthermore, the descriptions and examples (see table 1) provided for types of cognitive demand and levels of difficulty were only regarded as guidelines. For example, all friendly letters would not necessarily be regarded as easy application questions – all aspects of questions such as topic, purpose and language level should be taken into consideration when categorising a question.

In the analysis of the examination papers, the following procedure was followed:

In the first instance, the papers were evaluated at face value. The team considered the general impression of each paper, layout, instructions, numbering of questions, mark allocation, and so on. Once this had been done, the team did an item-by-item analysis of each question in each paper.

The data collected from this item-by-item analysis was plotted on an MS Excel spreadsheet and then used to compile a report on each paper.

Once the reports on the papers had been completed, the results of the 2011 analysis were compared with the results of the 2009 and 2010 analyses.

As was indicated above, Papers 1, 2 and 3 of the DBE were analysed.

The content assessed in the papers is indicated in table 2 below.

Table 2: Content assessed – Papers 1, 2 and 3

Paper 1	Marks	Paper 2	Marks	Paper 3	Marks
Comprehension	30	Novel	35	Essay	50
Summary	10	Drama	35	Longer transactional text	30
Language	40	Short stories	35	Shorter transactional/referential/informational text	20
		Poetry	35		
Total	80	Total	140	Total	100
Grand total: 320 marks					

1.4 Results of examination paper analysis

The number of papers analysed made it very difficult to present a narrative report in the format prescribed by Umalusi.

Accordingly, the report is presented in the sections that follow. Section 1.5 discusses the compliance of the DBE papers with the Subject Assessment Guidelines (SAG), section 1.6 explains the cognitive demand and level of difficulty of the exam papers, and sections 1.7 and 1.8 discuss a model for future use and the standard and quality of the papers respectively.

1.5 Compliance with the Subject Assessment Guidelines

Paper 1

The suggested format and mark allocation for the DBE examination papers are presented in the *Subject Assessment Guidelines for Languages* (2008:21).

The DBE papers analysed adhered to all the requirements set out in the *Subject Assessment Guidelines*, including mark allocation (80 marks) and duration (2 hours).

The comprehension questions (questions 1 and 2) were set on two different texts, of which one was a visual text, as suggested in the SAG.

The question on the summary (question 3) required the learners to summarise the text in full sentences in no more than 70 words. This, and the fact that the passage for the summary question was different to those used in the comprehension questions, was in accordance with the requirements of the SAG.

Language structures were, as suggested in the SAG, assessed in context in question 4 (analysis of an advertisement and a cartoon) and question 5 (language and editing skills) based on a text from a magazine.

The mark allocation in Paper 1 agreed exactly with the suggestions in the SAG – comprehension (30 marks), summary (10 marks) and language structures (40 marks).

Paper 2

Paper 2, the literature paper, was a very long paper, consisting of 40 pages. The comprehensiveness of the paper is determined by that fact that different literary works, from which schools may make a selection, are prescribed. Questions therefore have to be set on all the prescribed works in order to afford learners with the opportunity to answer questions on the literary works that they have studied during the year.

As with Paper 1, this paper adhered to all the requirements in the SAG, including mark allocation (70 marks), the duration of the paper (2 hours) and the length of the essay-type questions (250–300 words).

Two questions (one essay questions and one contextual question) were set on the novel, drama and short stories (35 marks each), and four contextual questions were set on seen poems (17½ marks each). Learners were required to answer one question from two of the four sections (novel, drama, short stories and poetry) set in the paper. Learners who chose poetry as one of the sections were required to answer three questions in total (one on the novel, drama or short stories and two on poetry), while those who did not choose poetry as one of the sections were required to answer two questions only.

Paper 3

As with Papers 1 and 2, Paper 3, the writing paper, also adhered to the SAG, including mark allocation (100 marks) and duration (2 ½ hours).

In section A (essay) the learners could choose to write one essay (50 marks) of 250–300 words from a number of essay topics and visual stimuli as prescribed in the SAG.

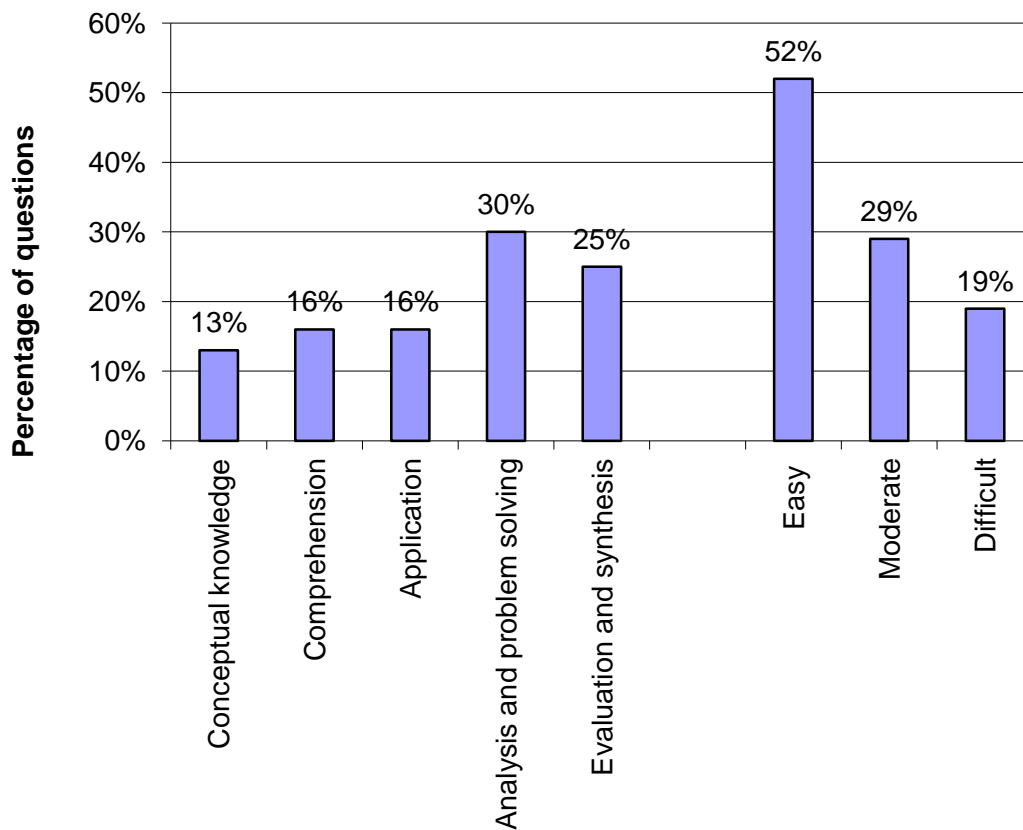
In accordance with the SAG, in section B (longer transactional text) the learners could choose to write a formal letter, a dialogue, a speech or a magazine article (30 marks) of 120–150 words.

In section C (shorter text), the learners could choose to write an advertisement, a postcard or instructions (20 marks) of 80–100 words in accordance with the SAG.

1.6 Cognitive demand and level of difficulty

Paper 1

The type of cognitive demand and the level of difficulty of the questions in DBE Paper 1 are indicated in graph 1.



Graph 1: Type of cognitive demand and level of difficulty – Paper 1

From graph 1 it is clear that most questions in Paper 1 were categorised as analysis and problem-solving questions (30%) and evaluation and synthesis questions (25%). Sixteen percent of questions were categorised as comprehension questions, 16% were regarded as application questions, and 13% were regarded as conceptual knowledge questions.

From this it is clear that learners were not required to simply reproduce knowledge gained by rote learning, but that most questions required learners to analyse or evaluate information provided before venturing to answer the set questions.

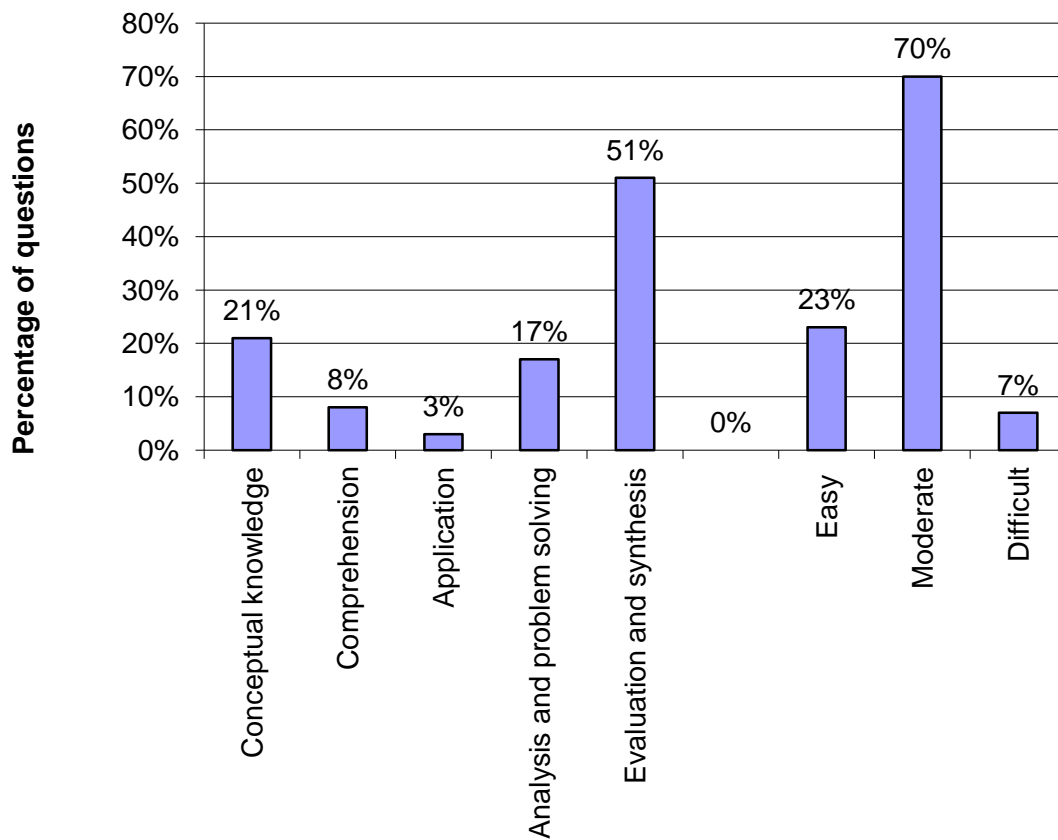
With regard to the level of difficulty, most questions in Paper 1 were regarded as easy (52%), while 29% of questions were regarded as moderate and 19% of questions were categorised as difficult.

From the data it is clear that the level of cognitive demand of questions in Paper 1 was evenly balanced, although slightly more analysis and evaluation questions were

set. The same cannot be said for the level of difficulty. More than half the questions (52%) were regarded as easy questions, while the remainder of the questions were regarded as moderate (29%) and difficult (19%).

Paper 2

The type of cognitive demand and level of difficulty of the questions in DBE Paper 2 are indicated in graph 2.



Graph 2: Type of cognitive demand and level of difficulty – Paper 2

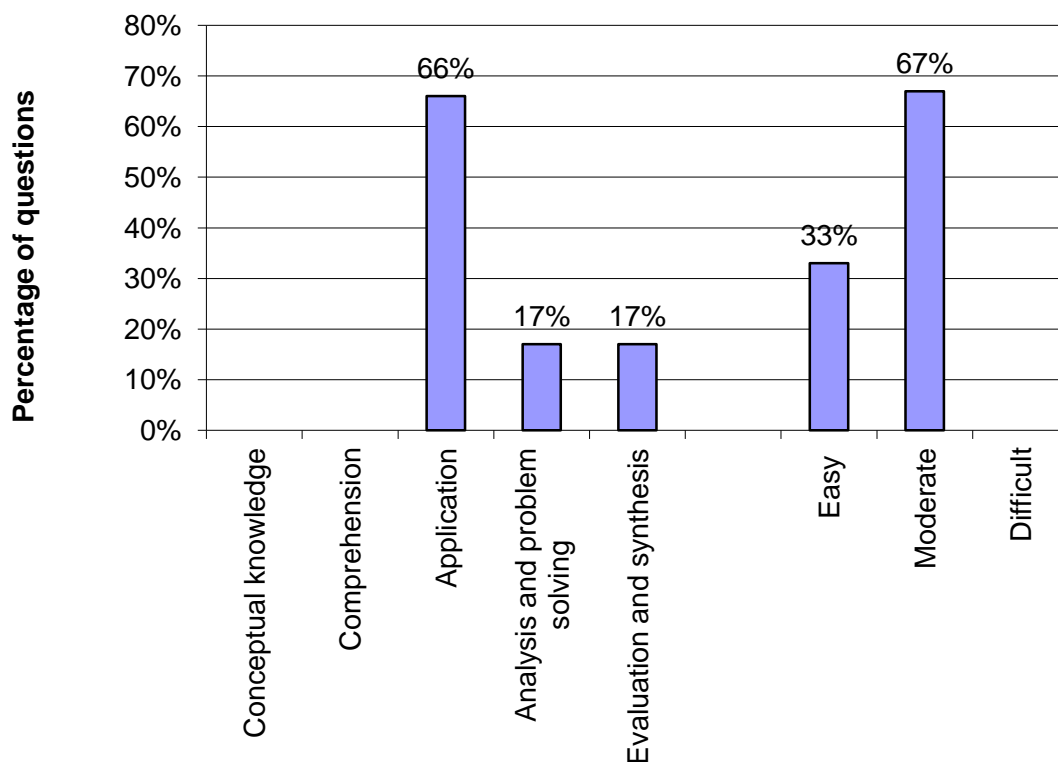
From the data it seems as though there is a leaning towards evaluation and synthesis questions (51%), while very few application (3%) and comprehension questions (8%) were set in this paper.

The team was of the opinion that this was acceptable for the literature paper as the evaluation of literature texts mainly requires learners to provide personal responses to texts, or to analyse or evaluate texts before providing answers to the questions.

With regard to the level of difficulty of questions, 23% of questions were regarded as easy, 70% as moderate and only 7% as difficult.

Paper 3

The type of cognitive demand and level of difficulty of the questions in DBE Paper 3 are indicated in graph 3.



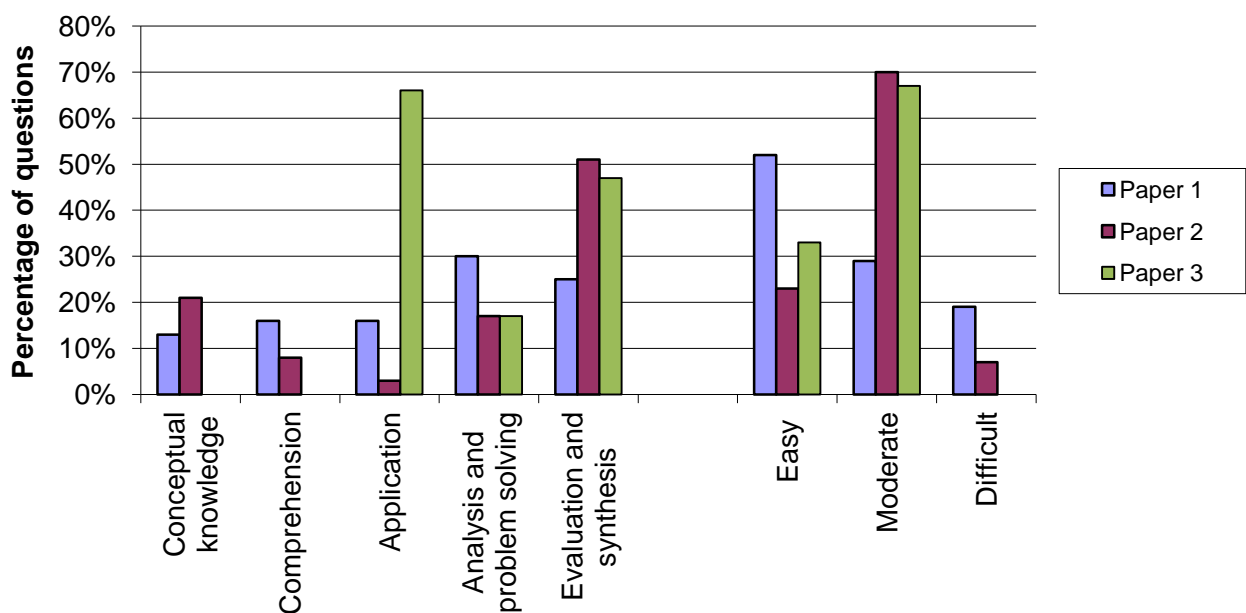
Graph 3: Type of cognitive demand and level of difficulty – Paper 3

In Paper 3, 66% of questions were regarded as application questions, while 17% of questions were regarded as analysis and problem solving, and 17% of questions were regarded as evaluation and synthesis questions. From the data it is thus clear that there was a leaning towards application questions (66%) in Paper 3.

The team was of the opinion that this was acceptable for the writing paper as writing requires learners to provide personal responses to texts, or to analyse or evaluate texts before providing answers in response to the topic or visual stimulus.

With regard to the level of difficulty of questions, 23% of questions were categorised as easy and the remainder of the questions were regarded as moderate (67%). None of the questions in Paper 3 were regarded as difficult questions and this might have advantaged all learners. Once again the team was of the opinion that this was acceptable for the writing paper, as learners needed to analyse or evaluate the topics of visual stimuli before answering the questions.

The combined type of cognitive demand and level of difficulty of the questions in the three papers is presented in graph 4.



Graph 4: Type of cognitive demand and level of difficulty – combined papers

From the data in the graph it seems as though there is a leaning towards moderate to difficult evaluation and synthesis question in all the papers. However, as was indicated above, for the reasons provided the team was of the opinion that this spread of cognitive demand type and level of difficulty was acceptable.

1.7 Model for future use

The team was of the opinion that, in general, the 2011 NSC final papers for English FAL were a good model for future examinations.

1.8 Standard and quality of papers

The team was of the opinion that the 2011 English FAL final examination papers were of a very good standard and quality.

In addition, the language level in most of the questions seemed to have been appropriate. The team was of the opinion that it is important to scaffold questions and that archaic or verbose expressions should be avoided at all costs.

In Paper 1 the following words are low frequency words for which a glossary of terms might have been appropriate:

- Q1.4.1 'increasing urbanisation' (1 mark)
- Q1.5.1 'inherited factors' (2 marks)

The team also found the format of the papers and questions to be appropriate. Further, the questions were stated in a concise and to-the-point manner, avoiding long wordy introductions or instructions.

The instructions on the information pages of each paper were very clear. Learners who read and followed the instructions to the letter would have had no problems in answering correctly and answering the correct number of questions.

With regard to the contextualisation of questions, the team was of the opinion that the contexts in which the questions were set were appropriate for the South African learner.

With regard to the appropriateness of texts and stimulus material provided, the team was of the opinion that the texts and visual stimuli provided were clear (in most cases), appropriate and pitched at the correct level.

MATHEMATICS

2.1 Evaluators

Lynn Bowie (Team leader), Alison Kitto and Williams Ndlovu

2.2 Introduction

All learners taking the National Senior Certificate (NSC) are required to take and pass either Mathematics or Mathematical Literacy. The Subject Assessment Guidelines (SAG) of the DBE for the National Curriculum Statement (NCS) for Mathematics indicate that certain assessment standards have been designated as core and others as optional. Only the core assessment standards are examined in Papers 1 and 2. The optional assessment standards are examined separately in an optional paper, Paper 3. Learners' results for Paper 3 are reported separately from their results for Mathematics core, which is comprised of a combined score for Papers 1 and 2. In this report we discuss only Papers 1 and 2.

2.3 Method of analysis

In analysing the type of cognitive demand in the Mathematics examination papers for 2011, the team used the taxonomy of categories of mathematical demand set out on page 13 of the *DBE Subject Assessment Guidelines for Mathematics NCS (SAG)*, Jan 2008. The team chose to use this taxonomy as it is tailored specifically for mathematics examinations. The description of the categories, as given in the SAG, is shown in table 3.

Team members also used the examples of the types of question that can be set for each of the four categories of cognitive demand provided on pages 32 to 34 of the SAG, Jan 2008, to help guide their analysis.

In addition to using these categories the team designated a subcategory (E = easy, M = moderate, D = difficult) to each task. This subcategory was used to make finer distinctions within categories. For this reason we looked at them in conjunction with the category designation. For example, we looked at the number of questions involving routine procedures (R) at differing levels of difficulty to get an idea of how many were easy (RE), moderate (RM) or difficult (RD).

Table 3: Cognitive levels as described in the Subject Assessment Guidelines

Cognitive levels	Explanation of skills to be demonstrated
Knowledge (K)	<ul style="list-style-type: none"> • Algorithms • Estimation; appropriate rounding of numbers • Theorems • Straight recall • Identifying from data sheet • Simple mathematical facts • Knowledge and use of appropriate vocabulary • Knowledge and use of formulae <p>All of the above will be based on known knowledge.</p>
Routine procedures (R)	<ul style="list-style-type: none"> • Problems are not necessarily unfamiliar and can involve the integration of different LOs • Perform well-known procedures • Simple applications and calculations which must have many steps and may require interpretation from given information • Identifying and manipulating of formulae <p>All of the above will be based on known procedures.</p>
Complex procedures (C)	<ul style="list-style-type: none"> • Problems are mainly unfamiliar and learners are expected to solve by integrating different LOs • Problems do not have a direct route to the solution but involve: <ul style="list-style-type: none"> ❖ using higher level calculation skills and reasoning to solve problems ❖ mathematical reasoning processes • These problems are not necessarily based on real-world contexts and may be abstract requiring fairly complex procedures in finding the solutions.
Solving problems (P)	<ul style="list-style-type: none"> • Solving non-routine, unseen problems by demonstrating higher level understanding and cognitive processes • Interpreting and extrapolating from solutions obtained by solving problems based in unfamiliar contexts • Using higher level cognitive skills and reasoning to solve non-routine problems • Being able to break down a problem into its constituent parts – identifying what is required to be solved and then using appropriate methods in solving the problem • Non-routine problems based on real contexts

The experience of the team in evaluating the 2008 and 2009 papers had led us to produce a refined taxonomy which we used for the analysis in 2010 and which we feel provides a good reflection of the level of difficulty of the paper. This categorisation is summarised in table 4 below.

Table 4: Categorisation of cognitive demand and level of difficulty

	Level	Categories and subcategories included	Description (to be read in conjunction with the descriptions in table 3)
Lower cognitive demand	Level 1	Knowledge and routine procedure (easy)	Questions that require recall or the performance of a simple, well-known procedure. The well-known procedure will generally require only one or two steps.
	Level 2	Routine procedure (moderate)	Questions that require the performance of a straightforward well-known procedure.
Higher cognitive demand	Level 3	Routine procedure (difficult) and complex procedures	Questions that either require the performance of a well-known procedure that is difficult to execute/involve complicated manipulation or that require performance of complex procedures where there is no direct route to the solution.
	Level 4	Problem solving	As described in table 3.

Each team member initially worked through the examination papers individually and allocated each question¹ to one of the categories of cognitive demand. After the initial individual analysis, the team discussed the papers question by question to produce a single team evaluation of the examination. Clearly, the categorisation of questions into the various levels of cognitive demand relies on the judgement and experience of each of the individual evaluators and, thus, there were questions where our evaluations differed. In such cases the team discussed and debated the cognitive demand of the question to reach consensus. In addition, the team kept a record of all the questions placed into each category. If there was a debate about whether to categorise a question as routine or complex, for example, we could compare the question to other questions in these two categories to help us decide where to place the question and to ensure consistency in our evaluations. The team referred to records of our allocation of questions from the 2009 and 2010 Mathematics examination papers into the categories and subcategories to help guide our allocation of questions from the 2011 examination papers and ensure consistency across the years.

The levels given in our taxonomy do not correspond exactly with the taxonomy provided in the SAG, as shown in table 3. However, in making a comparison between our evaluation and the weighting suggested in the SAG we have equated

¹ If question 2 was divided into 2a, 2b i, 2b ii and 2c, we analysed 2a, 2b i, 2b ii and 2c separately. For ease of reference we will refer to these sub-questions and sub-sub-questions simply as questions.

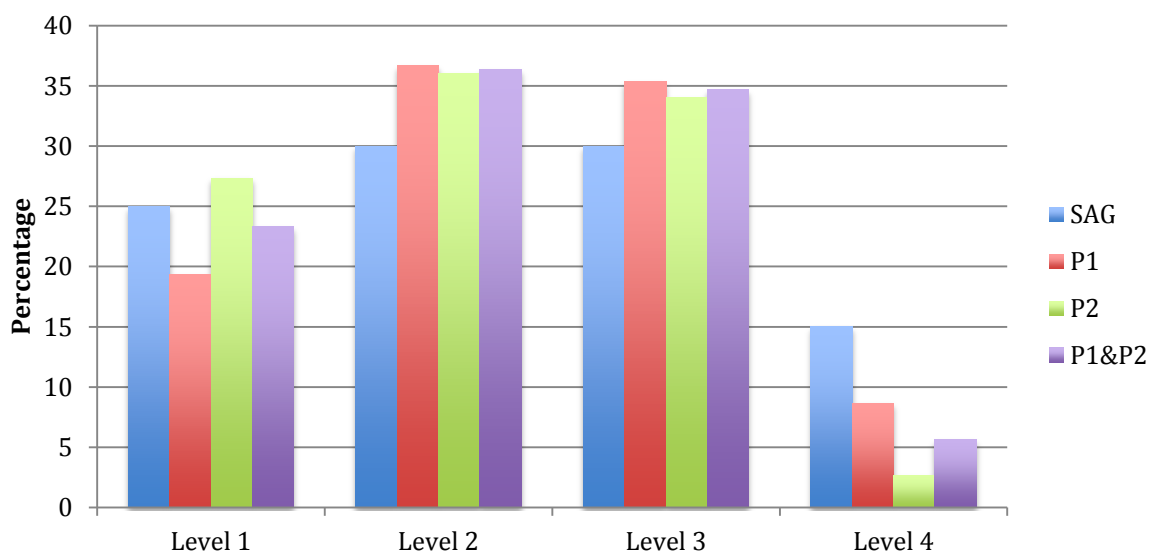
our level 1 with the lowest level of cognitive demand in the taxonomy, and our level 2 with the second lowest level, and so on. Although this decision means that we are, for example, comparing our level 1 (which contains both Knowledge and Routine Easy questions) with the SAG level 1 (which is the Knowledge category), the team felt the understanding and use of the categories in the taxonomy has evolved to represent the levels we present in table 4 more strongly. We thus felt that making the comparison in this way was appropriate.

2.4 Cognitive demand

Table 5 and graph 5 below show the categorisation of the DBE core Mathematics papers. Paper 1 and Paper 2 are shown separately and a combined mark for both papers is given as well. The suggested allocation of marks as presented in the SAG document is also provided.

Table 5: Categorisation of the core papers

DBE	SAG	P1	P2	P1 & P2
Level 1 K+RE	25	19	27	23
Level 2 RM	30	37	36	36
Level 3 RD +C	30	35	34	35
Level 4 P	15	9	3	6



Graph 5: Cognitive demand of the papers

Comparing the allocation of marks to levels with the suggested allocation in the SAG we note the following:

- Both papers did not contain sufficient level 4 (problem solving) questions. However, both papers contained slightly more level 3 questions than the SAG recommends.
- A combination of papers 1 and 2 contained roughly the recommended proportion of level 1 questions.
- Both Papers 1 and 2 contained slightly too many marks at level 2.

2.5 Weighting of level of difficulty

In table 6 we have combined levels 1 and 2 to give a picture of the weighting of lower cognitive demand compared to higher cognitive demand questions.

Table 6: Weighting of lower and higher cognitive demand

2011 Mathematics	SAG	P1	P2	P1&P2
Lower cognitive demand	55	56	63	59
Higher cognitive demand	45	44	37	41

Table 6 indicates that Paper 1 was in line with SAG recommendations, but Paper 2 was easier. The combination of both papers is slightly easier than the SAG recommendations in terms of cognitive demand.

2.6 Model for future use

The 2011 DBE Mathematics papers are good models for future use. They cover the content of the curriculum in compliance with the recommendations of the SAG and, at a broad level, the combination of Papers 1 and 2 provides the spread of cognitive demand stipulated in the SAG. However, both papers did not contain sufficient level 4 (problem-solving) questions, although this was compensated for by a heavier weighting of level 3 questions.

2.7 Standard and quality of papers

Although, in general, we felt that the papers are good models for future use there were a few specific questions or issues that, we suggest, need to be addressed:

- The questions in the data-handling section tended to be very procedural. Those questions that ask for some interpretation (e.g. Paper 2 Q1.4) are quite vague which enables many different interpretations. Thus they do not end up testing understanding of the concepts involved.
- We queried whether providing a labelled grid for the ogive was necessary and suggest that deciding on the scale and appropriate labels is part of what should be tested.
- Although the paper was clearly laid out and the language used was generally straightforward, we felt that the wording of Q7.3 was confusing. The emphasis on the particular dates on which the investments were made could have suggested to some learners that the deposit made on 1 April would only accumulate interest on the 1st of each month. We suggest simpler wording like 'Nicky opened a savings account with a deposit of R1 000. A month later she made the first of 18 monthly payments of R700. The account earns interest of 15% p.a. compounded monthly. How much will she have in her savings account immediately after the last deposit is made?'
- We were concerned about cases where work depended on getting the correct answer to a previous question (e.g. Q6.4 and 6.5 of Paper 1 depended on Q6.3) and suggest this be avoided where possible.
- Although we welcomed questions like Paper 2 Q8.3, which required learners to apply learnt skills to a new situation, we caution that many teachers will begin to incorporate such questions into their teaching so it will not be novel or challenging if used in next year's paper.

2.8 Comparability 2008–2011

Tables 7 and 8 below show the combined weightings of Papers 1 and 2 for 2008–2011.

Table 7: Levels 1 to 4 comparison of combined weighting 2008–2011

	SAG	2011	2010	2009	2008
Level 1 K+RE	25	23	23	22	24
Level 2 RM	30	36	32	32	40
Level 3 RD +C	30	35	41	35	32
Level 4 P	15	6	4	11	4

Table 8: 2008–2011 weighting of Papers 1 and 2

	SAG	2011	2010	2009	2008
Lower cognitive demand	55	59	55	54	64
Higher cognitive demand	45	41	45	46	36

From table 8 it is apparent that the 2009 and 2010 papers have similar weightings at the lower level of cognitive demand and at the higher level of cognitive demand. These weightings also aligned well with those in the SAG document. This contrasts with the 2008 papers, which were more strongly weighted to the lower levels of cognitive demand. The 2011 papers appear slightly more heavily weighted at the lower levels of cognitive demand than the 2009 and 2010 papers.

From table 7 it is apparent that at level 1 the papers have been similar across the four years. However, at level 2 there was a greater weighting in 2008 than in 2009, 2010 and 2011. The 2008, 2010 and 2011 papers all had fewer marks at level 4 than as stipulated in the SAG. However, in 2009, 2010 and 2011 there was a higher weighting at level 3 than stipulated in the SAG.

The team felt that over the period 2009 to 2011, the Mathematics examinations had settled well without becoming too predictable.

Table 9, shown below, indicates that in 2009, 2010 and 2011 Paper 2 was easier than Paper 1.

Table 9: Comparison of level of difficulty 2008–2011

	SAG	P1				P2			
		2011	2010	2009	2008	2011	2010	2009	2008
Lower cognitive demand	55	56	46	49	65	63	65	59	63
Higher cognitive demand	45	44	54	51	35	37	35	41	37

2.9 Closing remarks

The team felt that the DBE papers were appropriate and good models for future examinations.

MATHEMATICAL LITERACY

3.1 Evaluators

Mrs Joan Houston (team leader), Mr Phil Ntenza, and Mrs Solante Hough

Introduction

Mathematical Literacy is a new subject in the suite of NSC examinations and it has a short history in South Africa. The 2011 examination is only the fourth time the subject has been examined and there is therefore very little with which to compare the examination. In order to attempt to benchmark the 2011 examination, the previous (Maintaining Standards 2008 and 2009) analyses of the 2008, 2009 and 2010 NSC examination papers were used, and compared with the 2011 DBE NSC examinations. Comparisons were made with respect to types and levels of cognitive demand.

The papers that are analysed here are the 2011 DBE NSC Final Papers 1 and 2

3.2 Method of analysis

To provide a guide for decisions made about the type of cognitive demand and level of difficulty of the examination questions, the Mathematical Literacy evaluation team used a table, which is discussed below. The three members of the evaluation team worked together to analyse every question in the 2011 DBE NSC papers. In cases where there was disagreement, the team noted the differing views and returned to the question later once other similar questions had been reviewed. This enabled a consistency of analysis across the papers analysed. The team also analysed the papers with respect to the coverage of learning outcomes as assessed by each question.

The team used the same principles of analysis that it has used over the past three years to interpret and award marks at the different levels of cognitive demand and degrees of difficulty. Although some of our views may have changed slightly, we have agreed to the same 'set of rules' for analysis as in the past to ensure the consistency and comparability of the evaluations from 2008 to the present.

The team has developed a working document which lists in detail the types of question that can be categorised under the four cognitive levels at three degrees of difficulty. This has been done to ensure comparability across the years and the examining boards. In addition to the table below, this working document provides a further detailed interpretation of the different taxonomy levels according to the four learning outcomes. These were used extensively by the team for specific questions. The taxonomy used to classify the cognitive demand of the Mathematical Literacy papers comes from the NSC Mathematical Literacy Grade 12 Examination Guidelines 2009.

Table 10: Classification of skills according to taxonomy of cognitive demand

Category	Descriptions
Knowing (K)	<ul style="list-style-type: none"> • Calculate using the basic operations including: <ul style="list-style-type: none"> ❖ algorithms for +, -, x and ÷ ❖ appropriate rounding of numbers ❖ estimation ❖ calculating a percentage of a given amount ❖ measurement • Know and use appropriate vocabulary such as equation, formula, bar graph, pie chart, Cartesian plane, table of values, mean, median and mode. • Know and use formulae such as the area of a rectangle, a triangle and a circle where each of the required dimensions is readily available. • Read information directly from a table (e.g. the time that bus number 1234 departs from the terminal).
Applying routine procedures (RP)	<ul style="list-style-type: none"> • Perform well-known procedures in familiar contexts. Learners know what procedure is required to solve the problem from the way the problem is posed. All of the information required is immediately available to the student. • Solve equations by means of trial and improvement or algebraic processes. • Draw data graphs for provided data. • Draw algebraic graphs for given equations. • Measure dimension such as length, time and weight using appropriate measuring instruments sensitive to levels of accuracy.
Applying multi-step procedures in a variety of contexts (MP)	<ul style="list-style-type: none"> • Solve problems using well-known procedures. The required procedure is, however, not immediately obvious from the way the problem is posed. Learners will have to decide on the most appropriate procedure to find the solution to the question and may have to perform one or more preliminary calculations before determining a solution. • Select the most appropriate data for solving a problem from options in a table of values. • Decide on the best way to represent data to create a particular impression.
Reasoning and reflecting (RR)	<ul style="list-style-type: none"> • Pose and answer questions about what mathematics is required to solve a problem and then select and use that mathematical content. • Interpret the solution to a problem in the context of the problem and where necessary adjust the mathematical solution to make sense in the context. • Critique solutions to problems and statements about situations made by others. • Generalise patterns observed in situations, make predictions based on these patterns and/or other evidence and determine conditions that will lead to the desired outcomes.

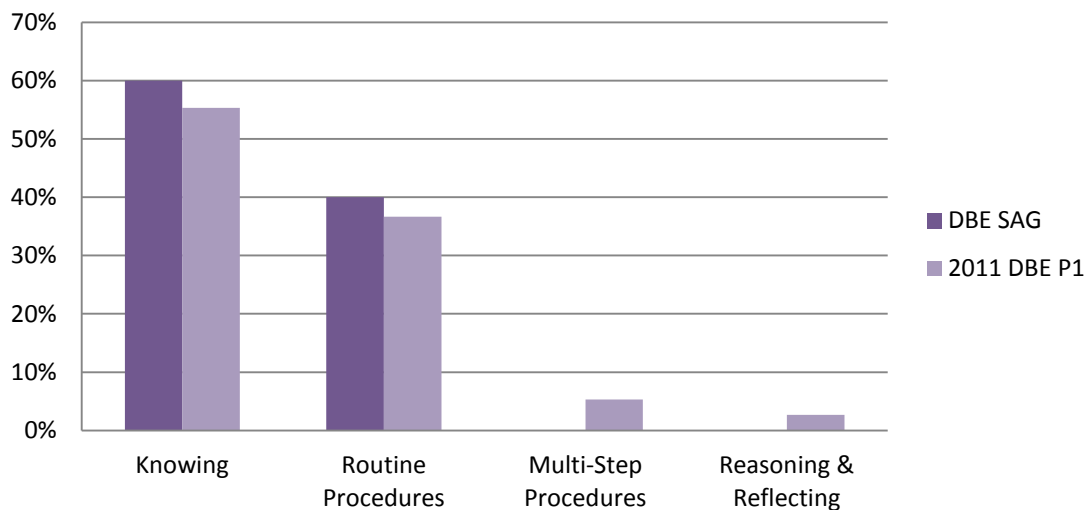
3.3 Results of examination paper analysis

Cognitive levels

Graphs 6 and 7 show the comparison of the percentage coverage of cognitive levels in the Subject Assessment Guidelines (SAG) (2008) and the coverage in the 2011 DBE NSC Papers 1 and 2.

Paper 1

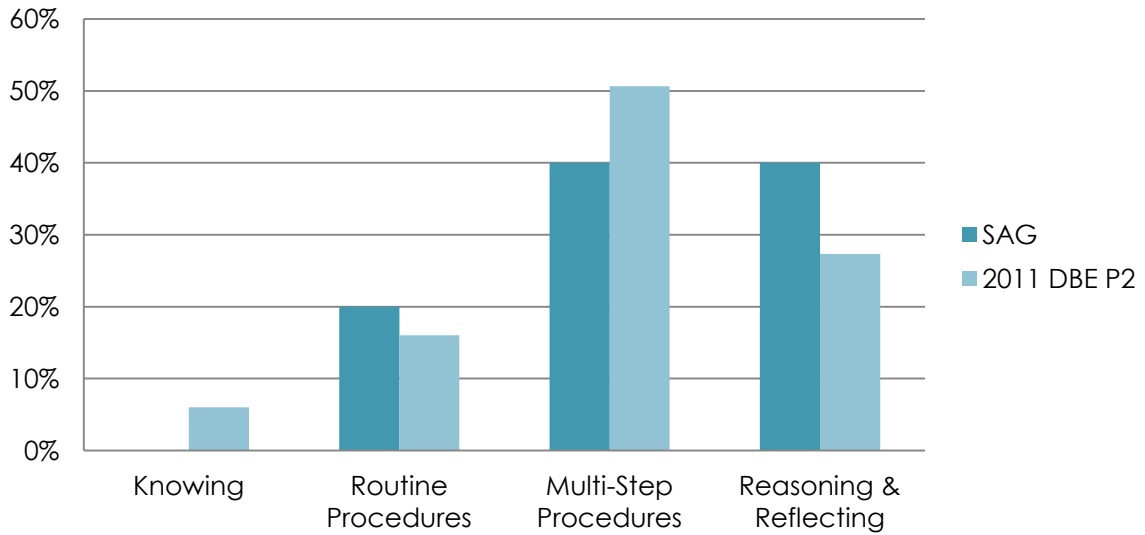
The 2011 DBE NSC Paper 1 is very well matched with the SAG with respect to cognitive levels. The SAG allow for a $\pm 5\%$ deviation from the bar heights in graph 6 below.



Graph 6: Comparison of cognitive levels – Paper 1

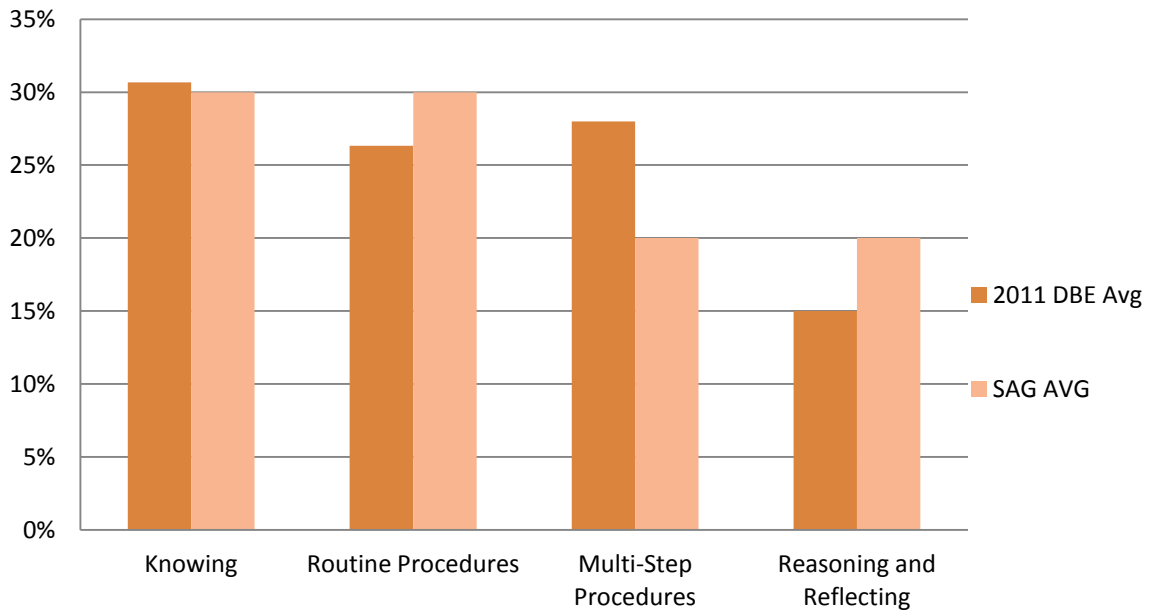
Paper 2

The match of the 2011 DBE NSC Paper 2 with the SAG is fairly good. There is almost nothing at the first level and a good match at the second level. The two higher levels are not as well matched, however. There were too many marks at the second highest order level of Multi-step Procedure and too few at the highest level, Reasoning and Reflecting. This paper had, however, 36% of the marks at the level of difficult questions which would have proved demanding for high achieving candidates.



Graph 7: Comparison of cognitive levels – Paper 2

Overall



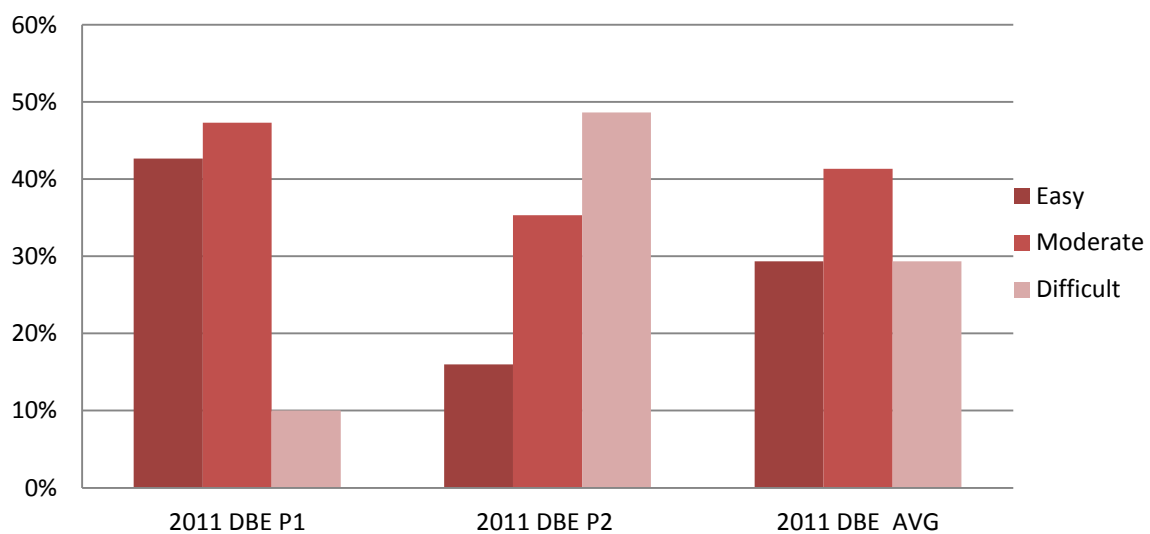
Graph 8: Overall comparison of cognitive levels

The 2011 DBE papers do not completely comply with the SAG with respect to type of cognitive demand. The biggest deviation is at the third level of Multi-step Procedures where there are too many (about 24) marks and at the highest level of Reasoning and Reflecting where there are too few (about 15) marks. However, as has been

pointed out, this discrepancy is less problematic because of the number of difficult Multi-step Procedures that included elements of Reasoning and Reflecting.

Degrees of difficulty

Each of the four types of cognitive demand question could be classified as easy, moderate or difficult. Graph 9 below shows the results of an analysis of the questions in Papers 1 and 2 and the average of the two papers with respect to degree of difficulty.



Graph 9: Comparison of levels of difficulty

The overall result is that the exam was very well balanced with respect to levels of difficulty. Paper 1 is clearly easy and would allow for the average learner to achieve a pass. Almost half the questions in Paper 2, on the other hand, are estimated to have been set at a 'difficult' degree of difficulty. This would allow for good differentiation of the A grade candidates.

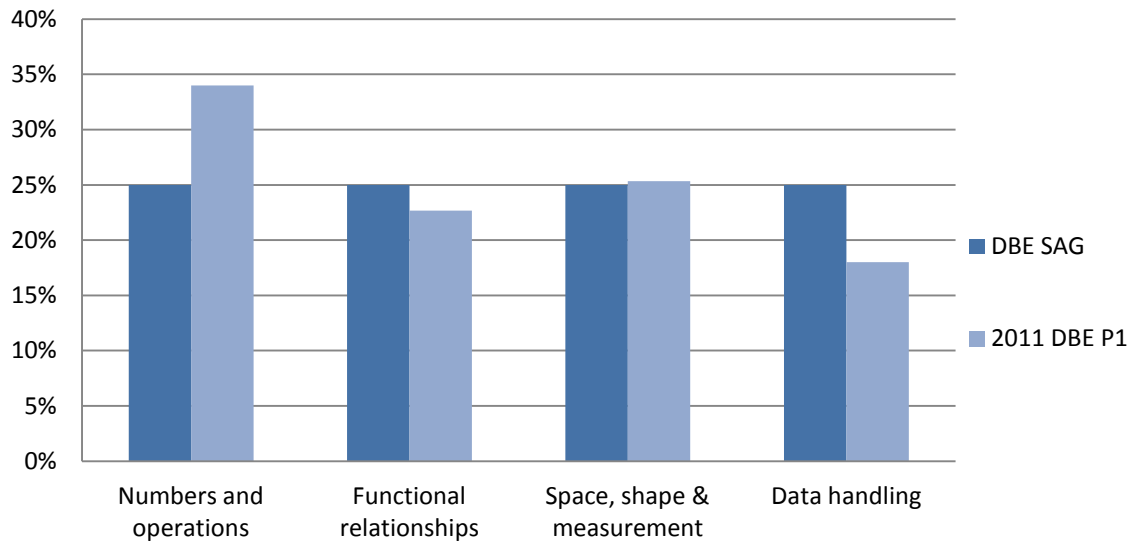
3.4 Compliance with Subject Assessment Guidelines

Learning outcomes

The following graphs show the comparison of the percentage coverage of learning outcomes (LOs) in the SAG (2008) and the coverage in the 2011 DBE NSC Papers 1 and 2.

Paper 1

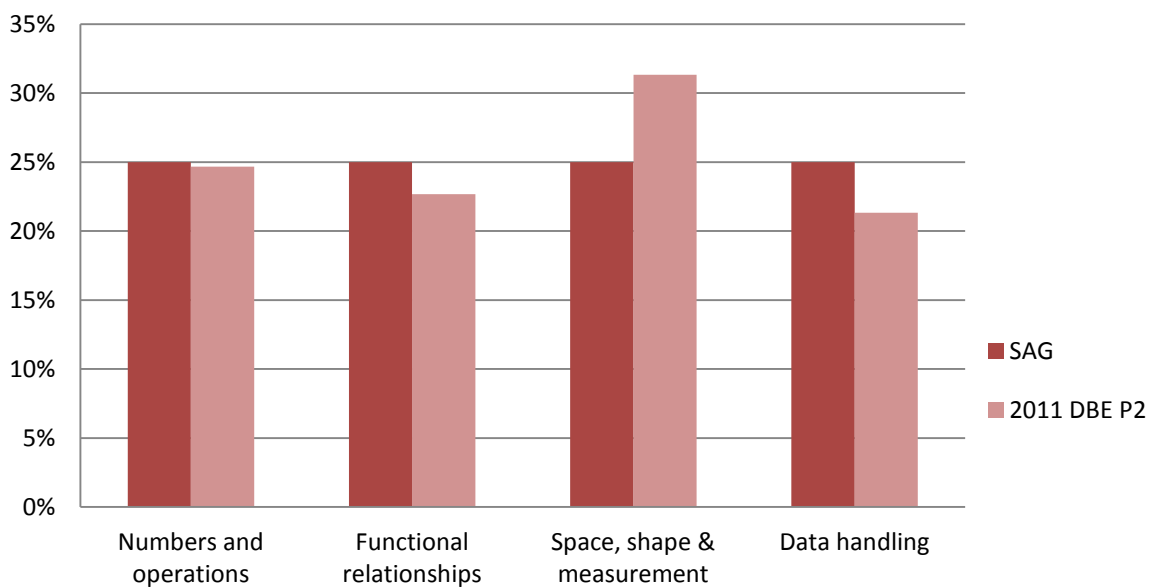
The 2011 DBE NSC Paper 1 was largely compliant with the SAG. As can be seen in graph 1 below, there were a few too many marks awarded to Numbers and Operations at the expense of Data Handling.



Graph 10: Paper 1 comparison of learning outcomes with SAG

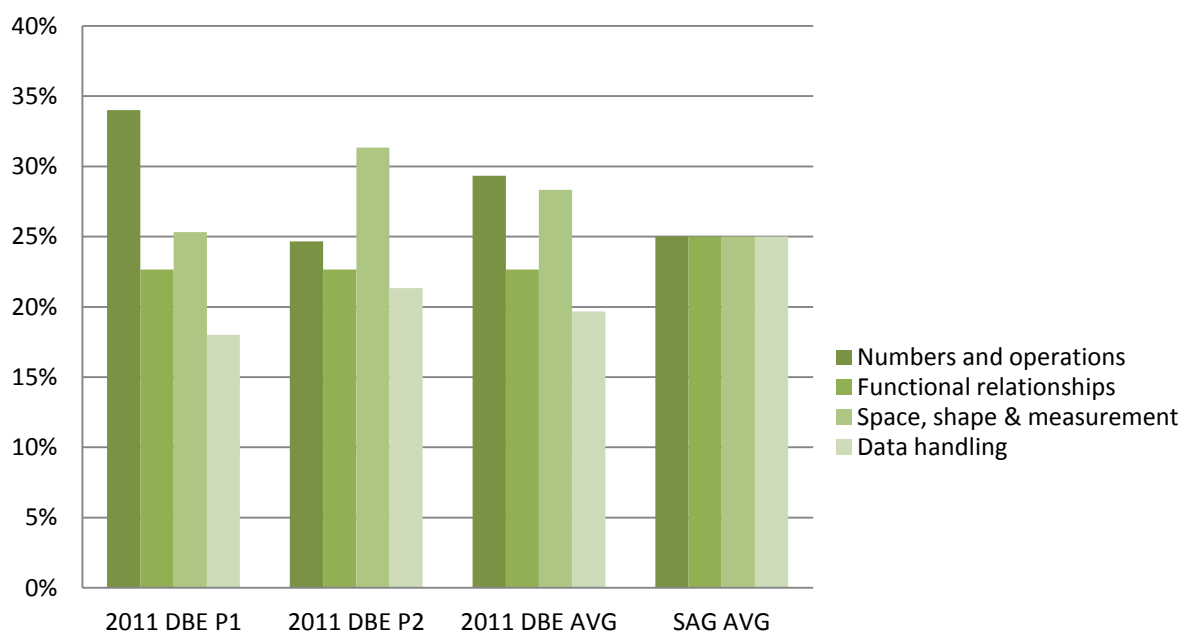
Paper 2

The 2011 DBE NSC Paper 2 was almost completely compliant with the SAG.



Graph 11: Paper 2 comparison of learning outcomes with SAG

The overall picture is that the two papers have achieved a high level of compliance with the SAG in terms of the distribution of LOs. With the exception of Numbers and Operations, the three other LOs have been well covered in terms of the SAG. It is inevitable that the calculations involving numbers will be over-represented as Mathematical Literacy is an integrated subject.



Graph 12: Overall comparison of learning outcomes with SAG

Assessment standards

With regard to the coverage of Assessment Standards (ASs) across the curriculum, there were a few gaps.

The following omissions were noted:

- LO3 AS 12.3.2 'international time zones'
- LO3 AS 12.3.6 'recognition, visualisation, description and comparison of geometrical planes'
- LO4 AS 12.4.1 'investigate a problem on issues such as those related to social, environmental and political factors, people's opinions, human rights and inclusivity'
- LO4 AS 12.4.2 'summarising and displaying data'

Except for 'international time zones', these ASs are very difficult to assess in a written exam paper.

Errors in the marking memo

These comments are based on the version of the marking memo given to the team by Umalusi at the start of the evaluation.

Paper 1:

- Q6.2.2: Answer should be 294,12 minutes

Paper 2:

- Q1.1.2: Marking memo suggests the points should be discrete if (0;0) is not allowed. This is inconsistent with the solid lines drawn.
- Q2.1.2: Mark scheme has only one answer whereas there are two.
- Q3.3.1 (a): Answer should be 3,9 cm (which affected 20 marks).
- Q4.3.2: Answer should be 'incorrect'.
- Q4.4: Answer should be 'invoice amount = R538,50'.

Problem questions

In the 2011 DBE NSC Papers there were few problematic questions

Paper 1

The evaluation team noted that the examiner used many questions involving reading off either a table or a graph. Since the tables were not complex this is probably better than having a lot of text for the learners to read.

Paper 2

The evaluation team noted that there were many questions with a high mark allocation. A third of the marks were allocated to sub-questions worth more than 5 marks. This may discourage lower achievers from even attempting to answer the question.

In Q2 having two photos of the car damage was distracting. One with two labels would have been more effective. There was also a lot of dense information in three

tables. This increased the degree of difficulty of this question. The heading of the last column of the TBO was confusing. Consulting the tables on the annexure was awkward as it was attached at the end of the question paper. No typographical or mathematical errors were found in either paper.

Contextualisation of questions

Most questions were based on authentic situations and used real data. There was a spread of contexts, most of which would not have been prejudicial to a learner in either a rural or an urban setting. However, the team felt that 'social networking' (Q1.3) might be an unfamiliar context for many candidates.

Language use

The 2011 DBE papers still contained some ambiguities and problematic words. However, the papers contained more tables and graphs which made the reading of the papers simpler than reading dense text.

Only a few difficulties were apparent. The following are instances of possibly inappropriate wording identified:

Paper 1

- Q1.1.6: Wording makes it hard to understand. Suggest: Break the one sentence into two sentences. '9 February 2011 is a Wednesday, What is the probability that 26 February 2001 will be a Saturday?'
- Q1.2.2: Wording below formula should specify that 'A is per person and B is per person'.
- Q1.3.2(a): Unfamiliar context of 'mobile devices' increased degree of difficulty.
- Q2.1.2: Concept and wording are complex.
- Q2.2.3: Ambiguity in the question wording; should be 'which province's land area % is equal to its population %'.
- Q3.1: Ambiguity in the wording related to number of days of the month (30 days) compared to number of weeks ($4 \times 7 = 28$ days).
- Q3.2: Wording is misleading. Why say 'she studied for 4 years'?
- Q3.3.2: Wording should have indicated which end was the front of the hall.

- Q3.3.3: If compass directions are required then a compass (drawn on the plan) should have been included. However, in this context compass directions are inappropriate.
- Q4.1.4: Suggest the wording 'Give all/four shoe sizes not worn by boys', as two marks were awarded for four answers.
- Q5.2.1: Wording difficult: 'gold foil' or 'foil wrapping' not familiar to all learners.

Paper 2

- Q1.1.2: Language of 'stripping and assembling' is unfamiliar. 'Without doing any calculations' is unnecessary and distracting.
- Q4.1: Unfamiliar wording: 'Which direction does a window in bedroom 2 face?' Suggest: 'If you were in bedroom 2, in which direction would you be facing when looking out of the window?'
- Q4.3.1: Would have been better to partition or scaffold this question.

Distinguishing highest level achievers and average passing candidates

To determine whether the 2011 DBE NSC exam reflects sufficient distinction of highest level of achievement one should look at the percentage of marks allocated for difficult higher order questions (difficult Multistep Procedures and difficult Reasoning and Reflecting), since it would be these questions that differentiate highest achievement level learners. The questions which distinguish learners at the distinction level category (A grade) should be around 15% of the questions. In these papers 24% were found to be at these two levels. In the whole paper there were 11 sub-questions which required the learner to give reasons for the answer. This means that the 2011 DBE NSC examination was a challenging one.

The appropriate questions (which would be readily accessible to learners who just pass) fall into the categories of easy and moderate Knowing questions, together with easy Routine Procedures questions. These are lower-order cognitive skills and could therefore enable the weaker passing learner to achieve sufficient marks to pass.

The total percentage of marks assigned to easy and moderate Knowing questions, together with easy Routine Procedures questions, was ascertained from the examination analysis tables, and the results are shown in table 11 below.

Table 11: Total percentage of marks for lower order questions

Easy knowing questions	Moderate knowing questions	Easy routine procedures questions	Total achievable % by average learner
16%	10%	7%	33%

Since the passing percentage mark is 30%, this value of 33% (see table 11) is appropriate. It means that candidates who are weak and able to achieve marks for only the easy questions in the two lower order cognitive skills and for moderate second order questions will be able to achieve a grade of F or E.

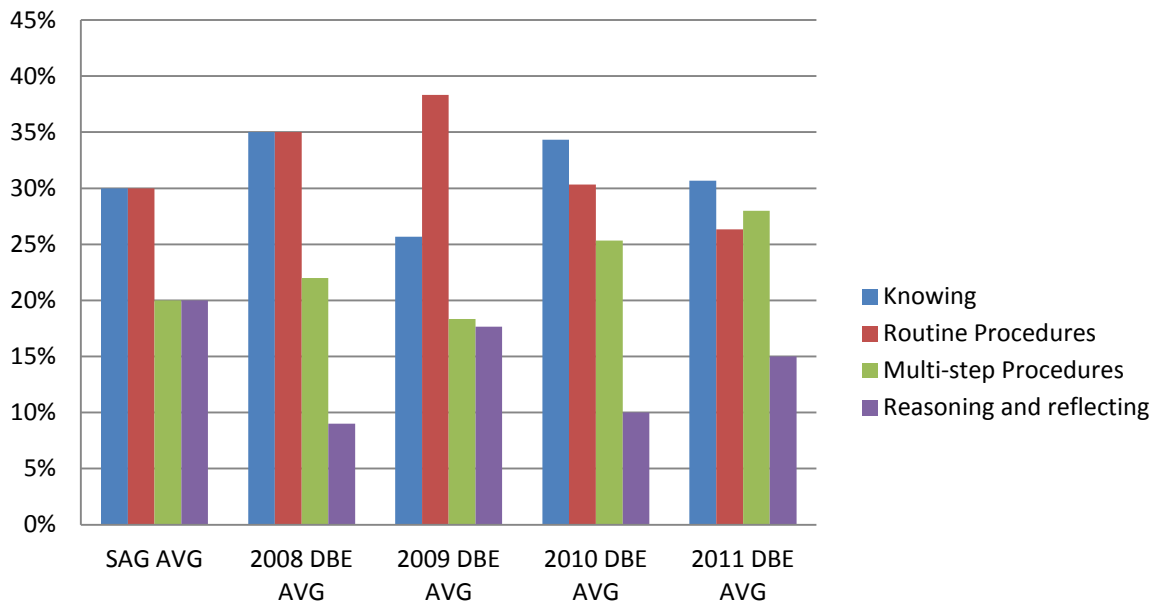
Although this percentage should be used merely as an indicator, it is the evaluation team's opinion that the 2011 Mathematical Literacy papers will produce fewer A grade passes than in the past three years which is evidence of a better standard.

3.5 Cognitive demand and level of difficulty

Cognitive demand

Overall the 2011 DBE NSC examination was a better match with the SAG in respect of cognitive demand than all the past papers.

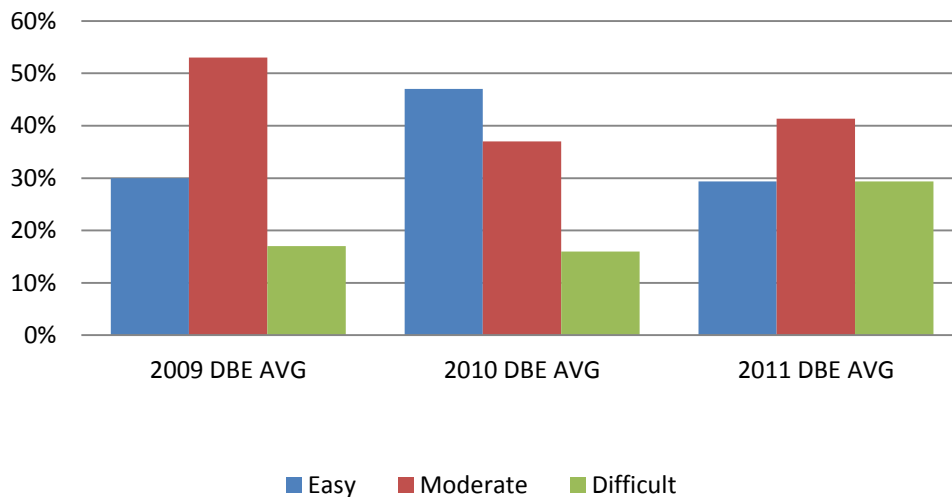
Graph 13 below shows a comparison of the overall levels of cognitive demand of the 2008 to 2011 examination papers.



Graph 13: Comparison of cognitive levels 2008–2011

Degrees of difficulty

The 2011 DBE examination was undoubtedly more difficult than any other in the past three years. Graph 14 below shows this clearly.



Graph 14: Comparison of degree of difficulty 2009–2011

3.6 Model for future use

Standard

It is the evaluation team's opinion that the 2011 examination is the best of the past four years and is a good model for future use. The main reason for this conclusion is that

- there is good coverage of all four LOs (none is markedly under-represented)
- the first paper is well constructed to test the average candidate while the second paper provides a significant challenge for high-achievers
- this is the first time in the four years that there has been sufficient challenge for the upper end of the range of candidates
- the papers are a good model of the balance of degrees of difficulty across both papers.

Format

Both papers are largely good models for future use with respect to format. The layout was clear, easy to read and not crowded. The text was accurate and generally economical.

3.7 Standard and quality of papers

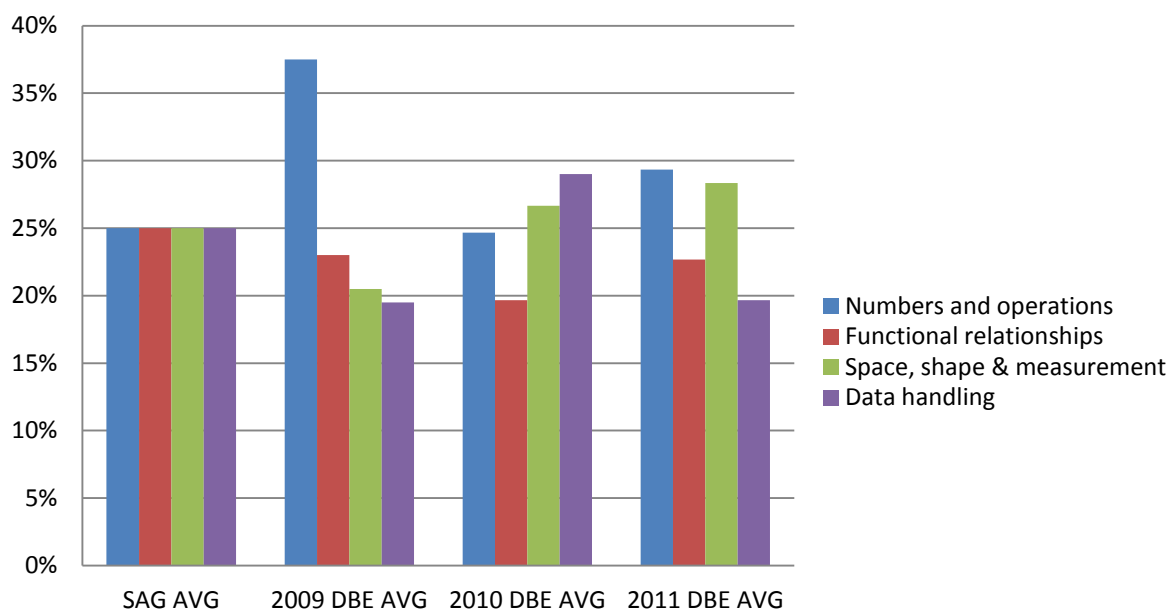
The evaluation team found that the standard and quality of the 2011 DBE NSC papers were generally good, making them a good model for future use as were the 2008 to 2010 papers. Despite too many difficult Multi-step Procedure questions compared to previous years in Paper 2 and too many high-mark questions, the team felt that this exam was of a good standard.

3.8 Comparability 2008–2011

Learning outcomes

With respect to the weighting given to the four LOs, the 2011 examination achieved better compliance than the 2008, 2009 and 2010 papers. The norm of 25% representation per LO was more closely approximated in 2011, with the exception of LO 1 (Numbers and Operations) to which too many marks were allocated. Since LO1 contains mainly calculations this is evidence of the integration of calculations

throughout the other LOs. (Only a verbal description of the 2008 coverage of LOs was available to the team, hence the absence of the data on graph 15 below.)



Graph 15: Comparison of LO distribution 2009–2011

Format

The format of the 2009 to 2011 papers has remained a good model for future use. Their layout was clear and easy to read. The 2008 paper, on the other hand, was not a good format.

Contextualisation of questions

The 2009 to 2011 papers covered a broad range of contexts which were generally familiar and interesting to learners from a wide background. The 2008 papers contained difficult contexts which were unfamiliar for some learners.

Conclusion

The 2011 DBE Mathematical Literacy examination was a good paper and a more challenging one than the 2008 to 2010 papers and had good discriminating power at the top end of marks. In most other respects, like format, language and layout,

the 2011 papers were a great improvement on the 2008 paper and a slight improvement on the 2009 to 2010 examinations.

3.9 Recommendations

The instrument used in this evaluation process should be used in future, since it provides a very clear picture of the overall cognitive demand and level of difficulty of examination papers.

Examiners would benefit from using a similar tool to design papers with better compliance with the guidelines, especially with respect to cognitive demand and level of difficulty.

PHYSICAL SCIENCES

4.1 Evaluators

Dr Sharon J Grussendorff (team leader), Ms Akeda Isaacs, and Dr André van der Hoven

4.2 Introduction

In order to make an attempt at benchmarking the NSC examinations held in 2011, the previous (Maintaining Standards 2008, 2009 and 2010) analyses of the 2008, 2009 and 2010 NSC examination papers were used, and compared with the 2011 DBE NSC examinations. Comparisons were made with respect to types and levels of cognitive demand.

The papers that were analysed here are The 2011 DBE NSC Physical Sciences Final Paper 1 and 2.

4.3 Method of analysis

To provide a guide for decisions made about type of cognitive demand and level of difficulty, the Physical Sciences evaluation team used a table that was developed and used for previous Umalusi benchmarking research projects (Umalusi, 2008). This tool was used because it has been proven to be appropriate and useful in the analysis of Physical Sciences examinations papers, and provides meaningful data.

Table 12: Types and levels of cognitive demand for Physical Sciences

Category	Level	Descriptions	Examples
Remember factual knowledge (F)	Easy	Very simple recall; state a simple law or equation; recognise content in MCQ	State term/simple definition e.g. velocity is rate of change of position; naming homologous series (simple); structural formula for simple (1 or 2 carbon) organic compounds e.g. ethane, methane etc; labelling diagrams
	Medium	Medium content, learnt diagrams	State Newton's laws, Boyle's law, draw electric field patterns etc; general formula for homologous series (containing functional groups), state Le Chatelier's principle
	Difficult	Recall complex content	Process for lab preparation of chemical compounds; testing for presence of chemicals; inorganic chemical interactions



Understand conceptual knowledge (C)	Easy	Simple relationships; simple explanations; 1-step answers; derivation of units	Relationship between resultant and equilibrant; explain what is meant by ...;
	Medium	Counter-intuitive relationships; qualitative proportional reasoning; more complex relationships or explanations; 2 steps to arrive at answer, simple applications; interpretation of realistic diagrams	Direction of acceleration for free-fall; effects of changes in circuits; identifying acid-base conjugates, redox pairs/ reactions etc; simple influences on dynamic equilibrium; diagrams of AC/DC generators; naming type of reaction etc; formulate a hypothesis; identify dependent and independent variables and controlled variables; writing conclusions
	Difficult	Identify principles which apply in a novel context; explaining complex reasoning involving synthesis, critical argument; novel or abstract contexts etc	Identify all influences on realistic motion; identify isomers of organic compounds; complex influences on dynamic equilibrium
Problem solving (P)	Easy	Simple procedure; plug into formula with only one unknown; no extraneous information; known or practised context; simple chemical equation	Given current and resistance, calculate voltage; simple conservation of momentum; reading values off a given graph;
	Medium	Sketch graphs; construction or interpretation of schematic diagrams; problems with 2 or more steps; basic logic leaps; proportional reasoning; interpretation of table of data; acid-base or redox equation	Sketch graph of motion or get information from given graph; force or vector diagrams; diagrams of drip patterns; circuits diagrams; concentration or molar calculations; naming of organic compounds; writing and balancing equations for reactions; using redox table; writing structural formulae
	Difficult	Complex abstract representation; combination of concepts across sub-fields; complex problems involving insight and logic-leaps; formulating new equations (using all unknowns); problem solving in novel context	Interpret complex graphs; translate between various graphs of motion; combine equations for mechanical energy and motion; combine gravitational and electrostatic forces; complex circuit calculations; combination of various factors influencing equilibrium

4.4 Results of examination paper analysis

Overall impression of the DBE exam papers for 2011

The Umalusi Physical Sciences evaluation team found the 2011 DBE papers to be very clearly written, with very little extraneous or unnecessary information, and simple language usage. The questions were stated in a very clear manner, such that the learners would be in no doubt as to what their responses should be.

Overall, the impression of the DBE exam paper was that it was very fair, accessible and clear. It is therefore a suitable model for future examinations.

Language use

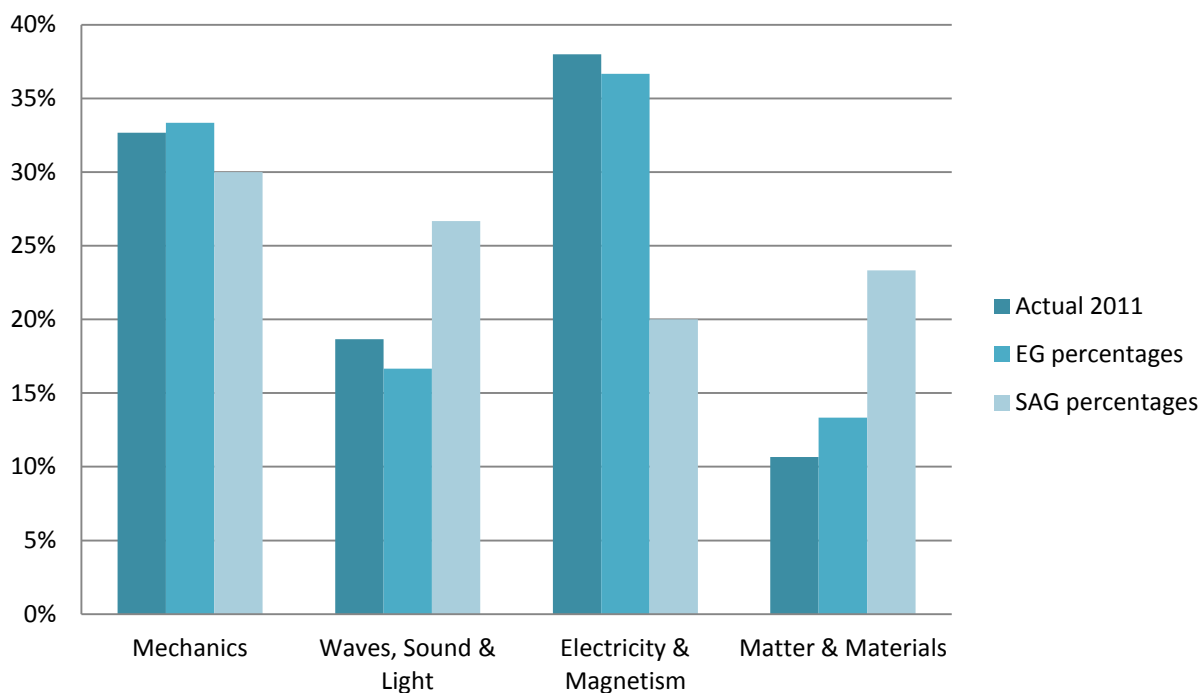
The 2011 examination papers were not problematic at all in terms of language level. The written text was kept to a minimum and the words used were generally accessible. Both papers were very pleasant to read.

4.5 Compliance with Subject Assessment Guidelines and Examination Guidelines

In Physical Sciences there have been a number of revisions regarding the structure and content of the examinations, including an appendix in 2010 to the Examination Guidelines document. Hence there are some inconsistencies between the SAG and the Examination Guidelines documents. The document which is considered the most reliable guide is the Examination Guidelines (2009) together with the appendix (2010), and this is therefore the document with which the exams should be in most close agreement.

Match with knowledge areas

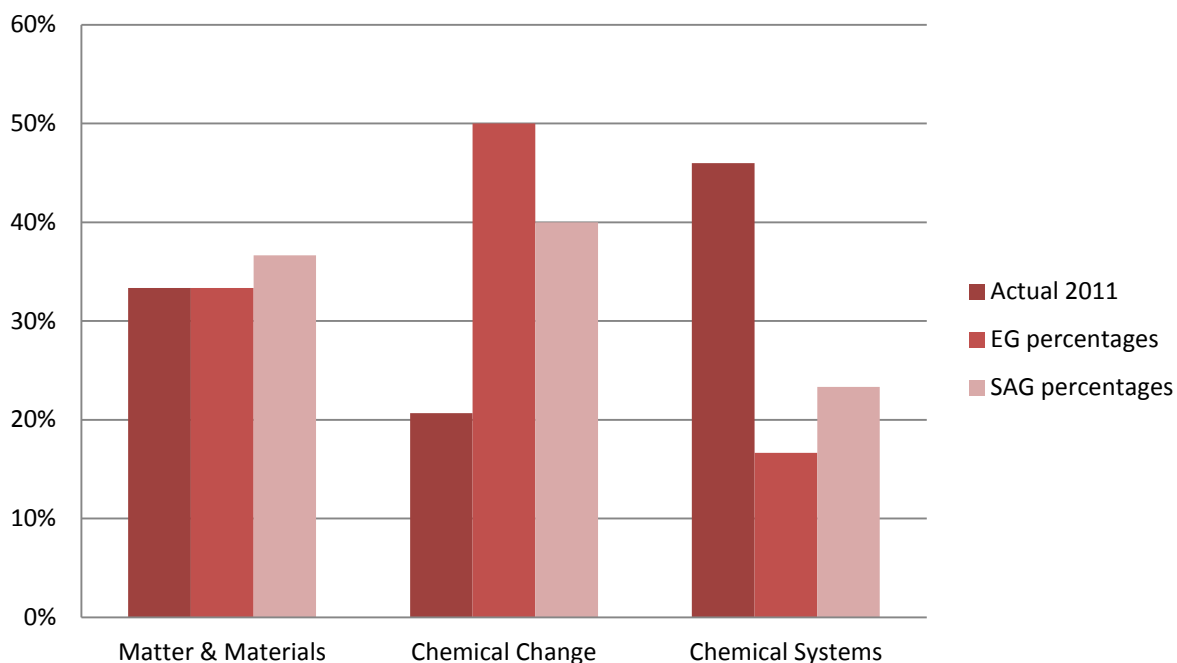
The following graph shows a comparison of the percentage coverage of knowledge areas in the Exam Guidelines (2009) and Appendix (2010) and the SAG (2008) and the coverage in the DBE 2011 Paper 1.



Graph 16: Comparison of knowledge areas for Paper 1

The 2011 DBE Paper 1 agrees well with the Examination Guidelines Appendix (2010), as it agrees with the stipulated percentages to within the 5% leeway. There is a notable difference with the SAG, however. This is caused by the deletion of certain content topics, namely colour from the Waves, Sound & Light section, and lasers from the Matter & Materials section. The marks that have been released by these deletions have been added to the Mechanics and the Electricity & Magnetism sections as indicated in the Examination Guidelines Appendix (2010).

The following graph compares the percentage coverage of knowledge areas in the Exam Guidelines (2009) and SAG (2008) and the coverage in the DBE 2011 Paper 2.

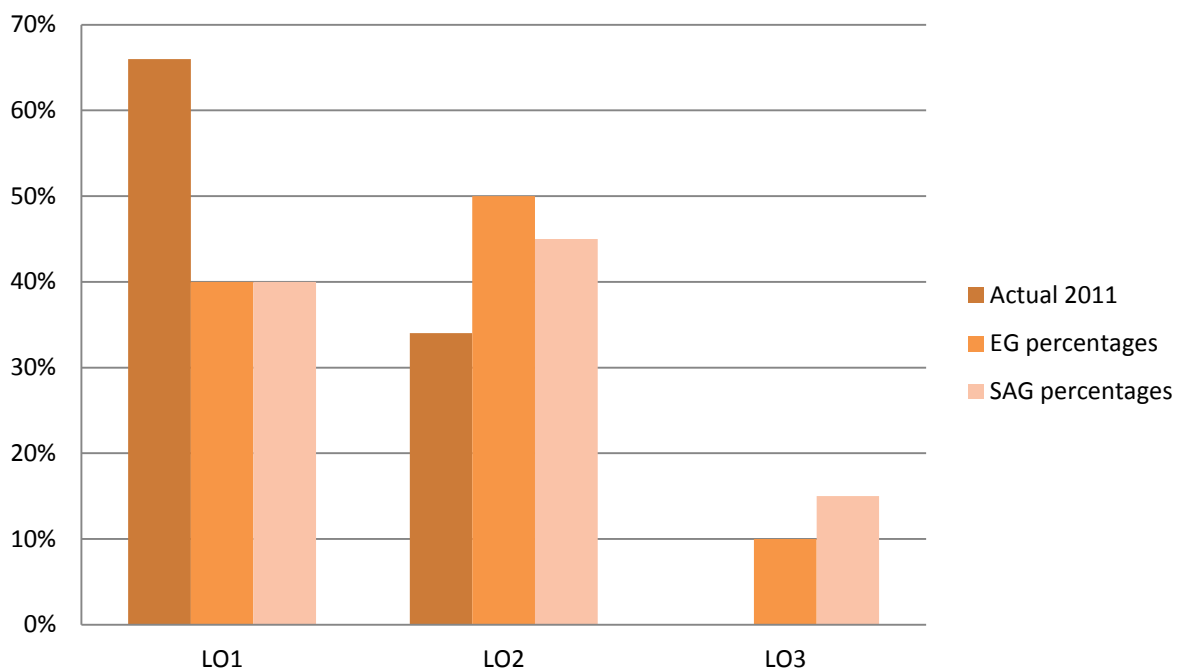


Graph 17: Comparison of knowledge areas for Paper 2

In the 2011 DBE Paper 2, the Matter & Materials content covered was as stipulated in the Examination Guidelines. However, there is a vast difference between that stipulated for the Chemical Change percentage (approximately 30% difference) and also for the Chemical Systems (approximately 30% difference). This is explained by the nature of the content included in Chemical Systems, which incorporates many of the foundational concepts from Chemical Change, particularly Electrochemical Cells. There is a lot of duplication of content between these two knowledge areas, which is a weakness of the curriculum as it leaves many gaps in essential chemistry disciplinary content which are not included in the Grade 12 examinable content. (These gaps were identified in a previous Umalusi exam report, 2009.)

Match with learning outcomes

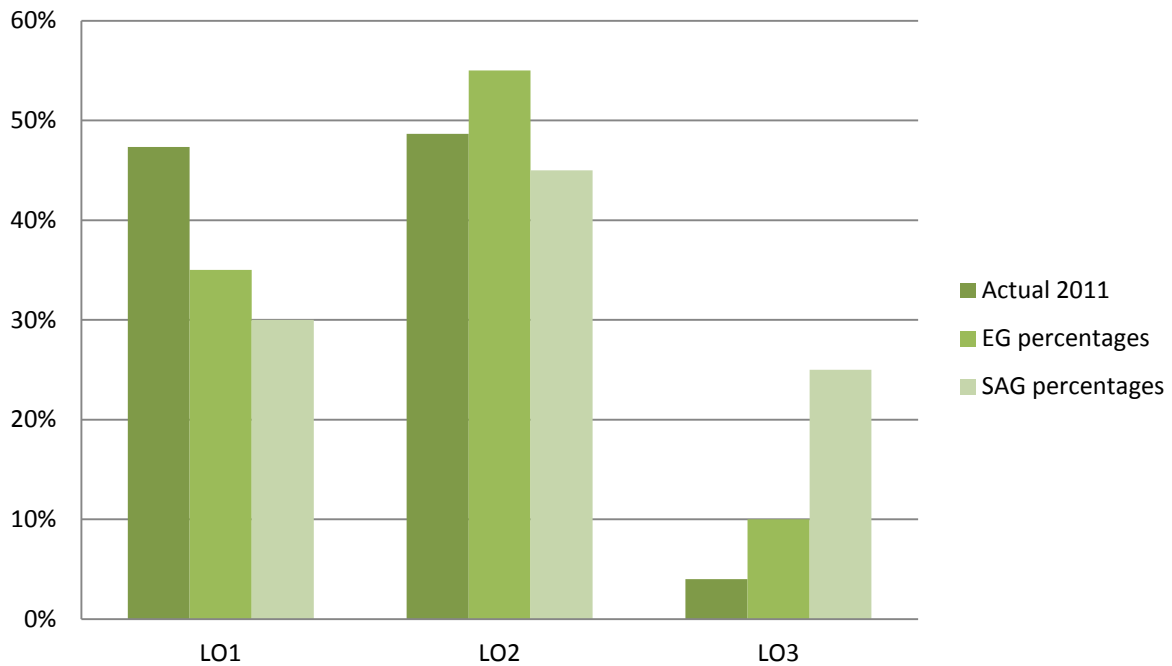
The following graph shows the comparison of the percentage coverage of LOs in the Exam Guidelines (2009) and the SAG (2008) and the coverage in the DBE 2011 Paper 1.



Graph 18: Comparison of learning outcomes for Paper 1

This graph shows a much higher percentage of LO1 questions (Practical Scientific Inquiry and Problem-solving Skills) than either of the Guideline documents suggest. This is because of the large proportion of problem-solving questions in Paper 1. There is also a lower percentage of LO2 (Constructing and Applying Scientific Knowledge) than both of the Guideline documents require. The LO1-related problem-solving questions do, however, also contain elements of application, which is part of LO2, and so this tends to balance out the representation of these two LOs. There are no LO3 questions in the 2011 Paper 1 (The Nature of Science and its Relationships to Technology, Society and the Environment), which is a contravention of the stipulations in both of the Guideline documents.

The following graph shows a comparison of the percentage coverage of LOs in the Exam Guidelines (2009) and SAG (2008) and the coverage in the DBE 2011 Paper 2.



Graph 19: Comparison of learning outcomes for Paper 2

Again this graph shows a bias towards questions that assess LO1. This is because of the large proportion of problem-solving questions in Paper 2. LO3 is again under-represented.

Distinguishing highest level achievers and average passing candidates

To determine whether the DBE 2011 exam reflects sufficient distinction of highest level of achievement when compared to the previous 2008 to 2010 DBE exams, one should look at the comparison of the percentage of marks for difficult questions, since it would be those questions that differentiate highest achievement level learners.

The percentage of marks for difficult questions for the 2011 DBE examination is 14%. This is an acceptable percentage of marks at the upper end of the scale for an exam of this nature. It is somewhat more difficult for the higher learners to achieve the equivalent of an A grade in the 2011 exam compared with the 2010 exam, where the percentage of marks for difficult questions was only 8%. On the other hand, both the 2008 and the 2009 DBE exams had a higher percentage of marks at this level, namely 20% and 22% respectively. These percentages were comparable

to those on previous Higher Grade exam papers, and were inappropriately high for a paper which should be at a standard that assesses the capabilities of a wider range of learners.

In the previous Maintaining Standards research (Umalusi 2008), it was found that in order to include all categories of distinction of learners' performance, the questions which distinguish learners in the high-end category (Level 7) should be reduced from the previous 20% to somewhere between 10 and 15%. The 14% found in the 2011 exam papers is therefore in the correct region, and this standard should be maintained in future years.

The appropriate questions which would be readily accessible to learners who just pass include easy questions, together with additional factual questions of medium difficulty, since this is a lower-order cognitive skill and could therefore enable the weaker passing learner to achieve additional marks beyond the easy questions.

The total percentage of marks assigned to easy questions together with the percentage assigned to medium factual questions was ascertained from the examination analysis tables, and the results are shown in the following table:

Table 13: Total percentage of marks for lower order questions in 2008–2011 papers

Paper description	Easy questions	Medium factual questions	Total achievable percentage by average learner*
2008 DoE Paper	16%	7%	23%
2009 DoE Paper	24%	5%	29%
2010 Paper	24%	4%	27%
2011 Paper	20%	6%	25%

(*Note: Slight discrepancies in the total are due to decimal places which are not shown for readability)

In the 2011 DBE exams the percentage of marks achievable by average learners is 25%, as compared with 27% in 2010, 29% in 2009 and 23% in 2008. Since the passing percentage is 30%, this value of 25% is too low to allow for this sector of learners to pass. Even though these learners may pick up marks elsewhere in the paper, they are not guaranteed to get 100% for these easy questions, so this is not a deterministic value, but should be used merely as an indicator that in the 2011 paper there is slightly less room for achievement by low-achieving learners than in the 2010 and

2009 DBE exams. However, the clarity of the exam paper should positively influence the performance of all candidates at all levels, particularly second language learners.

4.6 Cognitive demand and level of difficulty

Comparison of the 2010 and 2011 Physics and Chemistry examination papers

The Physical Sciences examination consists of two papers, Paper 1 (Physics) and Paper 2 (Chemistry). The standard of these two papers was compared over the past two years, and the results are shown in Table 14 below:

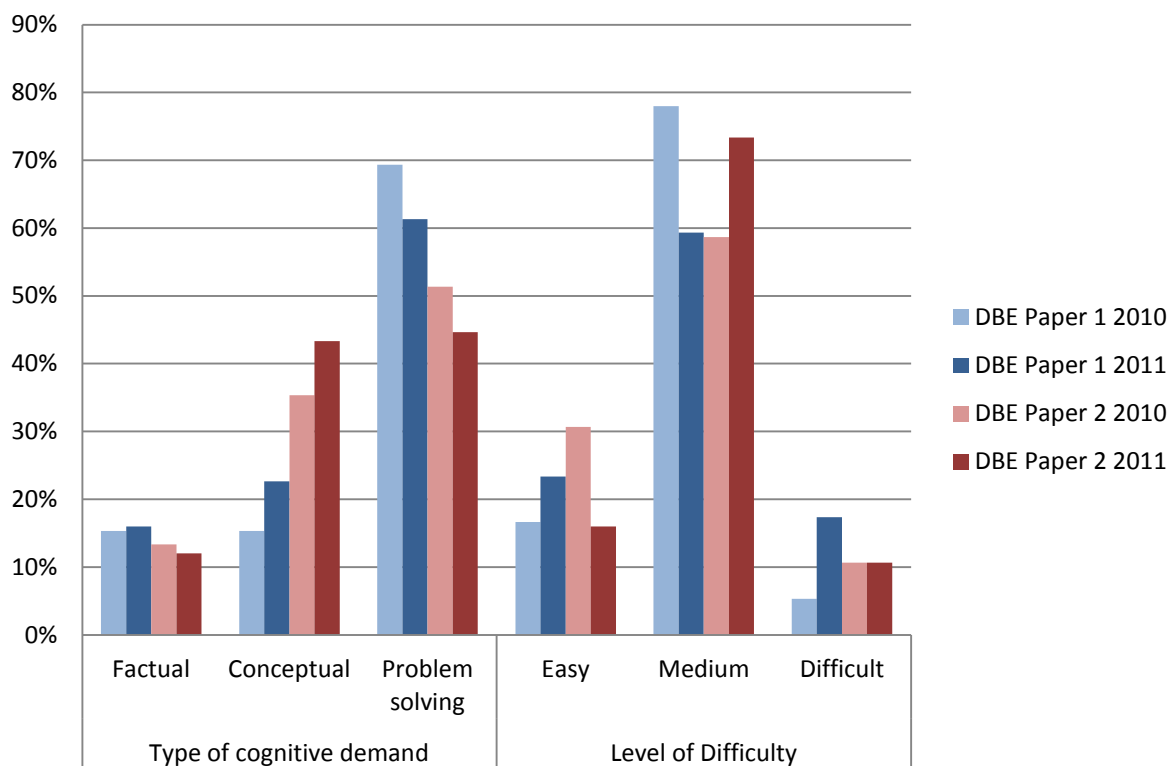
Table 14: Papers 1 and 2 cognitive and difficulty levels 2010–2011

Paper	Type of cognitive demand			Level of difficulty		
	Factual	Conceptual	Problem solving	Easy	Medium	Difficult
Paper 1 2010	15%	15%	69%	17%	78%	5%
Paper 1 2011	16%	23%	61%	23%	59%	17%
Paper 2 2010	13%	35%	51%	31%	59%	11%
Paper 2 2011	12%	43%	45%	16%	73%	11%

These results are shown in Graph 20 below:

In 2010 Paper 1 had less than half the percentage of difficult questions compared to Paper 2. On the other hand, the 2010 Paper 2 had a higher percentage of easy questions than Paper 1, and fewer medium questions than Paper 1. In 2011 the trend is reversed.

This trend has been the case over the four years of the NSC examinations. In the 2010 Umalusi examination report it was noted that in previous years (2008 and 2009) the standards of Papers 1 and 2 differed vastly from one another. In future, attention could be paid to finding a more even standard across the two papers.



Graph 20: Papers 1 and 2 cognitive and difficulty levels 2010–2011

4.7 Model for future use

The evaluation team found both Paper 1 and Paper 2 to be very fair, accessible and clear. The language was clear and questions contained no superfluous information. There was no forced attempt to contextualise the questions, which tends to obscure their meaning and adds to the level of difficulty of the questions. The memo is very well structured, and allows for a number of alternative solutions. These exams may therefore be considered to be a suitable model for future examination setting.

The questions were stated in a clear manner and both papers were mostly error free. One error was found, which had previously been reported to the DBE by Umalusi, but nothing was done to correct it. The error unfortunately made the question unanswerable and therefore unfair on the learners (Paper 1 Q1.2)

4.8 Comparability 2008–2011

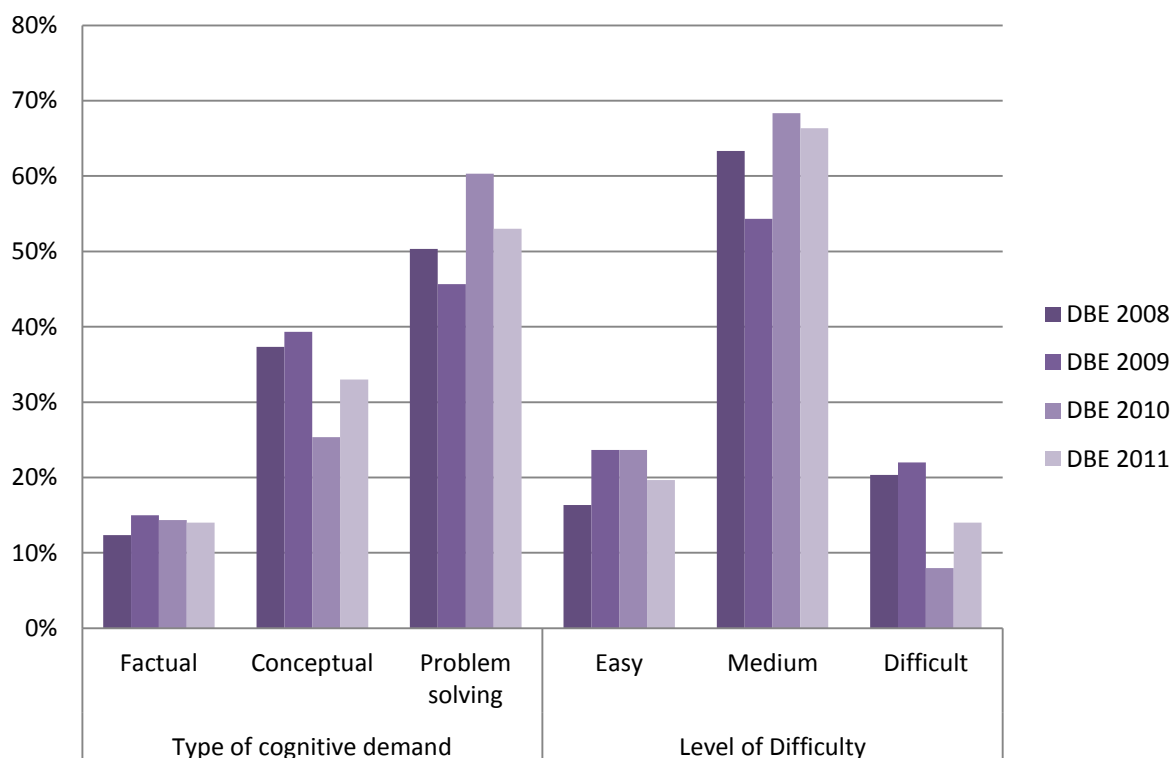
The number of marks associated with the various types of cognitive demand and levels of difficulty were combined for each exam paper analysed in the 2011 DBE

exams, and were compared with those for the 2008, 2009 and 2010 examinations. The results of this analysis are presented in table 15 below:

Table 15: Cognitive demand and level of difficulty 2008–2011

	Type of cognitive demand			Level of difficulty		
	Factual	Conceptual	Problem solving	Easy	Medium	Difficult
2008	12%	37%	50%	16%	63%	20%
2009	15%	39%	46%	24%	54%	22%
2010	14%	25%	60%	24%	68%	8%
2011	14%	33%	53%	20%	66%	14%

These results are shown below in graph 21:



Graph 21: Cognitive demand and level of difficulty 2008–2011

From this graph one can conclude that the overall standard of the 2011 Physical Sciences examination was higher than the 2010 paper. This can be seen in the lower percentage of easy questions. The percentage of difficult questions (14%) is higher than in 2010 (8%). The overall standard of the 2011 paper was lower than the 2008

and 2009 papers. This can be seen in the lower percentage of difficult questions. The percentage of easy questions is slightly higher than in 2008 but lower than in 2009. The bulk of the percentage of questions lies in the medium category (66%). It can therefore be inferred that the exam papers of 2011 are more appropriately placed in terms of their standard than any of the previous papers, since the 2010 exams were considered to be somewhat low in standard, and the 2008 and 2009 papers were similar to the previous Higher Grade level of difficulty, which was inappropriately high for a single examination which should cater for the whole range of South African matriculants.

There has been a slight decrease in the percentage of problem-solving questions (53%) from 2010 (60%), and an increase in conceptual questions (from 25% in 2010 to 33% in 2011). This is a positive shift since in 2010 there was an overemphasis on problem solving at the expense of assessing conceptual understanding.

Closing remarks

The team looked at each paper for the overall impression, style and accessibility. The general first impression of all of the papers was good. The layout is neat and clear. Generally speaking, the amount of text used was kept to the necessary minimum.

The DBE papers used contexts appropriately without unnecessarily obscuring the question with the context.

Overall standard of exam papers

It was found that generally the exams lacked questions which probe deep conceptual understanding. Using the Umalusi Physical Sciences tool, these are categorised as conceptually difficult questions. The following table shows the percentages of questions that fall into the conceptually difficult category in each paper.

Table 16: Percentages of questions falling into conceptually difficult category

Exam Paper	Percentage of conceptually difficult
Paper 1	5%
Paper 2	4%

4.9 References

Umalusi (2008). Learning from Africa: A report of Umalusi's research comparing syllabuses and examinations in South Africa with those in Ghana, Kenya and Zambia. Umalusi Council of Quality Assurance in General and Further Education and Training: Pretoria, South Africa

Umalusi. (2009). *From NATED 500 to the new National Curriculum: maintaining standards in 2008*. H. Bolton, M. Mathey, P. Beets; E. Dempster, L. Bowie, A. Brombacher and S. Grussendorff. Umalusi Council of Quality Assurance in General and Further Education and Training: Pretoria, South Africa

LIFE SCIENCES

5.1 Evaluators

Dr Edith Dempster (Team leader), Ms Susan Wiese and Ms Lizette Cilliers

5.2 Summary

Curriculum change

A *New Content Framework for Life Sciences* was examined for the first time in 2011 by all examining bodies. A curriculum comparison showed that 'Environmental issues' in the original NCS has been replaced by population and community ecology in the New Content Framework and several topics have been added to the curriculum. The overall effect is that cognitive demand has increased in the examined curriculum for 2011.

Knowledge areas have been moved between examination papers, with Heredity and Evolution now being examined in Paper 1, and Life Processes and Ecology in Paper 2. This is an improvement on the previous arrangement. Prescribed weighting on levels of cognitive challenge and LOs has also changed.

Analysis of examination papers

Examination papers for 2011 were analysed using a four-level measure of cognitive demand, and three levels of difficulty.

Cognitive demand

Remember factual or conceptual knowledge

Understand facts or concepts

Apply procedures, facts or concepts to unfamiliar contexts

Analyse or evaluate supplied or recalled information, or create a new product

Levels of difficulty

Easy: a question that is easy to understand, based on content that learners find easy to learn, and requiring an output that is easy to construct.

Moderate: questions that are somewhat more difficult to understand, based on content that learners find more difficult to learn, and requiring an output that is more difficult to construct.

Difficult questions are difficult to understand, and/or based on content or skills that are cognitively challenging, and require an output that learners find difficult to construct.

Examination papers analysed were DBE Version 1 Papers 1 and 2 and DBE Version 2 Papers 1 & 2.

The DBE examination papers followed the allocated percentage of marks per knowledge area as specified in the assessment guidelines (DBE Examination Guidelines 2009 and 2011).

Versions 1 and 2

The Version 1 examination was overweighted in terms of lower order cognitive skills (remember and understand) and underweighted in respect of higher order skills relative to the Examination Guidelines 2011. Paper 2 was considerably less difficult than Paper 1, where, in total, 20% of the marks were allocated to 'difficult' questions.

The Version 2 examination was overweighted in terms of remember, underweighted in terms of understanding and application, and correct in terms of higher order cognitive skills relative to the Examination Guidelines 2009. The papers were rather easy, with insufficient challenge to differentiate learners adequately at the upper end of the scale.

The Version 1 examination is not directly comparable with previous years' examinations owing to the curriculum change. The proportion of higher order questions in Version 2 is substantially lower in 2011 than in 2008 and 2010, and the proportion of middle-order questions has increased. The proportion of 'remember' questions has remained stable, however.

The Version 2 paper was substantially easier than in any of the previous years. Version 1 contained more 'difficult' questions than Version 2, and more than 2009 and 2010.

Concluding comments

Specific recommendations and critiques of types of question are provided in this report.

5.3 Introduction

The subject Life Sciences emerged from the merger of the old Biology and Physiology subjects of the NATED 550 curriculum. It is structured around three LOs:

LO1 The learner is able to competently explore and investigate phenomena relevant to Life Sciences by using inquiry, problem-solving, critical-thinking and other skills.

LO2 The learner is able to access, interpret, construct and use Life Sciences concepts to explain phenomena relevant to Life Sciences.

LO3 The learner is able to demonstrate an understanding of the nature of science, the influence of ethics and biases in the Life Sciences, and the interrelationship of science, technology, indigenous knowledge, the environment and society.

The LOs are further subdivided into ASs, which indicate progression across the three years of Further Education and Training (FET). The assessment standards are not used in the design of assessment tasks.

The LOs have been adapted in practice. LO1 is interpreted as any question that can be answered using skills only. This includes extracting information in given text, interpreting tables of data and graphs, and drawing graphs. LO2 is interpreted as any question that requires acquired knowledge or concepts for the construction of an answer. LO3 is interpreted as questions that relate to learners' everyday life.

The subject matter is organised into four knowledge areas:

Tissues, cells and molecular studies

Structure, control and life processes in plants and animals

Environmental studies
Biodiversity, change and continuity

(National Curriculum Statement Life Sciences 2003)

New Content Framework 2011

A new curriculum for Life Sciences was introduced in Grade 10 in 2009 and is examined in the NSC for the first time in 2011. This is referred to as Version 1 in the examination papers and throughout this report. However, part-time candidates and those repeating the subject had the option of writing examinations on the previous curriculum. This paper is referred to as Version 2 in the examination papers and throughout this report.

Changes in the structure of examination papers

In 2011, the allocation of subject matter to each paper changed from the previous allocation.

Comments

The DBE Examination Guidelines of 2009 and 2011 expand on the content that is to be examined in Grade 12. The examined curriculum is described in more detail than the official curriculum document. Consequently, the DBE has departed somewhat from the official curriculum document, the New Content Framework of 2007.

The DBE 2011 examined curriculum was broader than that examined in 2008 to 2010, and it was also more demanding. Exchanging the local environmental studies section for population and community ecology has increased the conceptual demand of this section and coordination in plants and animals has increased the cognitive demand of the 2011 curriculum.

Changes in the structure of examination papers

In 2011, the allocation of subject matter to each paper changed from the previous allocation. The changes are as follows:

Table 17: Allocation of subject matter 2008–2011

	2008–2010	2011
Paper 1	DNA, protein synthesis & genetics (60%) Reproduction in humans and plants (40%)	DNA, protein synthesis & genetics (60%) Evolution (40%)
Paper 2	Local environmental issues (50%) Evolution (50%)	Coordination & reproduction in plants and animals (60%) Ecology (40%)

Prescribed weighting per LO has changed between 2010 and 2011 as shown in table 18.

Table 18: Weighting per learning outcome 2009–2011

Learning Outcome	2008–2010	2011
LO1	40%	30%
LO2	40%	60%
LO3	20%	10%

The structure of the examination papers is as follows:

2008–2010

Theory papers x 2 (2,5 hour each)

Section A: short answers	50 marks
Section B: variety of question types	60 marks
Section C: Data analysis and essay	40 marks (essay worth 15 marks)
Total marks	300

2011

Theory papers x 2 (2,5 hour each)

Section A: short answers	50 marks
Section B: variety of question types	60 marks
Section C: Data-response questions	20 marks
Mini-essay	20 marks
Total marks	300

Analysis of DBE examination papers

The list of papers analysed in 2011 is as follows:

- Version 1 Paper 1
- Version 1 Paper 2
- Version 2 Paper 1
- Version 2 Paper 2

Documents used to guide the analysis were the following:

- Life Sciences Subject Assessment Guidelines 2008 (for Version 2)
- Life Sciences Examination Guidelines 2009 (for Version 2)
- Life Sciences Examination Guidelines 2011 (for Version 1)

5.4 Method of analysis

Cognitive demand

Pollitt, Ahmed and Crisp (2007) define 'demand' as the 'cognitive mental processes that a typical student is assumed to have to carry out in order to complete the task set by a question' (p. 169) and 'difficulty' as 'an empirical measure of how successful a group of students were on a question' (p. 169). Demand requires that examiners and evaluators of examinations identify what happens in the student's mind as s/he makes sense of a question and constructs a response to a question. Difficulty derives from the ability of the student and the requirements of an assessment task. It is estimated by the analysis of students' scores on an examination or test. Accurate analysis of difficulty can only be conducted after the examination process, since many unexpected factors intervene when students actually respond to questions (Pollitt et al. 2007; Coe 2008).

In the 2008 Maintaining Standards project, Umalusi required analysts to assign questions to one of three levels of cognitive demand, using a supplied analytical instrument. It also required analysts to make a subjective assessment of the level of difficulty on a three-level scale. This was conducted before examination results were available. The release of average marks for the three years prior to 2010 (Mabizela, 2011) enabled us to check our estimates of level of difficulty of examinations against

the actual performance of learners. The results are presented in the tables that follow.

Life Sciences has been analysed for four successive years, using a three-level instrument as requested by Umalusi. There are advantages to all subjects using the same instrument, such as enabling comparability across subjects, as has been attempted by the Curriculum and Qualifications Authority and its successor, Ofqual in the United Kingdom (see, for example, QCA 2008a, 2008b; Ofqual 2011). However, in South Africa, agreement has not yet been reached among subjects on a common taxonomy, and each subject has adapted the recommended Umalusi instrument to suit that subject.

The curriculum change in 2011 permitted Life Sciences to change to a 4-level taxonomy that is aligned with the DBE taxonomy.

The taxonomy used in the 2011 analysis is based on the cognitive dimension of the Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001) and shown in table 19. One addition was made to the Anderson and Krathwohl definition for the cognitive skill 'apply': apply conceptual or factual knowledge in an unfamiliar context. This is in line with Bloom's original definition of the conceptual skill 'application'.

Table 19: Taxonomy of cognitive demand used in the analysis

Type of cognitive demand	Description
Remember	Recall; remember; identify; recognise
Understand	Interpret, exemplify, classify, categorise, infer (draw conclusion), compare, explain why
Apply	Implement, execute a procedure; apply conceptual or factual knowledge in an unfamiliar context
Analyse, evaluate, create	Find coherence, integrate, differentiate, check, create hypothesis, make a product, deconstruct complex information

The DBE uses four cognitive levels which are the traditional Bloom's Taxonomy levels of knowledge, comprehension, application, and analysis, synthesis and evaluation grouped together in one cognitive level. Definitions of the cognitive levels as interpreted by the DBE are not given in the documentation.

Levels of difficulty

Levels of difficulty have remained unchanged since the 2008 study.

Table 20: Criteria used in assigning levels of difficulty

Level of difficulty	Description
Easy	Simple wording, easy subject matter, short answer, answer easily extracted from text, professional experience
Moderate	Between easy and difficult
Difficult	Complex wording, more difficult subject matter, extended answer, use own knowledge and understanding in addition to provided information; professional experience

It is not necessary for all three criteria to be present in order for a question to be rated in terms of level of difficulty. Our combined experience of teaching Life Sciences also enabled us to make a subjective judgement of the level of difficulty of each question.

The three analysts discussed the various levels to clarify the criteria for each. We also referred to the definitions for each type of cognitive demand given by Anderson and Krathwohl (2001). We then analysed each exam paper independently and entered our analysis on a spreadsheet. Where we differed markedly in our analysis, we discussed the question and arrived at a more similar decision. Totals for each cognitive level and level of difficulty were then calculated for each analyst, and averages calculated.

Each question was allocated to an LO and a knowledge area. Totals were calculated for each paper.

5.5 Compliance with Subject Assessment Guidelines

Do the 2011 exam paper(s) comply with the SAG?

Version 1

Both papers were close to the prescribed weighting per knowledge area.

The weighting per LO for the two papers together was closely aligned to that specified in the SAG.

Table 21: Version 1 – percentage of marks allocated to each knowledge area and learning outcome compared with SAG 2011

Knowledge area/LO	EG 2011	Paper 1	Paper 2	Total
DNA, protein synthesis, genetics	60	60		
Evolution	40	40		
Coordination & reproduction in plants & animals	60		60.7	
Ecology	40		39.3	
LO1	30			29
LO2	60			62
LO3	10			9

Version 2

Table 22: Version 2 – percentage of marks allocated to each knowledge area and learning outcome compared with SAG 2009

Knowledge area/LO	EG 2009	Paper 1	Paper 2	Total
DNA, protein synthesis, genetics	60	59.3		
Reproduction in plants & humans	40	40.7		
Local environmental issues	50		40.7	
Evolution	50		59.3	
LO1	40			42.3
LO2	40			37.7
LO3	20			20

Paper 1 was closely aligned with the 2009 SAG document, but not Paper 2. The weighting of LOs was closely aligned with that prescribed.

5.6 Cognitive demand and level of difficulty

Does the cognitive demand of and difficulty level of the paper(s) match the specifications of the SAG?

Table 23: Version 1 – percentage marks by cognitive demand compared with SAG 2011

Cognitive demand	Version 1			Exam Guidelines 2011	
	Paper 1	Paper 2	Total		
Remember	47.1	33.1	40.1	30	Basic knowledge
Understand	25.6	46.7.6	36.1	30	Comprehension
Apply	20.4	8.9	14.7	20	Application
Analyse, evaluate & create	6.9	11.3	9.1	20	Evaluation and synthesis

Table 23 shows that the two papers had different profiles of cognitive demand, with Paper 1 being more heavily weighted in Remember and Apply, and Paper 2 more heavily weighted in Understand and higher order cognitive skills. Accordingly, the papers were overweighted in terms of lower order cognitive skills (Remember and Understand) and underweighted in higher order skills.

Table 24: Version 1 – percentage marks by level of difficulty

Level of difficulty	Paper 1	Paper 2	Total
Easy	37.6	41.3	39.4
Moderate	36.2	45.8	41.0
Difficult	26.2	12.9	19.6

According to our analysis, Paper 2 was considerably less difficult than Paper 1. In total, 20% of the marks were allocated to 'difficult' questions. These are the questions that should differentiate the A candidates from lower achieving candidates.

Table 25: Version 2 percentage marks by cognitive demand compared with SAG 2009

Cognitive demand	Version 2			Exam Guidelines 2009	
	Paper 1	Paper 2	Total		
Remember	33.3	30.7	32.0	20	Basic knowledge
Understand	31.1	37.3	34.2	40	Comprehension
Apply	26.2	19.6	22.9	30	Application
Analyse, evaluate & create	9.3	12.4	10.9	10	Evaluation and synthesis

Table 25 shows that the two papers had similar profiles of cognitive demand. Relative to the SAG, the papers were overweighted in remember, underweighted in understanding and application, and correct in terms of higher order cognitive skills.

Table 26: Version 2 percentage marks by level of difficulty

Level of difficulty	Paper 1	Paper 2	Total
Easy	44.7	36.0	40.3
Moderate	46.7	55.8	51.2
Difficult	8.7	8.2	8.4

The 2011 Version 2 papers were rather easy, and we felt there was insufficient challenge to differentiate learners adequately at the upper end of the scale. The pass rate may increase in this version.

5.7 Model for future use

Are the 2011 DBE final papers a good model for future examinations, or should the format be critically re-examined immediately?

The 2011 DBE examinations illustrate the ripple effect of curriculum change. Large numbers of part-time candidates and repeaters had not studied the new curriculum, and wrote an examination paper based on the SAG of 2009. In addition, there are still candidates writing examination papers based on the NATED curriculum, which was phased out in 2007. The current New Content Framework, examined for the first time in 2011, will be replaced by an examination based on the CAPS curriculum in 2014. Unless the DBE sets a limit on the length of time it offers exams based on each curriculum, we face the possibility of four different exam papers in 2014 (NATED, NCS, New Content Framework and CAPS).

With regard to the 2011 examinations, the following points should be noted:

- The examined curriculum of 2011 is more extensive and closer to the discipline of Biology than the curriculum of 2009.
- The weighting on the three LOs has changed, and is evident in the profile of cognitive demand. Higher weighting on LO1 in the pre-2011 curriculum is expressed in the Version 2 examination as more questions requiring learners to apply knowledge or procedures. In the Version 1 examination, LO1 received

a lower weighting, and the cognitive demand has moved to 'remember' and 'understand'. This should not necessarily be interpreted as cognitively less demanding, since remembering complex information is a demanding task (Ofqual 2011).

- The Version 1 examination had more than twice as many marks for difficult questions as the Version 2 examination. The Version 2 examination, based on the discontinued curriculum, was substantially easier than the Version 1 examination.

The 2011 examination papers are assessments of learning, rather than assessments that *contribute to* learning. We are disappointed to see fictitious case studies and experiments still appearing in the examination papers, despite years of commenting on this feature of DBE examination papers.

5.8 Standard and quality of papers

Language level is fair to complex in some questions. Overall, the readability is at an appropriate level for the majority of candidates. We reiterate that Instruction 10 should be changed to reflect that it is compulsory to use a calculator, compass and protractor.

The Version 1 paper was somewhat different to the previous three years, and was more reminiscent of NATED examination papers.

- No bias was detected in the questions, either gender bias or rural/urban or disability.
- Q3 of Version 1, Paper 1, is based on a misconception that modern chimpanzees preceded *Homo erectus* and *Homo sapiens*, and therefore that it is possible for humans to have evolved from chimpanzees.
- Q1.1.7 of Version 1, Paper 2, shows a graph of the relationship between populations of jackals and rabbits over time. No source is given for this highly unlikely dataset, since jackals are opportunistic feeders which would not be affected by fluctuations in one prey item, as shown in the graph. A long-term study of the populations of jackals and rabbits has certainly not been undertaken in any part of Africa.

This is an example of the use of nonsense information which serves to misinform rather than promote learning.

- Version 1, Paper 2, Q4.2 – in this question it was difficult to understand how the fictitious experiment had been carried out. Since learners have not conducted anything similar to this experiment, it is difficult to think how learners would make sense of this question.

The format of the Version 2 has been similar for several years, and is now familiar to both teachers and learners.

The same comments about sources apply to Version 2 examination papers.

- Graphs are not acknowledged.
- Paper 1 Q3.3 shows a pedigree diagram in which a brother and sister have a baby!
- Paper 1 Q4 is a good example of the use of real information to set the context for a question. By contrast, Paper 2, Q3.3 is based on a fabricated experiment with fabricated data.

We have commented annually on the inappropriate and inaccurate use of fictitious data and experiments, and would like to see an improvement next year.

5.9 Comparability 2008–2011

For the sake of longitudinal comparison, the four-level instrument was reduced to a three-level taxonomy by combining the categories 'understand' and 'apply', as was done in 2008 to 2010. The Version 2 examination is based on the same SAG as those used in 2009 and 2010, and is directly comparable with those two papers. The Version 1 examination is not directly comparable since it is based on a different curriculum.

The proportion of higher order questions in Version 2 is substantially lower in 2011 than in 2008 and 2010, and the proportion of middle-order questions has increased. The proportion of 'remember' questions has remained stable.

The judgement of easy, moderate and difficult is a pre-judgement, and is believed by some authors to be possible only by post-exam analysis of question-by-question

scores (refs). Table 13 shows the average scores obtained by candidates in previous examinations, and they are consistent with our judgements of the proportion of difficult questions. Given the accuracy of our predictions previously, we feel confident in predicting that the 2011 examination was considerably less difficult than the 2010 examination.

Table 27: Percentage marks by cognitive demand and level of difficulty 2008–2011

	NCS curriculum				New content
	2008	2009	2010	2011 V2	2011 V1
Cognitive demand					
Remember	36.0	32.7	35.6	32.0	40.1
Understand and apply	38.1	54.3	41.6	57.1	50.8
Analyse, evaluate & create	25.9	13.1	22.9	10.9	9.1
Level of difficulty					
Easy	32.9	23.8	35.3	40.3	39.4
Moderate	43.2	53.8	50.2	51.2	41.0
Difficult	23.9	22.3	14.4	8.4	19.6
Average score and standardisation decision*	35.15	34.84	41.6 adj to 38.0		

*Average marks obtained from Umalusi report, Feb 2011.

Care should be taken when comparing the 2011 profile with that of previous years, as this is based on a new curriculum, with more subject matter, and greater cognitive demand. The proportion of marks allocated to 'remember' is substantially higher than the previous three years, 'understand and apply' has fluctuated each year, and higher-order cognitive demand is lower in this new curriculum paper than before. While this is disappointing, remembering and recalling complex and abstract information is regarded as a high-order skill by some examining authorities (Pollitt, Ahmed & Crisp, 2007; Ofqual 2011), while applying information supplied on the question paper is a lower order cognitive skill.

The profile of level of difficulty of the 2011 Version 1 paper indicates that there were fewer moderate questions on the paper, and more difficult questions than has been the case in the previous three years. Our prediction is therefore that the average

mark will be somewhat lower than was the case in 2010, and certainly lower than the average mark for the Version 2 paper.

5.10 Closing remarks

The sources of case studies, diagrams and data sets are mostly absent in the DBE examination papers and some DBE questions provide false and misleading information that detracts from learning.

Notwithstanding our success in interpreting the level of difficulty of DBE examinations in the past, we draw the attention of the standardisation committee to the work of Pollitt et al (2007) and Coe (2008), both of whom indicate that difficulty can only be measured accurately when examination results are scrutinised, since many factors intervene when candidates engage with an examination paper.

5.11 References

Anderson, L.W. & Krathwohl, D.R. (Eds). 2001. A taxonomy for learning, teaching and assessing: revision of Bloom's Taxonomy of educational objectives. New York: Longman.

Coe, R. 2008. Comparability of GCSE examinations in different subjects: an application of the Rasch model. *Oxford Review of Education*, 34: 609–636.

Harlen, W. 2007. *Assessment of learning*. London: SAGE Publications Ltd.

Mabizela, S. 2011. *How Umalusi adjusted the 2010 matric results: Text of briefing* February 23 2011. Downloaded 17 July 2011 from www.politicsweb.co.za/politicsweb/view/politicsweb/en/page71656

Ofqual 2011. International comparisons in senior secondary assessment: Progress report. London: Ofqual.

Pollitt, A., Ahmed, A. & Crisp, V. 2007. The demands of examination syllabuses and question papers. In: P Newton, J-A Baird, H Goldstein, H Patrick and P Tymms (Eds), *Techniques for monitoring the comparability of examination standards*. London: Qualifications and Curriculum Authority.

Qualifications and Curriculum Authority. 2008a. *Inter-subject comparability studies. Study 1b: GCSE, AS and A level sciences*. London: Qualifications and Curriculum Authority.

Qualifications and Curriculum Authority. 2008b. *Inter-subject comparability studies. Study 2a: A level biology, psychology and sociology*. London: Qualifications and Curriculum Authority.

HISTORY

6.1 Evaluators

Dr Carol Bertram (team leader), Mr Brian Mathews and Mr Simon Haw

6.2 Summary of the conclusions

The cognitive demand of DBE Paper 1 and Paper 2 in 2011 was very similar. In 2010 Paper 1 was more difficult and more cognitively demanding than Paper 2.

In terms of source-based questions, both 2011 papers focused mostly on level 2 questions (59%), with 27% on level 1 and 14% on level 3 questions. The proportion of level 1 questions is a concern as it is higher than the 10% required by the SAG.

There were far more level 1 source-based questions in the 2011 papers than in the 2010 papers. However, the percentage of level 3 questions was almost the same. In terms of extended writing demands, the 2011 papers had a fair spread, with candidates given a choice between narrative and argumentative essays. Thus, students should have found the source-based questions in the 2011 papers to be less cognitively demanding than the 2010 papers.

In terms of difficulty of questions, Paper 1 2011 had more marks allocated to easier questions than Paper 2 2011.

6.3 Introduction

A team of three members analysed the examination papers. Where there were differences of opinion, we discussed the question until we reached consensus.

In 2009, the team of History evaluators compared the curriculum documents, and analysed the NATED exam papers 2005 to 2007 and the DoE papers for 2008 and 2009, and the 2009 IEB papers. The NATED papers were differently structured to the NSC DOE papers. The team developed an analysis instrument that worked for the NATED, the DoE and the IEB papers.

The DBE History examination comprises two papers with four questions per paper, of which candidates select two. Each question comprises a set of sources, and is structured in the same way, with 45 marks allocated to the source-based question

and 30 marks to an extended writing question. These are expected to be 2 pages long.

6.4 Method of analysis

The set of cognitive demand descriptors given by the Umalusi instrument in 2009 was found to be difficult to adapt to all types of question found in the History exam papers. Accordingly, to provide a guide for decisions made about the type of cognitive demand, the History team developed a tool that was loosely based on the levels provided in the marking memos of the NATED (the old Senior Certificate curriculum) examination papers. This was deemed to be more appropriate than the NSC levels, which are linked to assessment standards. This tool was developed in order to ensure that the analysis covered all possible categories of question.

The History exam papers include both essay questions (extended writing) and source-based questions. Since essay and source-based questions differ in nature, the team felt that it was necessary to have a different set of categories for each.

The criteria for the levels of difficulty were the same for both the essay questions and the source-based questions. Levels of difficulty were assessed using the following criteria: the level of language in the question, the number of marks allocated compared to the number of points listed in the exam memoranda; whether learners typically find the content topic complex and difficult, and the density and complexity of textual sources.

6.5 Results of examination paper analysis

Source-based questions

The NATED memoranda discussion guidelines (2003) provide four types of question that may be asked about sources. The NCS Grade 12 Examination Guidelines 2009 give three levels of questions. These are taken from the ASs, and in fact do not seem to support a progression of cognitive development. For example, the cognitive requirements 'analyse and evaluate' are placed on Level 2, while 'examine, explain and compare and contrast' are placed on Level 3.

The Umalusi team therefore developed the following set of three levels based predominantly on the NATED levels:

Table 28: Level of cognitive demand for extended writing and essays

Category	Description	Examples
Level 1/N (Narrative essay)	The development of a coherent narrative or descriptive essay which requires description and historical explanation. (Possible task words: <i>explain, describe</i>)	Use all the sources and your own knowledge to explain the role that Kennedy played in the Cuban Missile Crisis. (DBE 2011, Q1.6)
Level 2/G Discursive (with a given line of argument)	Discursive essay with a given line of argument. Requires some basic level of analysis. (Possible task words: <i>Explain why, discuss</i>)	Write an article for your local newspaper showing how peaceful resistance brought about changes to the policy of segregation in the USA. (DBE P1 3.7.2)
Level 3/A (Argumentative essay)	The development of a coherent, relevant, independent line of argument together with analysis and historical explanation. (Possible task words: <i>Critically evaluate, argue for a particular viewpoint</i>)	Explain whether the TRC succeeded in healing SA from its divided past. (DBE P2 4.6.1)

Table 29: Levels of cognitive demand for source-based questions

Category	Description	Examples
Level 1/B (Basic comprehension of sources)	Extract relevant textual or statistical information from source/s to answer a question. Possibly does not require historical knowledge to answer. OR Definition of historical concepts	What was Nyerere's vision for Tanzania? (DBE 2011 P1 Q2.1.2) (<i>Answer clearly stated in the source document</i>)
Level 2/I (Interpretation and understanding of sources)	Use the source/s for the purposes of historical explanation Locate the sources in the wider context of the topic by bringing together the source/s with historical knowledge Relate the sources to key historical concepts Recognise the perspective of the producer of the source/comparison of the content of two sources. OR Show understanding of a historical context or concept.	Using the source and your own knowledge, explain why Vietnam became a focal point of the Cold War in the East. (DBE 2010 P1 Q 1.1.6) In what way did Gorbachev's decision to abandon the Brezhnev Doctrine lead to a 'more human face of socialism'? (IEB Paper 1, Section B, Q9)
Level 3/Y (Analysis and evaluation of sources)	Demonstrate an understanding of the multilayered nature of sources as historical by analysing and/or evaluating one or more sources in terms of: usefulness, reliability, bias, appropriateness for the historical task.	Explain which one of the three sources you would consider to be most useful to a historian researching the USA's involvement in the Vietnam war. (DBE 2010 P1 Q 1.4) Explain why this photograph is so famously symbolic of the Cold War (of an East German border guard jumping over to the West). (IEB 2010 Paper 1, Q 1.4)

6.6 Compliance with Subject Assessment Guidelines

In terms of content and structure, the two papers comply with the History Grade 12 SAG 2009. Whether this is also true in terms of *cognitive demand*, is not straightforward to answer, because the team used different criteria to the SAG to describe the three levels of source-based questions. We did this because we did not find the SAG levels convincing in terms of cognitive hierarchy.

The SAG for the 2009 History exam give the requirements for the levels of source-based questions as follows:

Table 30: Requirements for the levels of source-based questions

Level 1	10%	Extract information from sources/ explain historical concepts
Level 2	40%	Analyse information from a number of sources/ evaluate sources to assess appropriateness
Level 3	50%	Interpret and evaluate information from sources/ Analyse historical concepts as social constructs/ Explain changing power dynamics/ Compare and contrast interpretations/ Evaluate sources' usefulness

The team did not feel that these are useful levels, as they do not increase in cognitive demand. For example, analyse information and data and evaluate the sources are placed in Level 2, while these are generally understood as higher level cognitive demands.

According to our analysis of the 2011 papers, the percentage of marks at level 1 is 26% for Paper 1 and 28% for Paper 2 (an average of 27% for both papers), which is much higher than the guideline of 10% for level 1 questions.

Assessing the learning outcomes and assessment standards

The source-based questions mostly assess LO1, AS3 'interpret and evaluate information and data from sources'. Two-thirds (59%) of the source-based questions required some interpretation of sources. There were no questions on reliability of sources, and very few questions engaged with the nature of the source as a historical source. However, there are questions which ask for an evaluation of the usefulness of the source (LO1, AS4).

LO2 is minimally assessed. Very few questions asked learners to compare interpretations of the same event, and there are no questions requiring the

dynamics of changing power relations and historical concepts as social constructs. This was the same in 2008, 2009 and 2010.

The extended writing tasks assess LO3, that is, synthesising information, sustaining a coherent argument and communicating knowledge and understanding. Given the choice in extended writing, candidates do not necessarily have to construct, sustain and defend a coherent argument (LO3, AS2 and 3). LO3 AS1 (interpretation of statistics) is not tested at all in either of the 2011 papers.

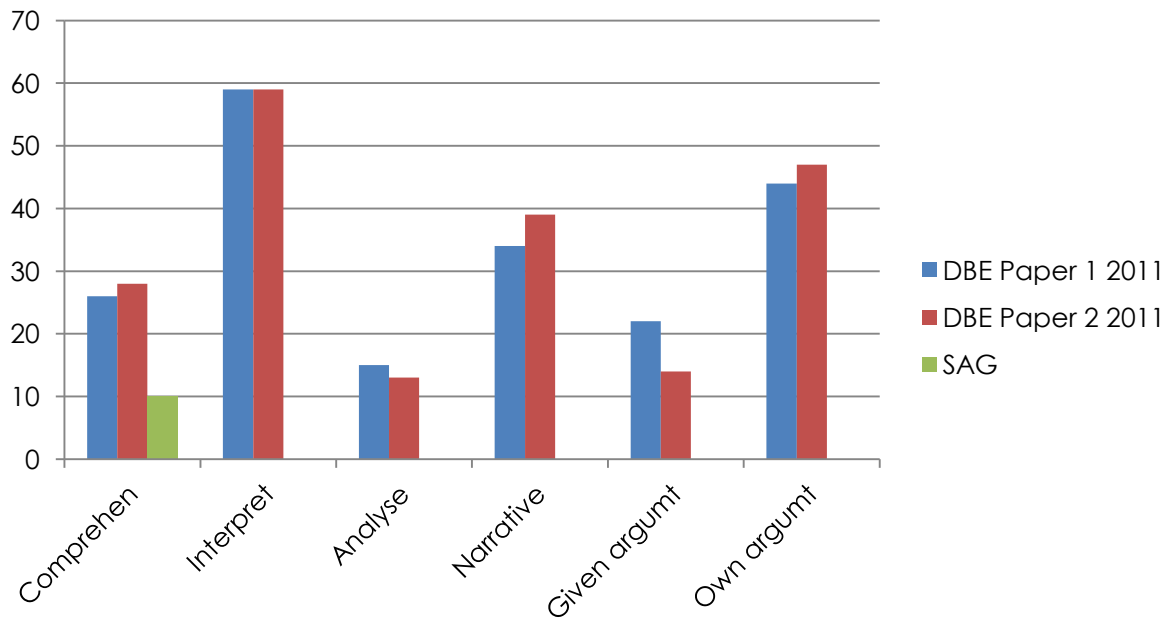
6.7 Cognitive demand and level of difficulty

Table 31: Levels of difficulty for all questions

Easy	The topic is understood to be familiar; the language used is straightforward; there is no ambiguity about what the question means. For source-based questions, the source is clear and uses fairly straightforward language. There is one source to work with. For essay questions, the topic was familiar, a strong likelihood that this topic had been seen before in class. For extended writing based on sources, the sources were familiar or fairly straightforward in terms of language.
Moderate	The topic is understood to be somewhat familiar; the language used is fairly clear; perhaps some ambiguity in terms of what the question means. For source-based questions, the source/s may use fairly complex language. Working with more than one source. For essay questions, the topic was somewhat familiar, a possibility that this topic had been seen before in class. If source-based extended writing, then the sources were moderately complex.
Difficult	The topic is understood to be unfamiliar and complex; the language used is difficult; there is ambiguity about what the question means. For source-based questions, the source/s may use complex language, and be difficult to understand. Working with a number of sources. For essay questions, the topic was not familiar, very little possibility that this topic had been seen before in class. If source-based extended writing, then the sources were complex and lengthy.

The application of the 'levels of difficulty' categories given in table31 to particular examination questions relies on the personal opinion and experience of the evaluators. The questions can only be analysed at face value. Of course it is possible that an essay that appears to require an argument in fact has been learnt off by heart. On the other hand, it is not possible to know exactly how markers applied the memo. In order to provide an indication of the level and difficulty of a question, we also used the marking memo, looking particularly at the number of 'facts' given in the memo compared to the number of marks allocated to the question.

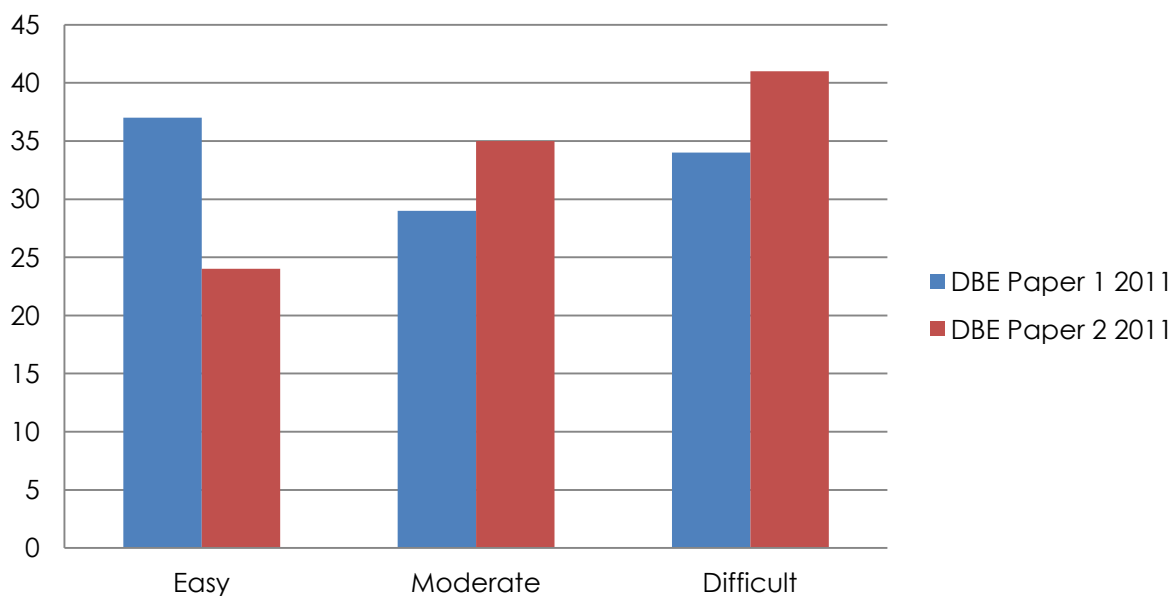
The SAG do not give any guidance on cognitive demand and difficulty level, apart from the levels described above, which are essentially a clustering of the ASs. Thus, here we report on the cognitive demand and level of difficulty resulting from the use of the team's analysis instrument.



Graph 22: Cognitive demand – comparison of Papers 1 and 2

Graph 22 shows that both papers are similar in terms of the allocation of level 1, 2 and 3 source-based questions. The percentage of marks allocated to level 1 (essentially questions that can be answered by reading the source text given) is much higher than the SAG require.

In terms of extended writing, both papers are similar in their cognitive demand. Both papers have more marks allocated to essays which require a development of one's own argument.



Graph 23: Levels of difficulty – comparison of Papers 1 and 2

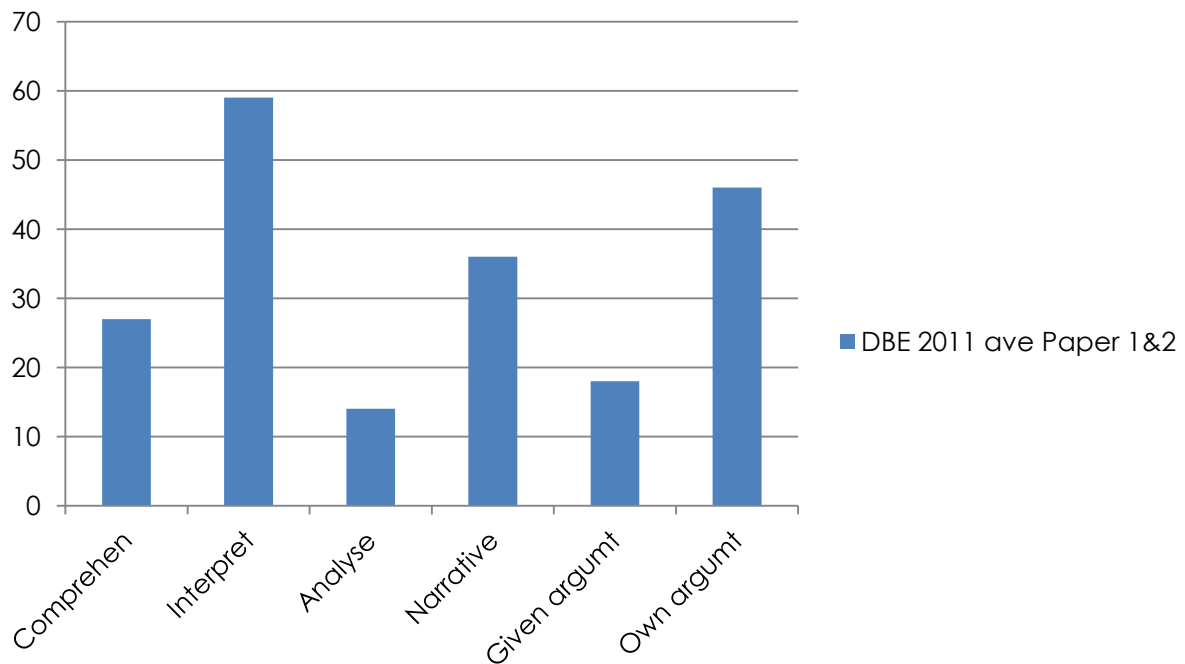
In terms of the levels of difficulty, Paper 2 appears to have more marks categorised as 'difficult' (41%) and far fewer marks categorised as 'easy' (29%). It is likely that candidates would have experienced Paper 1 as an easier paper than Paper 2. Generally, students find the topics assessed in this paper (Cold War, civil society protest in the US and SA) easier than those assessed in Paper 2.

Candidates' experience of the papers would depend on which two questions they chose to answer.

6.8 Weighting of cognitive demand

As shown in Graph 24, which give the average cognitive demand of Papers 1 and 2, slightly more than a quarter of the marks (27%) are allocated to level 1 questions, while nearly two-thirds of the source-based marks were allocated to level 2 (59%) questions, which expect learners to interpret information from the sources. The team noted that there were fewer questions which required learners to use their own historical knowledge than we saw in the 2010 papers. It was the team's opinion that historical knowledge was less necessary in order to do well in the 2011 papers, than it had been in the 2010 examination. This was seen as problematic by the team.

For the extended writing tasks, the cognitive levels were more equal, and probably at the correct level.



Graph 24: Cognitive demand – average for Papers 1 and 2

6.9 Model for future use

The team does not think the current exam structure is a good model for future use for the following reasons:

- The structure of the DBE paper is very predictable. There are four questions, of which learners choose two. Each question is similarly structured: there is a range of short 2 or 4 mark questions based on the sources, one 8-mark paragraph, and then a choice of two 'extended writing' tasks of 30 marks. The model provides little flexibility for the examiners.
- This structure can be problematic in that it does not allow for links across topics – each question deals with one topic only.
- It can also lead to a very narrow focus on just one topic – for example, the question on American civil rights in both 2010 and 2011 was on the March to the Lincoln Memorial (Q3 of P1). In 2011 this question was very similar to the

question in the 2010 paper. If learners work through previous exam papers, they will be well prepared.

- Examiners may not use more than four sources per question. This then means that examiners must ask a number of questions on one source. This narrow focus can lead to overlap in the source-based questions, particularly if the source has a narrow focus.
- There are some topics that do not lend themselves easily to source-based questions, for example Africa, which does not have a very wide range of primary sources. This leads to the use of secondary sources, which are often very dense. These topics would be better assessed through essays.
- The team believes that the *Levels of source based questions* in the DBE SAG (2009) are seriously flawed and are not cognitively hierarchical. Using a hierarchy of cognitive levels should lead to better coherence and cognitive coverage.
- The topic of the 8-mark paragraph overlaps quite substantially with the extended writing tasks. It is difficult to see the usefulness of this very short paragraph. The team's recommendation is that the marks allocated to this paragraph are reallocated, possibly three (3) marks to the source-based questions, and five (5) to the extended writing.
- There does not seem to be any reason to have two different essay rubrics for the markers. The senior marker commented that this becomes difficult for markers to use.

6.10 Standard and quality of papers

The team had previously identified an improvement from 2009 to 2010 in the quality of questioning. While there seemed to be more questions that required historical knowledge in 2010 compared to 2009, this trend did not continue in 2011. In 2011, 27% of the marks allocated to level 1 questions could have been answered with minimal historical knowledge, as the answers were easily extracted from the sources.

Positive trends noted in 2011 were that there were very few ambiguous questions and the language was generally easy to understand. Moreover, there were no glaring typographical errors. In addition, more use was made of visual sources than in 2010. The sources chosen were generally accessible to the average learner, and there were fewer very dense secondary sources. It was pleasing to note that the

extended writing required the genre of the history essay, and not newspaper articles, government reports and so on. The team had felt in the past that different genres added a level of complexity to writing that was a hurdle for the average learner.

Inappropriate questions

The examiners often ask questions about the 'accuracy of cartoons'. The team understands this as an inappropriate question for a history assessment, since the purpose of a cartoon is not to 'accurately' portray events, but to provide a comment on the events. A political cartoon is usually understood to be 'biased', as it represents the cartoonist's interpretation of an event. The use of the word 'accurate' also implies that there is only one proper interpretation of a historical event.

Thus a more appropriate question would be to ask: 'What is the cartoonist's intention or message?'

Another question often asked is 'which source is more useful', as the usefulness of sources is an assessment standard. All sources are useful, but in different ways and for different purposes. A more appropriate question may be: 'In what ways would the sources be of use to an historian?' or 'What are the limitations of a particular source for an historian?'

- In two instances, questions asked of the source required very similar responses. In Paper 1, Q1.1.2 and 1.1.5 (Cuban missile crisis) and in Paper 2 (Steve Biko and BC) Q4.2.1 and 4.2.3 – essentially require the same answer.
- Paper 2 Q1 on the USSR collapse in 1989. Q1.5.4 gives an extract from Alistair Sparks's book and then asks if De Klerk would have agreed with Sparks's portrait of him. This does not seem like an appropriate historical question, as there is no evidence to support a candidate's opinion. A better question would have probed Sparks's attitude to De Klerk.
- Paper 2 Q2 on the Truth and Reconciliation Commission. *P2 4.3.1 – Why was the TRC cartoon printed at this time?* There is no historical reason why this cartoon was printed on this particular day, thus also leading to an answer that is essentially guesswork.

Many DBE questions include the phrase 'do you think?' It appears that candidates are being asked for their own opinion, but in fact the answer can be found in the source. These kinds of questions are often categorised as level 2 questions by the marking memo, when they are in fact level 1 questions (according to the Umalusi analysis team).

- For example: Paper 1 Q4.2.3. *Why do you think Gertrude Fester supported the philosophy of BC? Give two reasons.* The memo categorises this as a level 2 question, that is, one which requires interpretation. However, the answer is clearly stated in the source (see below), thus we categorise it as a level 1 question.

Source 4B Interview with Gertrude Fester, member of United Women's Congress

Being inferior because you are black is something that takes a very long time to get rid of ... And participating in the Black Consciousness Movement helped a lot too. That was the beginning of my political involvement. Through it I came to understand that there's nothing wrong with me because I'm black. It's important to be proud of what you are. I remember the saying that we had that 'Black Consciousness is not a colour, it's a state of mind' ...

Historical knowledge

We were concerned that 25% of the marks allocated to source-based questions could be answered by reading the source, and extracting information from it, and did not require learners' own historical knowledge.

Misreading of cognitive levels

The examiners seem to have a different understanding of the cognitive level of questions to the Umalusi team. They seem to categorise any question that says 'Why, do you think' as a level 2, when often these are level 1 questions (basic comprehension of source).

Questions that call for comparison of two sources are categorised as level 3 by the DBE examiners. However, comparison is not a high-level cognitive skill on Bloom's

Taxonomy, thus we would categorise these types of question as level 2. See for example Paper 1 Q3.2.2.

Choice of sources

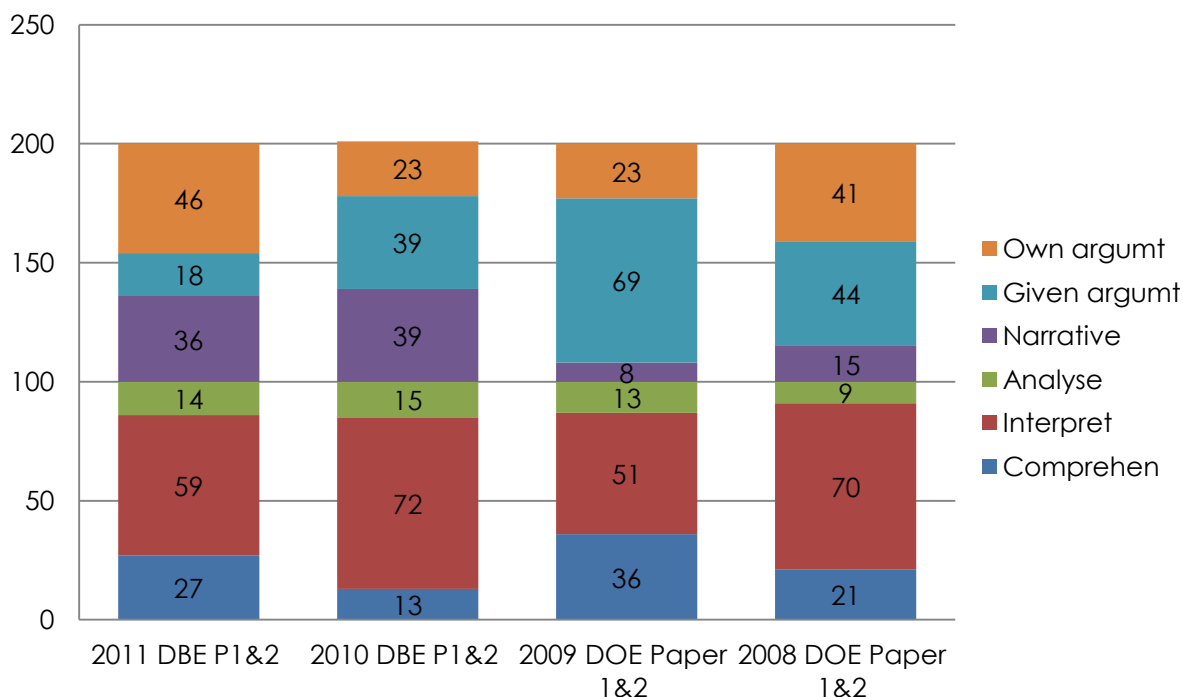
The team felt that there had been an improvement in the choice of sources year on year from 2008 to 2010. In 2011, we felt the source selection could have been improved for the sections on South Africa, where there are primary sources available (such as cartoons, photographs, speeches, interviews). In Paper 2 in the section on the *Collapse of the USSR in 1989 and SA*, three of the sources were secondary sources. The section on the TRC has a wealth of potential primary source material, but this was not used fully. The interview with the film maker did not appear to add to the richness of the topic.

It is difficult to obtain primary source material for Africa. The case study on Tanzania had two secondary sources and one primary source.

The contextualisation of sources was better (though still not completely detailed). In the case of contextualising the source, it would be useful to provide some data on the authors' context and perspective, as this can often lead to possible bias.

6.11 Comparability 2008–2011

In terms of source-based questions, 2011 allocates far more marks (27%) to level 1 (comprehension of sources) questions compared to 13% in 2010. These are marks where the answer could quite easily be extracted from the source. Thus, the 2011 papers would be easier to answer than 2010. Looking back over the past four years, there has been a fluctuation in the questions at level 1, although the percentage of marks allocated to level 3 questions has been fairly stable since 2009.



Graph 25: Cognitive demand 2008–2011

In terms of the demand for extended writing, the 2010 and 2011 papers allocate a similar percentage of marks to narrative essays (Level 1) as the 2008 and 2009 papers. This should give learners who would have been standard grade learners a better chance. The 2008 and 2009 papers allocated very few marks to level 1 essays, which the team had felt would disadvantage 'standard' grade learners.

In terms of source-based questions, the 2011 papers were easier than 2010, but in terms of extended writing questions, the 2011 papers were more demanding than 2010 (a greater percentage of marks was allocated to argumentative essays). However, candidates always have the choice of a narrative essay, so in conclusion, the 2011 papers should be experienced as easier than 2010.

As always, this depends very much on which questions candidates choose to answer in each paper.

GEOGRAPHY

7.1 Evaluators

Dr Sue Cohen (team leader), Ms Kedi Molapo, and Ms Jenny Simons

7.2 Introduction

The evaluators analysed the following DBE question papers: Paper 1, a theory paper, and Paper 2, mainly a mapwork paper.

7.3 Method of analysis

The Umalusi instrument used for the analysis required that each question be analysed in terms of

- cognitive demand
- level of difficulty
- curriculum content

In Geography, five types of cognitive demand in a hierarchy of demand and three levels of difficulty for each were considered. This allowed for a fairly nuanced analysis of the papers.

Table 32: The Umalusi 5-level instrument – types of cognitive demand and level of difficulty

Type of cognitive demand	Level of difficulty
Conceptual knowledge (CK) Recall and recite knowledge Define and describe Identify, label, select, locate information	Easy
	Moderate
	Difficult
Comprehension (C) Understanding of previously acquired information in a familiar context Regarding information gathering: change or match information Regarding use of knowledge: distinguish between aspects, compare and predict, defend and explain	Easy
	Moderate
	Difficult
Application (A) Interpret and apply knowledge Choose, collect and do basic classification of information Modify existing information by making use of comprehended knowledge	Easy
	Moderate
	Difficult
Analysis & Problem-solving (A&PS) Analysis of information in a new or unfamiliar context Examine and differentiate	Easy
	Moderate



Research and investigate information Distinguish to find the most appropriate solution	Difficult
Evaluation & Synthesis (E&S) Making judgements (evaluate), critique, and recommend by considering all material available Weigh possibilities and make recommendations Synthesise or create innovative solution Construct or formulate new ideas	Easy
	Moderate
	Difficult

However, the papers were initially analysed using the three-level instrument shown in table 33. In this three-level typology, the two highest cognitive levels on the five-level typology are collapsed into one, and comprehension and application are similarly collapsed to make one middle-level category. For the sake of consistency, therefore, the findings of the analysis of cognitive demand are reported using this three-level typology. Where relevant, more nuanced information from the five-level analysis (see table 32) is used to comment on the findings.

Table 33: The Umalusi 3-level typology

	Type of cognitive demand	Level of difficulty
Lower order	Basic conceptual knowledge Recall, Literal comprehension, Making simple evaluative judgements in terms of previously acquired facts, etc.	Easy
		Moderate
		Difficult
Middle order	Comprehension, application Understanding, application, analysis of previously acquired information in a familiar context Making evaluative judgements that require the use of a range of previously acquired facts/information, etc	Easy
		Moderate
		Difficult
Higher order	Problem solving Analysis, interpretation and application of information in a new or unfamiliar context Synthesis, creation of novel solution or product Evaluation or making judgement in relation to a mixture of old and new material or information	Easy
		Moderate
		Difficult

7.4 Compliance with Subject Assessment Guidelines

Structure of the examination

The DBE SAG prescribe that the examination as a whole and each paper should be structured as shown in tables 34 and 35 below. The 2011 Geography examination complied with these requirements.

Table 34: Structure of the examination

Paper	Total marks	No. of questions set	Number of questions to be answered
Paper 1	300	Four, in two sections	Three, one from each section and 1 other
Paper 2	100	Not specified	All

Table 35: Structure of Paper 1

Section	Number and focus of questions	Type of questions and mark allocations
A	Two questions, each on the content areas weighted as shown below: <ul style="list-style-type: none"> Climate and weather (50%) Fluvial processes (50%) 	In both questions, there should be: <ul style="list-style-type: none"> Short objective type of questions for 20 marks (both climate and weather and fluvial processes) Climate and weather for 40 marks Fluvial processes for 40 marks
B	Two questions, each on the content areas weighted as shown below: <ul style="list-style-type: none"> People and places: rural and urban settlement (50%) People and their needs (50%) 	In both questions, there should be: <ul style="list-style-type: none"> Short objective type of questions for 20 marks (both People and places & People and their needs) People and places: rural and urban settlement for 40 marks People and their needs for 40 marks

In addition, the weighting of marks for basic map work skills and the application of theory in Paper 2 is specified as shown in table 36 below. In 2011, 19 marks were allocated merely to geographical skills, indicating appropriate compliance.

Table 36: Compliance of Paper 2 with the relevant SAG

Focus of question	Specified marks/100	Actual marks/100 in 2011
Basic map work skills	20%	19%
Application of theory	80%	81%
TOTAL	100	100

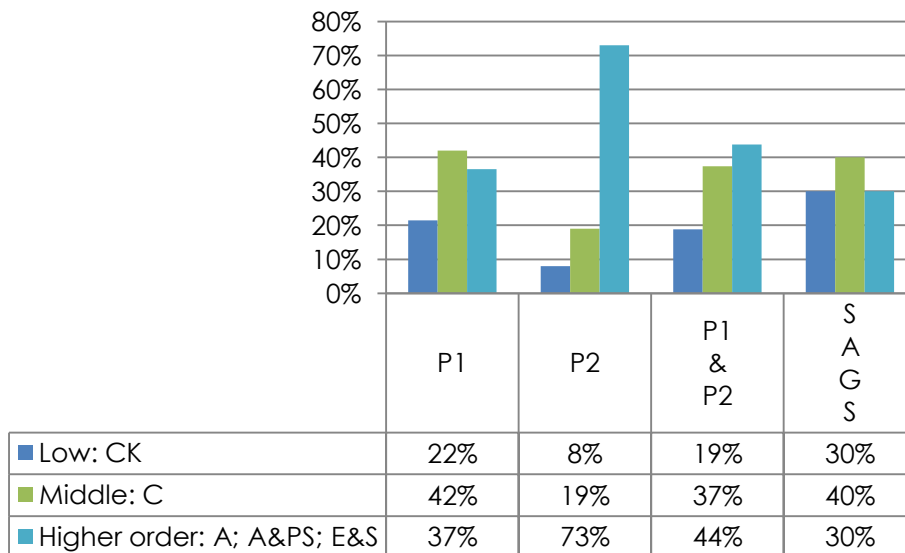
Cognitive demand

The DBE SAG specify the weighting of marks to be allocated to each of the cognitive levels shown in table 37 below. Note that these levels do not correspond with those of the Umalusi typology. Here, comprehension is in the middle level on its own, while application, also is the middle level in the three-level typology of Umalusi, has been included with analysis, synthesis and evaluation in the highest order.

Table 37: Weighting of marks allocated to different cognitive skills in the SAG

Cognitive level	Cognitive skills	Weighting
Lower order	Knowledge	30%
Middle order	Comprehension and understanding	40%
Higher order	Analysis, synthesis, application and evaluation	30%

Table 37, with its associated graph, shows the percentages of marks in each paper and, in the examination as a whole, in terms of the three-level typology specified in the SAG.



Graph 26: Comparison of papers with the SAG

Graph 26 shows that there is heavier weighting of higher order skills in the examination than in the SAG. This is the case in both papers, but most noticeably in Paper 2. This is largely ascribable to the requirement for Paper 2 that 80% of the marks for the paper be allocated to the application of theory, which means that this skill will be more heavily weighted in that paper than in the SAG. The fact that application is a high order skill in the DBE SAG means that its marks will overweight this category in Paper 2, and influence the weighting in the entire examination.

Summary of key points regarding compliance with the Subject Assessment Guidelines

The DBE papers are both compliant with the SAG in terms of their structure.

- Paper 1 had a greater proportion of marks allocated to the highest cognitive level than specified in the SAG, while the proportion allocated to the lowest level was lower.
- Paper 2 had a marked overweighting in level 3 (highest level) compared with the SAG, and a corresponding underweighting in the other two levels. This could be explained by the fact that the specifications for this paper demand that 80% of the marks be allocated to questions requiring application of conceptual knowledge – which is included in level 3.

As a result of the overweighting of level 3 in Paper 2, the examination as a whole had more weight in the category of high cognitive demand than specified by the SAG.

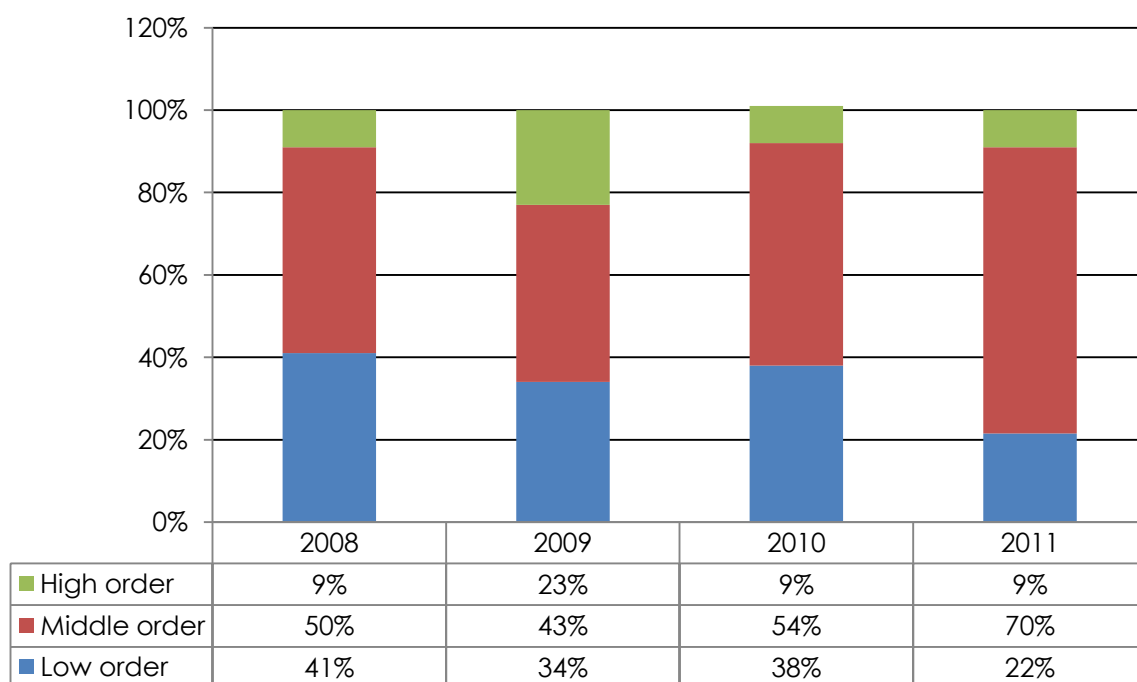
7.5 Cognitive demand and level of difficulty

Cognitive demand

Graphs 27, 28 and 29 show the cognitive demand of each of the 2011 examination papers compared with the papers of the previous three years and the examination as a whole.

Graph 27 shows the findings for Paper 1.

In 2011, cognitive demand is most heavily weighted in the middle category – comprehension and application – while lower and higher order levels are less weighed. The weighting for the highest order is the same as in all the previous years except for 2009, when the examination was more heavily weighted in this category. The weighting in the middle category in 2011 has been at the expense of the lowest level.

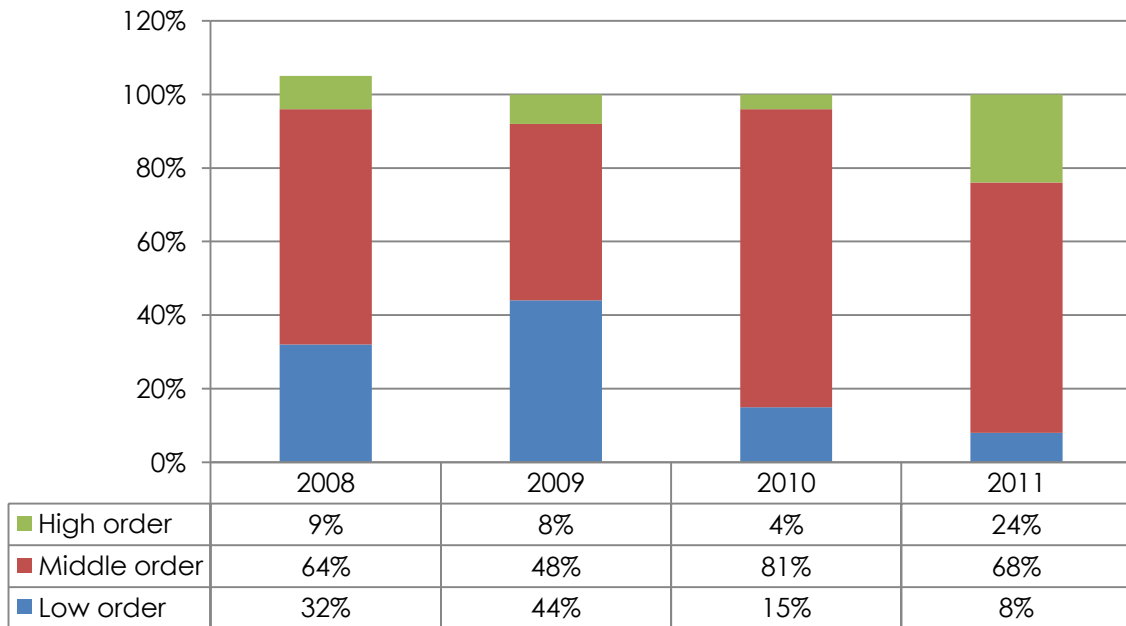


Graph 27: Paper 1 – comparison of cognitive demand 2008–2011

The shift downwards in the lowest level and upwards in the middle compared with previous years suggests that the 2011 paper is more challenging, and will be more difficult for the weakest candidates.

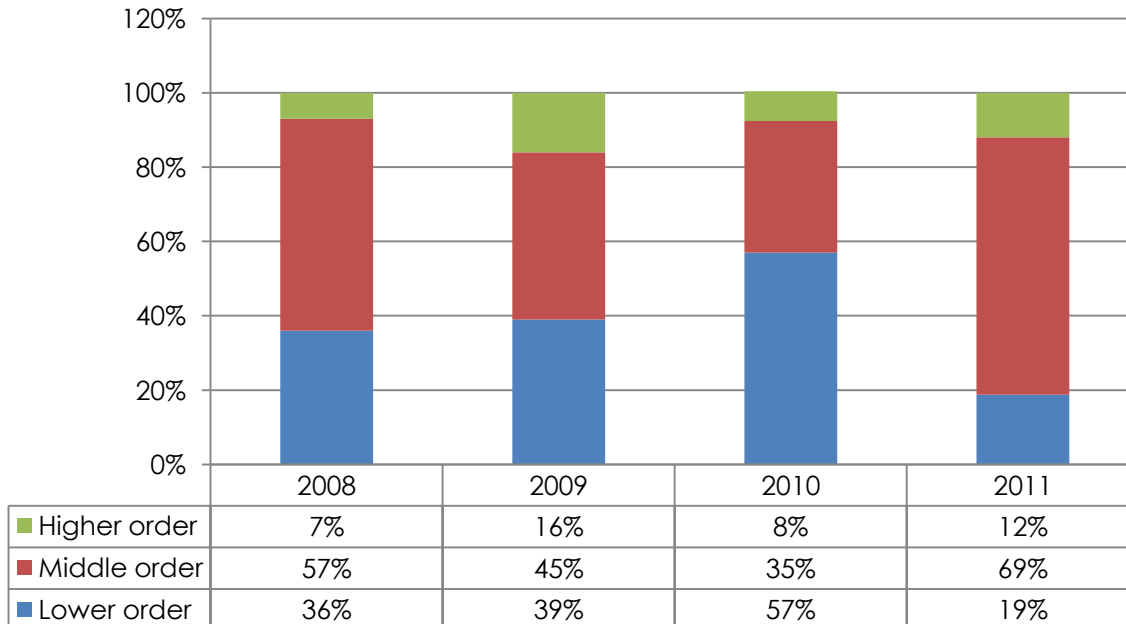
Graph 28 shows the findings for Paper 2.

In 2011, Paper 2 is most heavily weighted at the middle level, and least heavily weighted at the lowest level. Compared with previous years, there has been an upward shift in cognitive demand in this paper, with a noticeable increase in the weighting in the highest order in 2011, and a drop in the lowest. The 2011 Paper 2 thus seems more cognitively challenging than that of previous years. Weak candidates in particular will find it more difficult, and it is likely to have a better ability to distinguish the most able candidates than the papers in previous years.



Graph 28: Paper 2 – comparison of cognitive demand 2008–2011

Graph 29 shows the finding when the two papers are combined.



Graph 29: Combined papers – comparison of cognitive demand 2008–2011

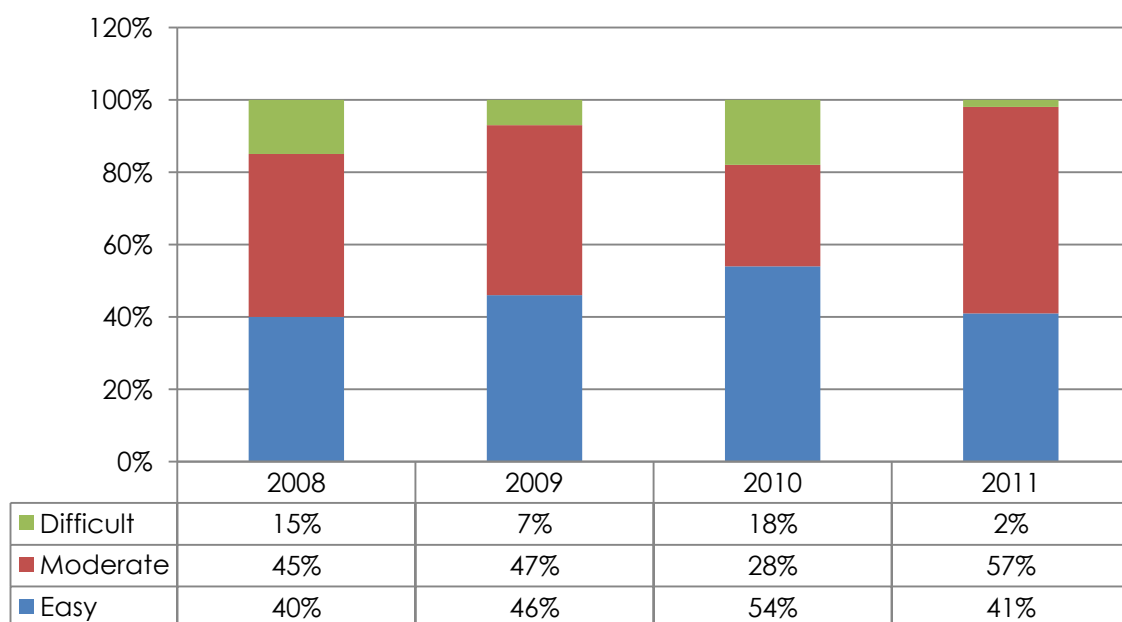
As graph 29 shows, the examination as a whole is noticeably most weighed in the middle level, and least weighted in the other two categories. There is a notable

decrease in the weighting at the lowest level of demand, making this paper more cognitively challenging than those of previous years, especially for weak candidates. There is also an upward shift in the highest category compared to all previous years other than 2009.

Level of difficulty

Graphs 30, 31 and 32 show the levels of difficulty of the 2011 examination and compare it with the papers of the previous three years for each paper and the examination as a whole.

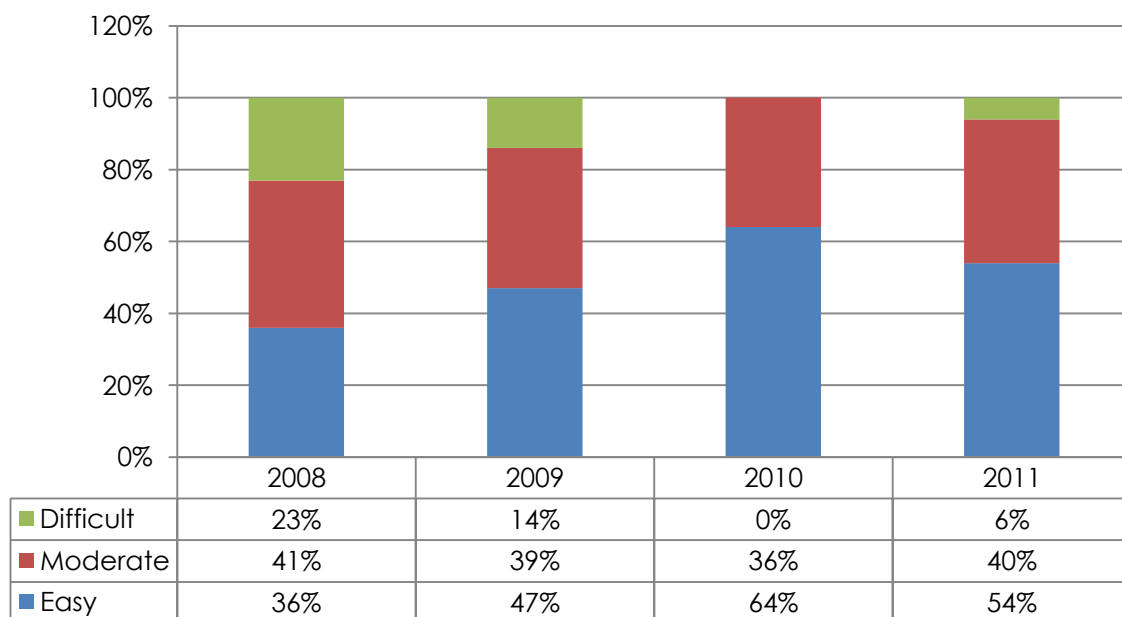
Graph 30 shows the findings for Paper 1.



Graph 30: Paper 1 – comparison of level of difficulty 2008–2011

In 2011, the bulk of the marks for Paper 1 are for questions that are easy and moderately difficult and very few for those that are difficult. Compared with previous years, there has been a shift from both ends towards questions that are moderately difficult. Fewer marks than in any previous years are allocated for difficult questions, and also for easier questions apart, from 2008 when the proportion of easy questions was the same. This paper is thus likely to have been more difficult for weaker candidates, and easier for strong candidates.

Graph 31 shows the findings for Paper 2.

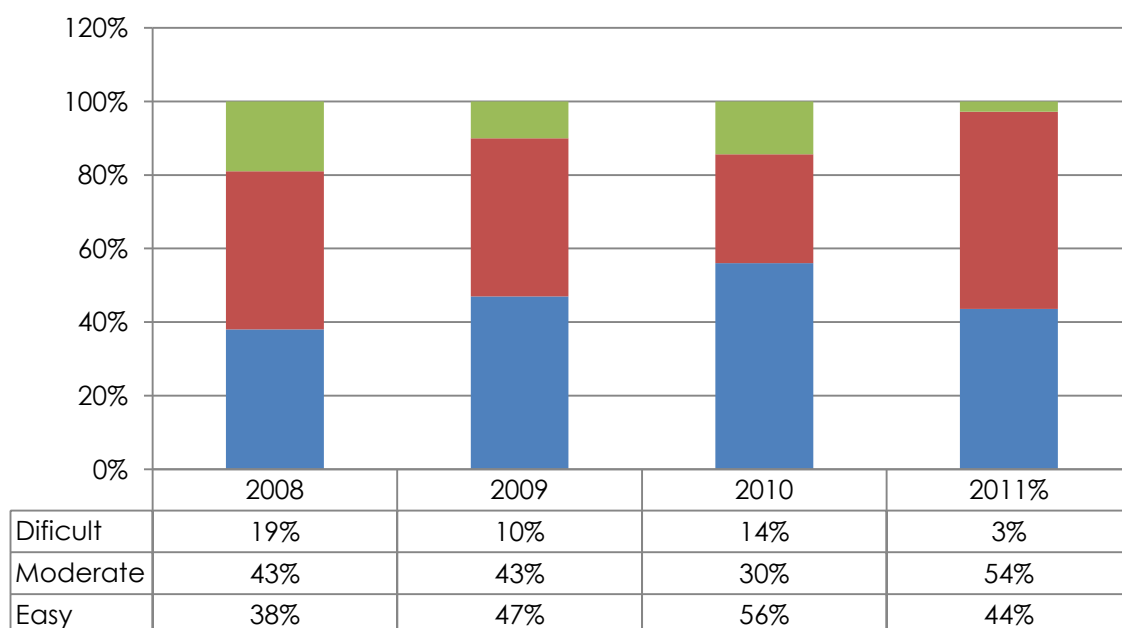


Graph 31: Paper 2 – comparison of level of difficulty 2008–2011

In Paper 2, easy questions are most heavily weighted. The proportion of marks in this category is higher than in 2008 or 2009, but lower than for 2010. The proportion of marks in the difficult category is also lower than in 2008 and 2009, but higher than for 2010 – where no questions were considered difficult. This suggests that, overall, candidates will have found this paper more difficult than the 2010 paper, but easier than the papers of 2008 and 2009.

For the examination as a whole, the weighting at the middle level of difficulty is clear; this is higher than in previous years. Weighting in the ‘easy’ category has decreased from 2010, and is similar to 2009 and 2008, but the weighting in the difficult category is noticeably lower than in previous years. This suggests that strong candidates will find the paper easier than in 2009, but weak candidates might find it more difficult.

Graph 32 shows the findings of the examination as a whole.

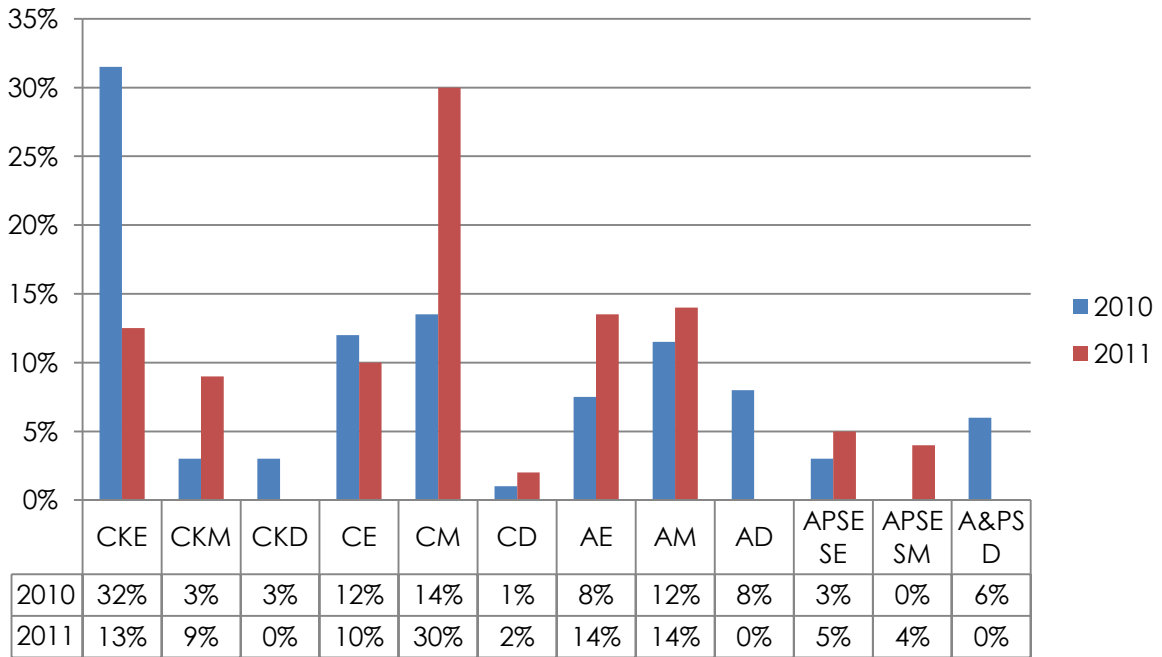


Graph 32: Combined papers – comparison of level of difficulty 2008–2011

Cognitive demand and level of difficulty combined.

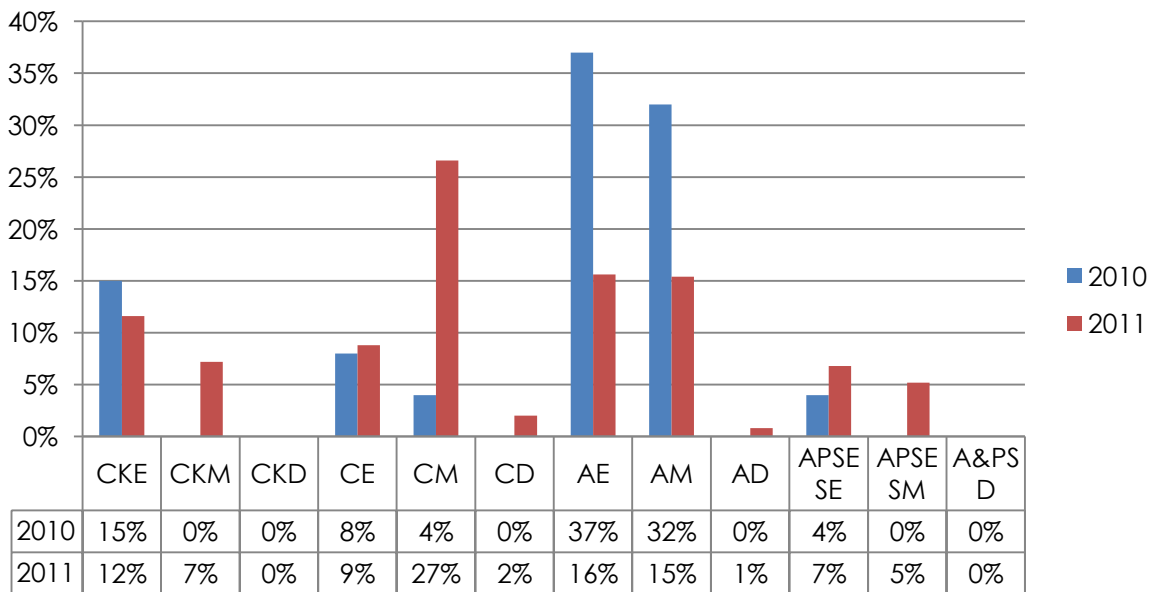
The analysis of the papers so far suggests that, in 2011, cognitive demand has increased, but that the level of difficulty has decreased from difficult to moderate, and increased from easy to moderate. Graphs 33 to 35 show these two dimensions of the examination together and in comparison with the 2010 examination.

Graph 33 shows that, for Paper 1, the proportion of marks allocated to the highest order questions remains the same as in 2009, but that the questions are generally easier in 2011. This suggests that strong candidates should do better in 2011 than they did in 2010. At the other end of the spectrum, the proportion of marks awarded to the lowest cognitive category – content knowledge – has decreased from 2010, with a noticeable drop in questions deemed easy. In 2011 there has also been a shift from straight content knowledge questions toward comprehension, with a weighting on moderately difficult comprehension questions. This would make the 2011 paper more challenging for weak candidates. While the proportion of marks for application questions is similar in both years, the weighting on difficult questions has decreased in 2011.



Graph 33: Paper 1 – comparison of cognitive demand/difficulty 2010–2011

Overall then, the DBE Paper 1 in 2011 seems more difficult for weak candidates, and seems to make more cognitive demands on strong candidates, but with slightly easier questions than the 2010 paper.

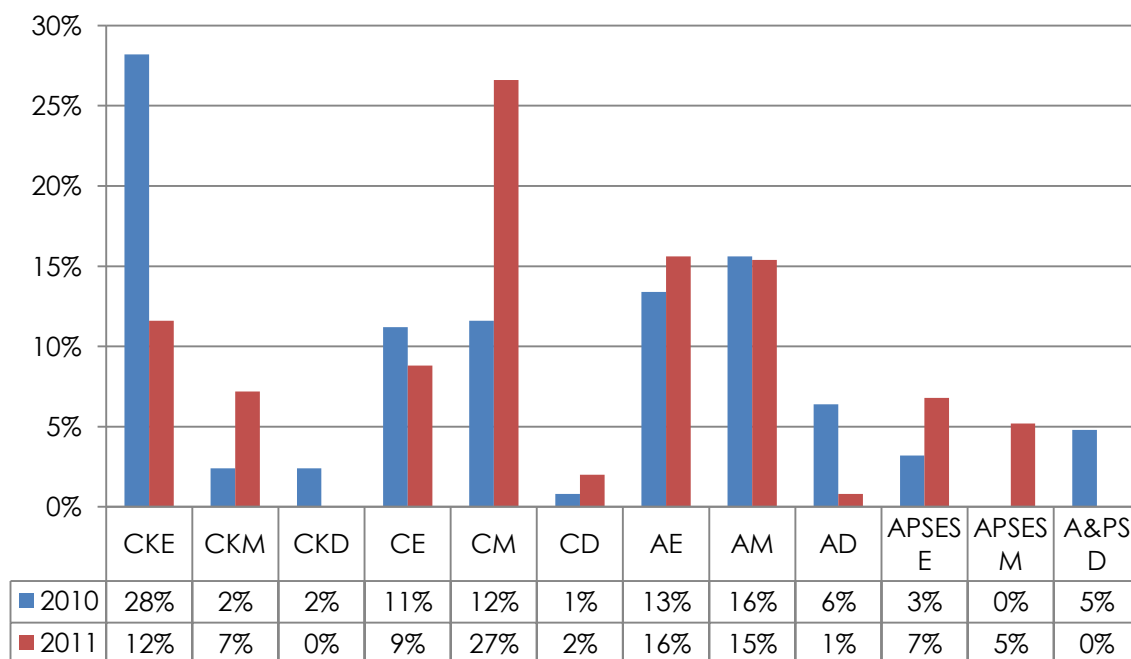


Graph 34: Paper 2 – comparison of cognitive demand/difficulty 2010–2011

In Paper 2 there is a noticeable increase in higher order questions from 2010. This is due in part to an increase in questions requiring analysis of map information, and then application of theory, rather than more straightforward application questions. However, this shift in cognitive demand is offset by the fact that the questions tend to easy or only moderately difficult – which seems appropriate in a year when this type of question is being asked more often than before. At the other end of the spectrum, the proportion of content knowledge questions has increased slightly, although these tend to be slightly more difficult than in 2010, and a again there is a shift towards more cognitively demanding comprehension questions, especially those that are moderately difficult, but also some that are difficult.

Overall, the 2011 DBE Geography Paper 2 is probably a more challenging paper for both weak and stronger candidates than was the paper in 2010.

Graph 35 shows the findings for the entire DBE examination



Graph 35: Combined papers – comparison of cognitive demand/difficulty 2010–2011

For the examination as a whole, the cognitive demand at the upper end of the spectrum has increased. This is compensated for to some extent by the fact that none of these questions is difficult, which happened in 2010, but there are some

which are moderately difficult. The paper is, therefore, likely to be more challenging for strong candidates than the 2010 paper.

At the lower end of the spectrum there has been a shift away from content knowledge questions towards comprehension, and a shift towards moderately difficult rather than easy questions. This shift will make the paper more challenging for weak candidates.

The application questions are similar in both years, but with a slight decrease in 2011 of difficulty questions in this category (offset by the higher proportion of analysis questions noted earlier), and a decrease in the level of difficulty.

7.6 Comparability 2009–2011

Overall, compared with the three previous years, the 2011 paper

- shows a distinct shift from low order cognitive demand towards the middle level of this category (fewer content knowledge questions, more comprehension questions)
- shows a shift toward the high order cognitive demand compared to all years except 2009
- contains more moderately difficult questions than before, and fewer easy or difficult questions
- is most like the 2009 paper with regard to levels of difficulty, although it has a much lower weighting in the difficult category than the paper of that year.

Overall, compared with the 2010 examination, the DBE 2011 examination is probably

- more challenging than the 2010 paper for weaker candidates
- more challenging for stronger candidates in terms of cognitive demand, but slightly easier in terms of the level of difficulty of the more cognitively demanding questions.

7.7 Model for future use

We did not see any questions that stood out as particularly good new models for future use.

7.8 Standard and quality of papers

The quality and standard of the DBE papers is good, and in some ways we felt they had improved on previous years. Overall:

- There is a good spread of questions across the topics in the curriculum.
- The questions were generally clearly formulated. There were a few instances where we felt a different term would have been more appropriate than the one used.
 - In P1, Q4.4.5 we wondered if the examiner perhaps had had unfair land distribution rather than land shortage in mind?
 - In Paper 1, Q2.6.6 the question asks learners to assess the impact of removing vegetation, but the memo makes it clear that they need only say what it might be.
- Diagrams were generally clear and the stimulus material needed for answering the questions was not just provided for decoration. Also, learners had to interpret what was provided, as the stimulus material did not merely provide the required information.
- There was a reasonable variety of stimulus material, including some contemporary case study material, and some demand was made on learners to cross reference.
- In Paper 1 we felt that the longer questions could have been more challenging – many were really just asking for a list of recalled information.
- The mapwork questions focused mainly on map reading and geographical techniques – with a few more interpretive/analytical questions. This could be built on in future papers.
- We picked up a few possible errors in the memos – but are sure they will have been identified at the marking meetings.

ACCOUNTING

8.1 Evaluators

Mrs Jabu Ngwenya (team leader), Mrs Pamela Townsend and Mrs Mahlape Vanneer

8.2 Introduction

The DBE 2011 Accounting examination papers were analysed to assess the standard of the question papers with regard to the following:

- distribution of curriculum content over the three major Accounting disciplines (i.e. Learning outcomes (LOs) and assessment standards (ASs)
- the cognitive demand
- the levels of challenge
- the degree to which problem-solving questions were addressed

The 2011 exam papers were analysed together with the 2010, 2009 and 2008 exam papers with the aim of rating the standard and quality.

As part of the final concluding remarks on the analysis, a comparison of the cognitive demand, levels of difficulty (challenge) and the degree to which problem-solving questions were addressed was done to provide a very clear picture of the overall standard and quality of the 2011 question papers

8.3 Method of analysis

The SAG documents published by the DBE include references to the setting of Grade 12 NSC papers. In addition, the DBE has issued NSC Examination Guidelines to reinforce and clarify the requirements of the SAG document. The panel considered both documents in analysing and assessing the quality of the NSC papers.

The papers were individually analysed with regard to content coverage, cognitive levels, degree of difficulty (challenge) and problem-solving questions.

It should be noted that the DBE sets one paper.

The targets relating to content coverage are as follows:

Table 38: Targets for content coverage

LO1	LO2	LO3
50–60%	20–25%	20–25%

With regard to addressing cognitive levels, the DBE uses an adapted version of Bloom's Revised Taxonomy with the following categories described:

Lower-order: Remembering, understanding and low level-application (apply 1)

Middle-order: More advanced application (apply 2) and low-level analysis (analysis 1)

Higher-order: More advanced analysis (analysis 2), evaluation and creation

Therefore the DBE adopts a three-way split covering lower-, middle- and higher-order levels.

Table 39: Required cognitive levels

Lower order	Middle order	Higher order
30%	40%	30%

Owing to the nature of the subject, cognitive levels do not necessarily correlate with the degree of challenge. Although the targets for degree of challenge in table 40 are not stipulated in the SAG documents, it is generally acknowledged that they have been historically accepted as reasonable by the external moderators.

Table 40: Generally accepted targets for degree of challenge

Easy	Medium	Difficult
30%	40%	30%

Problem-solving questions of a deep nature would normally form part of the Creative cognitive level, catering for new and unfamiliar situations within the context of the Accounting curriculum, and would require responses from candidates based on the detailed financial information provided. Problem-solving questions of a

surface nature were regarded as those of a more general nature that do not require in-depth interaction with information in a question. The following target is accepted as reasonable in the current context of high school education (in Accounting).

Table 41: Target for percentage of problem-solving questions

Surface	Deep	Total
		10.0%

8.4 Compliance with Subject Assessment Guidelines

Content coverage

With regard to content covered, the DBE 2011 paper complies with the SAG document, with LO1, LO2 and LO3 being covered in the ratio 58:20:22 respectively. In our opinion this weighting is appropriate as the paper covers all the assessment standards stipulated for Grade 12 and is generally in line with the SAG document and the exam guideline. The SAG document also stipulates a 20% inclusion of Grade 11 assessment standards that are relevant to Grade 12 assessment standards. This was appropriately applied.

Table 42: Content coverage

	Financial accounting LO1	Managerial accounting LO2	Managing resources LO3
Actual	58%	20%	22%
Target	50–60%	20–25%	20–25%

8.5 Cognitive demand and level of difficulty

Cognitive demand

With regard to the cognitive levels, this paper does not conform strictly with the SAG document in terms of the required target of 30:40:30. The paper tended to be weighted towards the application level at 51% of the paper. Lower-order and higher-order cognitive levels reflected a slightly higher percentage of 32% and 31% respectively above the target. As a result the paper reflected a 37% focus on middle-order level questions.

Table 43: Cognitive levels

	Lower order			Middle order		Higher order		
	Remember	Understand	Apply 1	Apply 2	Analyse 1	Analyse 2	Evaluate	Create
Actual	7%	8%	17%	34%	3%	7%	18%	6%
	32%			37%		31%		
Target	30%			40%		30%		

Levels of difficulty

Levels of challenge do not necessarily correlate with cognitive levels. No target is set in the SAG document but the team was of the opinion that it was reasonable and fair for degrees of challenge to mirror the weighting of 30:40:30 as per the cognitive levels. This is the generally accepted target adopted by the external moderators.

Regarding levels of difficulty, the paper reveals more emphasis on easy-level questions at 34% and less focus on medium questions at 35%. In Q1, 3 and 4 the matching of concepts required the learners to understand and remember the concepts, which was not challenging in terms of cognitive demand. However, Q4, 5 and 6 were more challenging, although the content had been covered in previous papers. Aspects of these questions required the learners to interpret and evaluate the information provided. The learners then had to solve problems by providing appropriate solutions.

Table 44: Levels of challenge

	Easy	Medium	Difficult
Actual	34%	35%	31%
Target	30%	40%	30%

Problem solving

The percentage of problem-solving questions is above the norm at 11%. The paper also reflected a higher percentage of deep-level questions at 7%. This was in our

opinion as a result of the learners having to solve a real problem faced by the business in Q6.

Table 45: Problem-solving questions

	Surface	Deep	Total
Actual	4%	7%	11%
Target			10%

8.6 Weighting of cognitive demand

Analysis shows that this paper tended to weigh towards the application of knowledge, that is, 51%. It is noted that the SAG document includes basic application and advanced application under two separate categories. Consequently, several questions required the learners to process information.

Table 46: Cognitive levels – application level

	Remember	Understand	Apply 1	Apply 2	Analyse 1	Analyse 2	Evaluate	Create
Actual	7%	8%	17%	34%	3%	7%	18%	6%
Application			51%					

8.7 Model for future use

In our opinion the paper can be used in the future. We considered the paper to be fair; however, we did concede that the average learner would find Q4, 5 and 6 difficult and the weak learners would find these questions extremely challenging. These questions were at the end of the paper and if learners had not used their time effectively, they might not have had enough time to complete them.

8.8 Standard and quality of papers

Language

We found the language used in the DBE paper to be appropriate for Grade 12 learners. We found that all the information provided is necessary for the answering of each question and the source material provided was brief and appropriate.

Format

The format of the question paper was clear and well set out. In our opinion the mark allocation was consistent throughout the paper.

Structure

Once again, the scaffolding of questions in terms of degree of accessibility to candidates of differing ability was generally well done. Again, the answer book which restated the questions is useful in focusing the learners on what is required from the information provided in the question. The information was structured in a logical way that should have facilitated the learners' thinking process. The requirements were clear and to the point.

The answer book guided the learners and was clear and concise. While we are of the opinion that there are still many figures provided in the answer book we concede that providing these figures does allow learners to complete the paper within the limited time available and for the examiners to examine the content broadly.

Layout

The layout provided the learners with all the required information. Blank pages were inserted in the question paper to ensure that, as far as possible, all questions were presented in a left/right format. This added to the user-friendly nature of the paper. However, we feel that in the answer book blank pages should rather be labelled as pages to show workings.

General impression of the paper

The DBE 2011 paper serves as a good model for future papers in terms of content coverage, spread of cognitive levels and challenge and the higher percentage of deep-level problem-solving questions.

8.9 Comparability 2008–2011

Content coverage

In terms of content coverage, all papers comply with the SAG document, with the 2008 paper strictly meeting the targets at 52%:23%:25%. LO1 was examined at the top end in the 2010 and 2011 paper at 58% while LO2 in 2009 was examined above the target.

Table 47: Comparison of content coverage 2008–2011

	LO 1	LO 2	LO 3
2008	52%	23%	25%
2009	54%	26%	20%
2010	58%	23%	19%
2011	58%	20%	22%
TARGET	50–60%	20–25%	20–25%

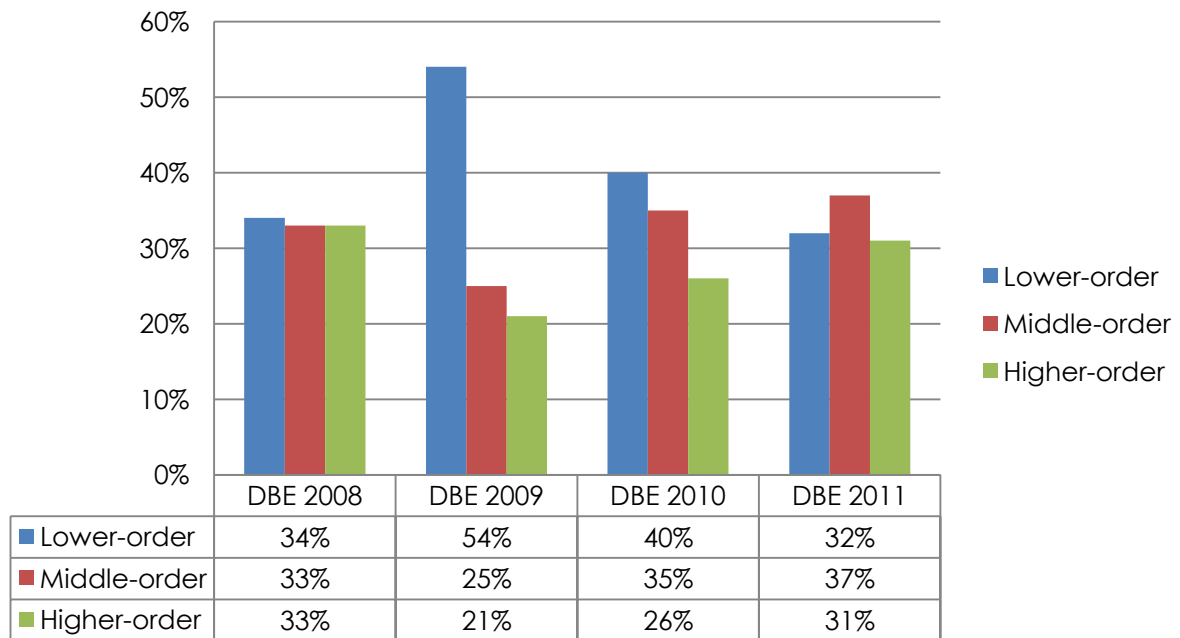
Cognitive levels

Table 48: Comparison of cognitive levels 2008-2011

	Lower order			Middle order		Higher order		
	Remember	Understand	Apply 1	Apply 2	Analyse 1	Analyse 2	Evaluate	Create
2008	3%	6%	25%	18%	15%	7%	22%	5%
			43%					
2009	2%	7%	45%	18%	7%	6%	12%	3%
			63%					
2010	3%	7%	30%	25%	9%	7%	12%	7%
			55%					
2011	7%	8%	17%	34%	3%	7%	18%	6%
			51%					

From a cognitive point of view, all papers do not strictly meet the targets. The 2011 paper reflects the closest correlation to the targets, with a 32%:37%:31% spread. The 2009 and 2010 papers focused more on the application level at 63% and 55%. While this has improved in the 2011 paper, there is still great emphasis on application of

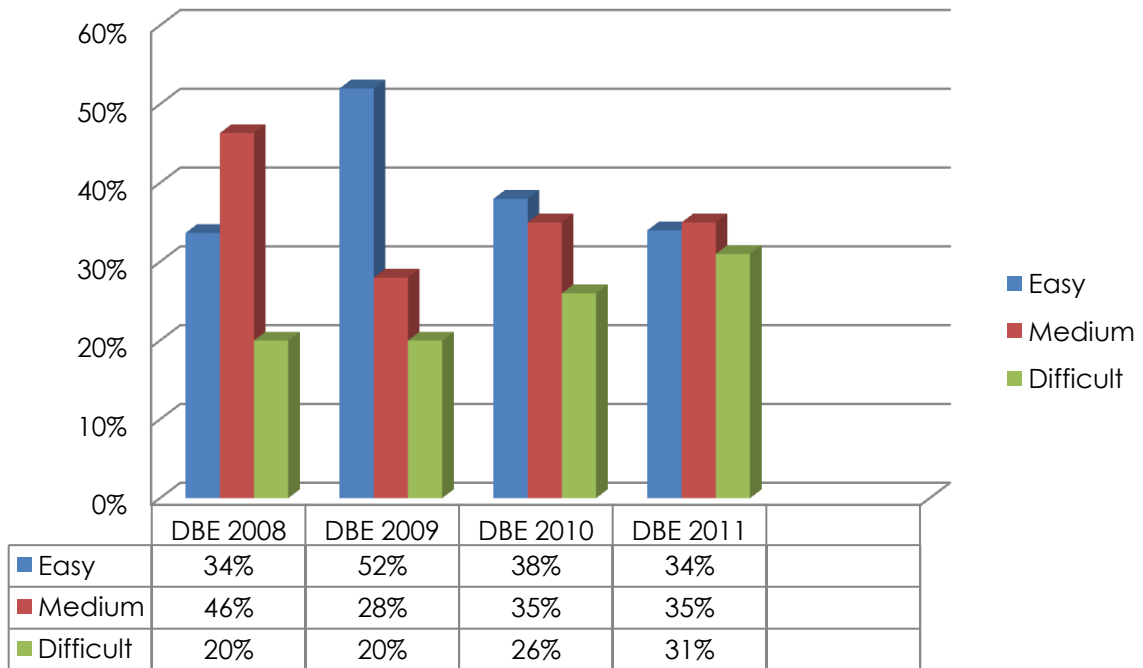
knowledge at 51%. The 2009 and 2010 papers focus heavily on lower-order levels at 54% and 40% while the 2008 and 2011 papers reflected a better balance with 33% and 31% devoted to higher-order level questions.



Graph 36: Comparison of cognitive levels 2008–2011

Levels of difficulty

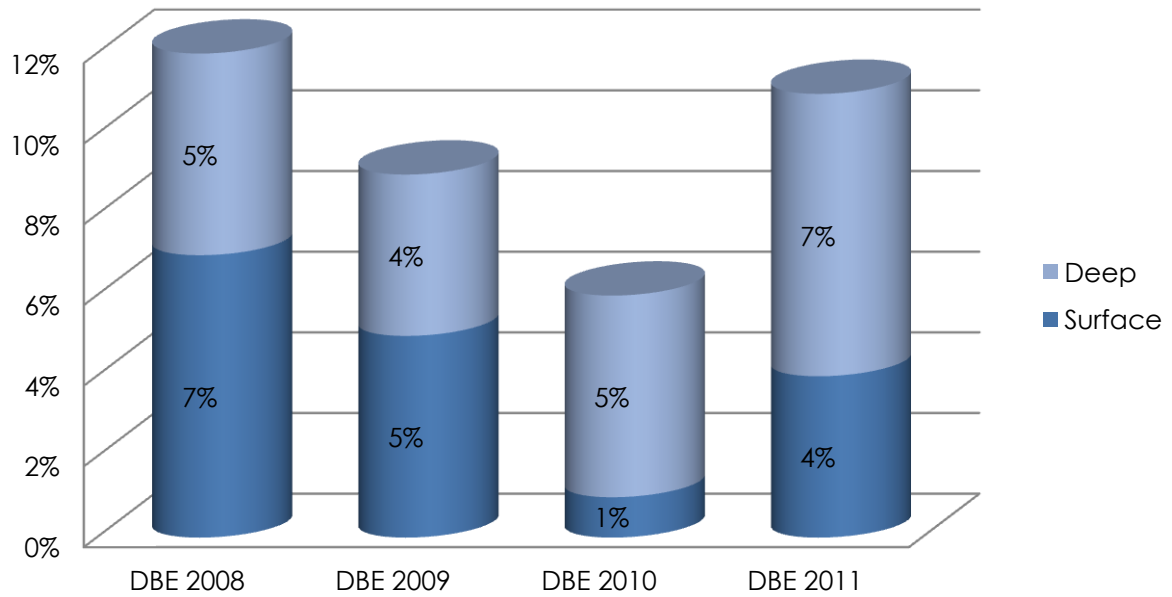
The 2009 paper appears to be the most lenient with 52% easy questions compared to other papers. For difficult questions, we found the 2008, 2009 and 2010 papers to be equivalent, with a range of 20% to 26%. The 2011 and 2008 papers are regarded as more appropriate models in this regard both with a 34% focus on easy questions. Although the papers reflected the same percentage of easy questions, the 2011 paper appeared to be the most difficult paper with 31% difficult questions.



Graph 37: Comparison of levels of challenge 2008–2011

Problem solving

In terms of problem-solving questions, the 2010 paper reflected a lower emphasis on problem solving at 6% while the 2008, 2009 and 2011 papers reflected a closer adherence to the target, with 12, 9 and 11% respectively. The 2008 and 2011 papers exceeded the 10% target for problem-solving type questions and the 2011 paper reflected a greater focus on deep problems.



Graph 38: Comparison of problem-solving questions 2008–2011

Conclusion

In conclusion, the team believed that the quality of 2010 paper is better than 2009 paper. There is a noticeable trend for the papers to provide more easy-challenge or lower-order questions at the expense of higher-order questions. The 2009 and 2010 papers both lean towards lower-order and easy level questions, while the 2008 and 2011 papers focused more on higher-order questions. Both papers also reflected a lower percentage of easy level questions. However, the 2011 paper reflected a higher percentage of difficult questions compared to the 2008 paper. Although both papers reflected a higher percentage of problem-solving questions, the 2011 paper focused more on deep level. Therefore, the 2011 paper is of better quality based on the cognitive levels, levels of challenge and higher percentage of problem-solving questions.

ECONOMICS

9.1 Evaluators

Dr SM Maistry (Team leader), Prof M van Wyk and Mrs L Rambuda

9.2 Introduction

This chapter documents the findings of the team of evaluators for the subject Economics for 2011. The final examination paper for the DBE NSC Examination for 2011 was analysed.

9.3 Method of analysis

In order to maintain consistency and to engage in meaningful comparisons across years, the Umalusi examination analysis framework that was employed for the analysis exercise for 2008 to 2010 was used again for the 2011 analysis process. As with previous years, the team applied a rigorous analysis procedure that entailed a careful scrutiny of both the examination question paper and the marking memorandum. The team leader discussed and reviewed the way in which the instrument had been employed in previous years and emphasised the need for consistency in the approach to the 2011 examination papers.

Before the paper was subjected to a panel analysis, each team member performed an *individual* analysis, making notes of areas of concern, ambiguity and uncertainty. The process entailed a fine-grained analysis of each question so as to establish its suitability, the cognitive demand, the level of difficulty, as well as the assessment standards and learning outcomes that were being assessed. The marking memorandum provided was also used to inform the analysis and classification of each question. When conflicting assessments of specific questions were encountered, the team leader allowed members to carefully deliberate with justification for the positions they had taken. These deliberations provided useful insights into how different questions might be interpreted by learners. Eventually consensus was reached.

The DBE paper provided for mandatory and choice questions with Section 'A' comprising compulsory questions and Sections 'B' and 'C', choice questions. For the

NSC (DBE) 2008–2011 final papers, candidates selected questions totalling 300 marks out of a total of 500 marks available. In several cases choice alternatives within sections did not test the same level of difficulty or the same type of cognitive demand (see discussion of these below).

The moderation team noted a definite improvement in the overall technical quality and technical standard of the 2011 paper as compared to the 2010 paper. Having said this, there is however an unacceptable number of language and other technical matters that need attention. These are discussed later.

The following analysis categories were employed:

Table 49: Types and levels of cognitive demand

Type of cognitive demand	Level of Difficulty
Basic conceptual, knowledge Recall Literal comprehension Making simple evaluative judgements in terms of previously acquired facts etc	Easy
	Moderate
	Difficult
Comprehension, application Understanding, application, analysis of previously acquired information in a familiar context Making evaluative judgements that require the use of a range of previously acquired facts/information etc	Easy
	Moderate
	Difficult
Problem-solving, analysis, synthesis Analysis, interpretation and application of information in a new or unfamiliar context Synthesis, creation of novel solution or product Evaluation or making judgements in relation to a mixture of old and new material or information	Easy
	Moderate
	Difficult

9.4 Compliance with the Subject Assessment Guidelines

The DBE Subject Assessment Guidelines (SAG) for Economics suggest an equal assessment weighting for each of the four LOs in Economics.

Table 50: Comparison of the SAG requirements and the actual distribution of questions

Learning outcome	SAG	Actual
LO1	25%	28%
LO2	25%	23%
LO3	25%	23%
LO4	25%	26%

The distribution of questions across the four LOs is acceptable as they are very close to the recommended distribution provided by the SAG.

9.5 Cognitive demand and level of difficulty

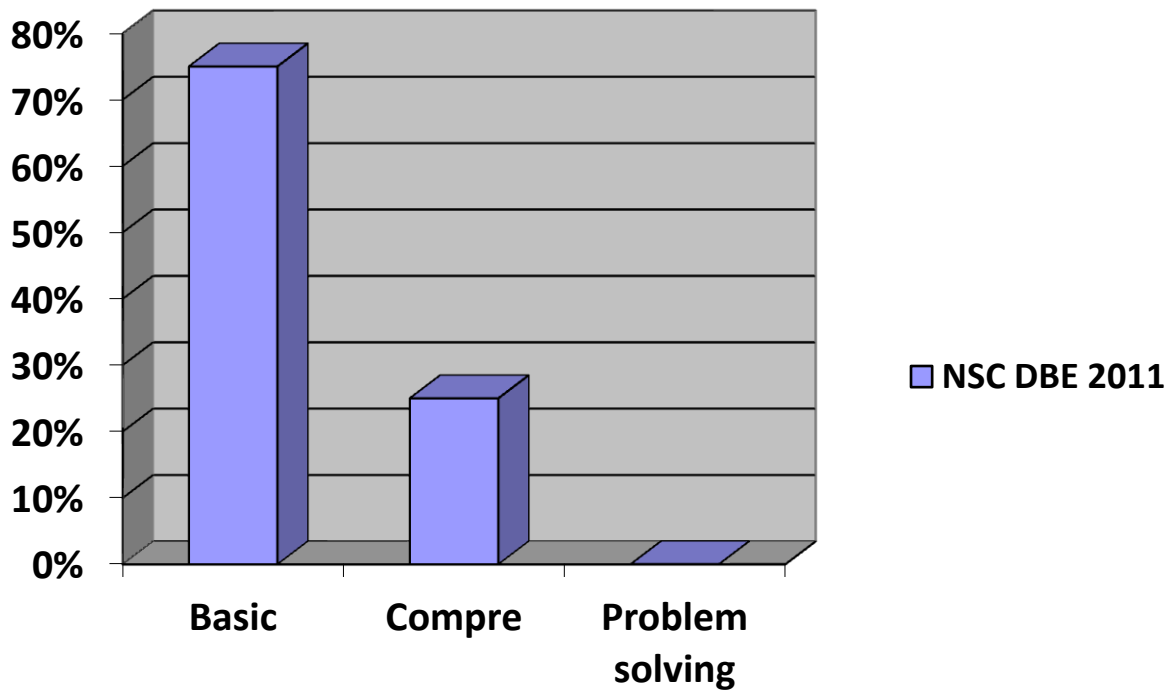
As described above, each question and sub-question was carefully assessed according to the analysis instrument (table 1). The marks/scores for the different types of cognitive demand and levels of difficulty were tallied for the DBE examination. To allow for easy comparison, table 51 provides a distribution of these as percentages for 2011.

Table 51: Distribution of questions by cognitive and difficulty level

Type of cognitive demand			Level of difficulty		
Basic	Comprehension application	Problem solving/analysis	Easy	Moderate	Difficult
75%	25%	0%	37%	51%	12%

The SAG stipulates a 30:40:30 ratio of 'Knowledge & Comprehension': 'Application & Analysis': 'Synthesis & Evaluation' questions across the cognitive levels. A direct comparison of the outcome of using Umalusi's instrument and the DBE's instrument (distribution stipulations) indicates that, had the evaluation team used the DBE instrument, the percentage of questions in the lower order category would be above 80%. This begs the question of how the examiners interpret and classify questions.

The distribution for 2011 indicates a significant divergence from the norm in terms of both the level of difficulty and the cognitive level. The above data is presented graphically in graph 39 below.

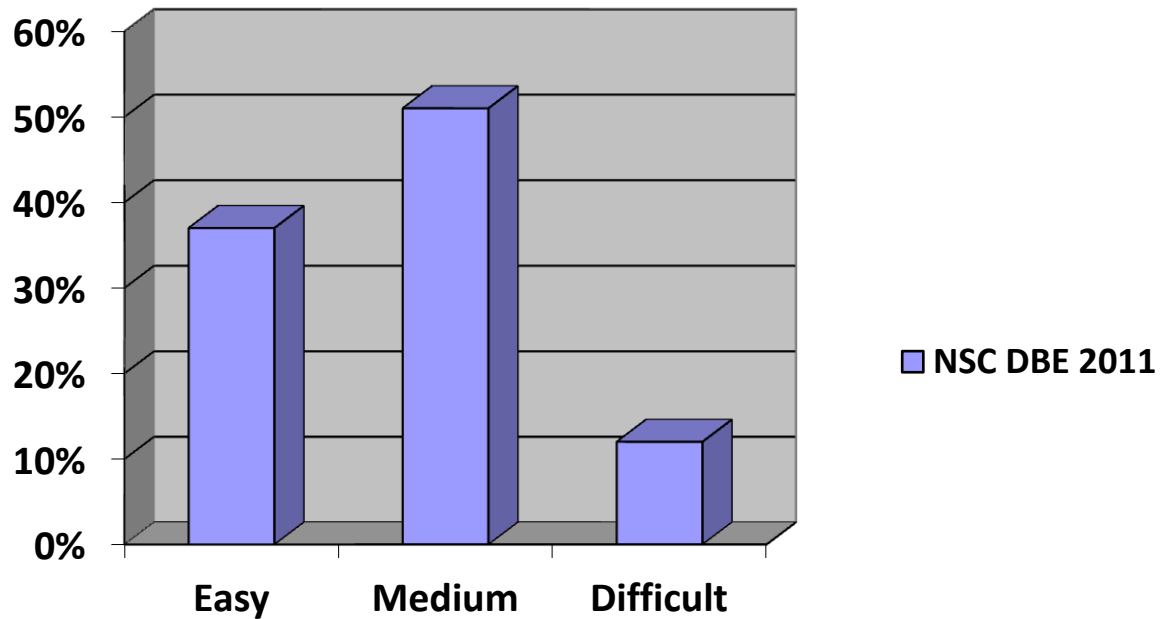


Graph 39: Distribution of questions by cognitive demand

9.6 Weighting of cognitive demand

A striking feature of the DBE 2011 examination paper is the absence of questions in the highest cognitive demand category. Of significance in the DBE 2010 Economics paper is the heavier than expected weighting (75%) in favour of basic recall questions. This represents 45% more than the expected norm. This has come at the cost of questions in the problem-solving/analysis category (0%). This distribution will favour the average and weaker candidates who sat for this paper. This conclusion develops more currency when the distribution of questions in terms of difficulty level is analysed. The table above and the graph below reflect a 7% deviation from the expected norm in difficulty level 1 which stands at 37%. There is a distinct loading of questions in difficulty level 2, which stands at 51%, 11% greater than the SAG recommendation. Only 12% of the paper comprised questions in the difficult category, 18% lower than the expectation for this level of difficulty.

Graph 40 represents the difficulty levels in graph form.



Graph 40: Distribution of questions by level of difficulty – Economics exam paper 2011

9.7 Model for future use

The evaluation team is of the view that the current model and format has certain inherent tensions. This model has its origins in the old NATED examination structure and has not been critically analysed to assess its shortcomings. Arguably, the most crucial and important critique is the presence of choice questions within sections. Had the examining panel been meticulous in setting each choice question at precisely the same level of cognitive demand and difficulty level, then there would be no issue. However, a repeated critique by the assessment panel is that this model and its application by the examining panel are seriously flawed. Distinct examples of this kind of inconsistency are glaring, especially in section C (long essay) where questions carry a significant 50 marks out of 300. In this section candidates are required to answer two questions. So, if a candidate chooses two of the less cognitively demanding and easier questions, this translates into 33,33% of the total marks the candidate writes for. There is no way of controlling for this distortion, except by ensuring that consistency of cognitive demand exists in all choice

questions, an outcome the examining panel has not been able to achieve since 2008.

A further critique of the structure of the paper that derives from the principle of choice is that, in attempting to be consistent across major choice questions with sub-questions, the examiners are forced into a rigid uniformity that comes at the cost of inventive, innovative and creative questioning. Such a strategy then frees the examiner to work within the SAG yet 'think out of the box' with regard to individual questions. There is no need for cross-question comparisons as each question then stands on its own.

9.8 Standard and quality of papers

The team, which comprised two members whose mother tongue is not English, felt that the language level was appropriate for a Grade 12 paper. In the discussion above a critique of the format of the questions was presented. A specific weakness of this paper is the use of texts and stimulus materials. The critique here is that when text is presented as stimulus, the questions appear to be very weakly connected to the data presented. In some cases, questions could well stand alone, that is, without the stimulus text. In Economics in particular, questions based on stimulus texts have to be more than comprehension/reading study; they have to assess economic knowledge in the 'new' stimulus context presented. The point then is that stimulus materials have to serve a particular evaluative value in an assessment artefact such as a national examination.

In contrast to the above discussion, the team felt that there were several questions that simply tested recall of economic information, but without a context. This is an important pedagogic and assessment principle as questions that assess content and skills in context allow learners to link economic theory to economic practice and current reality.

A further critique of stimulus material especially cartoons from popular media is the non-neutrality of such depictions. If anything, race, gender and class stereotypes are perpetuated. In some instances (Q3.4), class bias in questions may disadvantage certain learners who may not have had the life experience depicted by the images presented and as such present as foreign to such students. A greater sensitivity and

care is therefore needed in the selection of stimulus materials to ensure that all students have the same opportunity to demonstrate their economic knowledge.

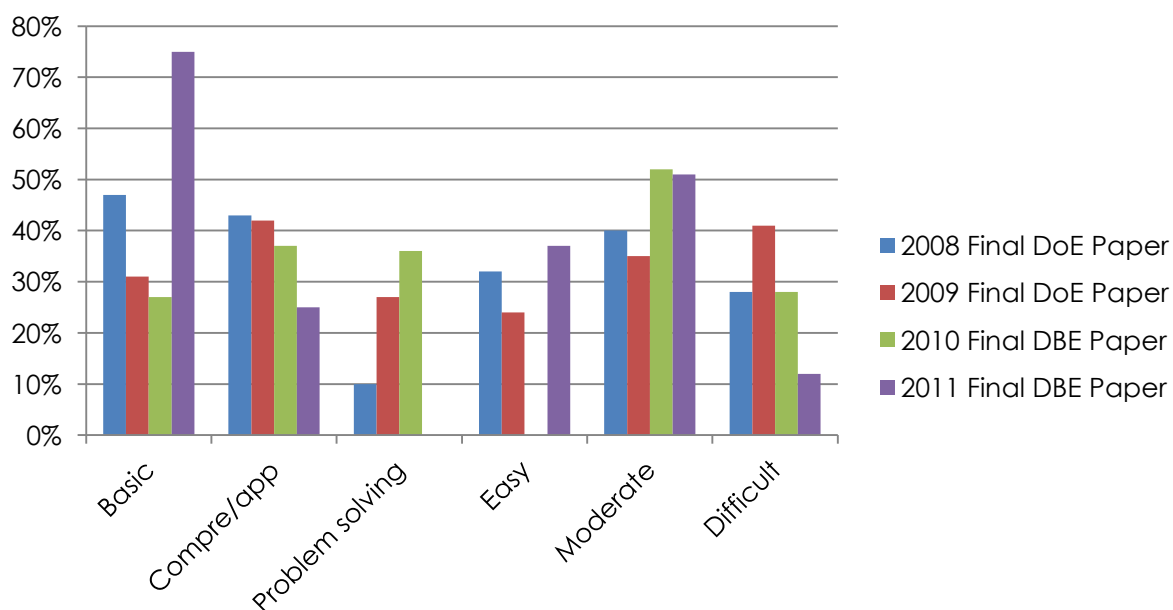
9.9 Comparability 2008–2011

In the table below, a comparison of the DBE papers for the past four years (2008–2011) is presented.

Table 52: Comparison of cognitive and difficulty levels 2008–2011

	Type of cognitive demand			Level of difficulty		
	Basic	Comprehension application	Problem solving	Easy	Moderate	Difficult
DoE Paper 2008	47%	43%	10%	32%	40%	28%
DoE Paper 2009	31%	42%	27%	24%	35%	41%
DBE Paper 2010	27%	37%	36%	20%	52%	28%
DBE Paper 2011	75%	25%	0%	37%	51%	12%

The above data is presented graphically in Graph 41 below.



Graph 41: Comparison of cognitive and difficulty levels 2008–2011

The standard of the DBE paper for 2011 as compared to the 2010 paper has declined substantially as is evident in the drop from 36% problem-solving/analysis

type questions in 2010 to 0% in 2011. Questions in the comprehension/application category have also dropped from 37 to 25%.

Similarly, in the easy category there has been an increase from 20% in 2010 to 37% in 2011. Questions in the difficult category dropped from 28 to 12%, a drop by 14 percentage points. Questions in the medium category have remained constant.

The overall analysis of the 2011 paper is that it is of a substantially lower standard than in previous years.

BUSINESS STUDIES

10.1 Evaluators

Ms Carina America (team leader), Mr Bernard Botha and Dr Milton M Nkoane

10.2 Introduction

This chapter provides an analysis of the NSC examination question papers for Business Studies Grade 12 of the DBE. The analysis focuses on cognitive demand and levels of difficulty.

The evaluation of the Business Studies Grade 12 examinations was done against the backdrop of the learners' knowledge and skills acquired in the FET phase (Grades 10 to 12). Teaching and learning for Business Studies take place within the framework of a National Curriculum Statement (NCS) and are informed by developments in the business environment, recent and changed legislation and changing markets.

10.3 Method of analysis

The Umalusi instrument is user-friendly and makes provision for comments to substantiate the selection of categories. Item-by-item analysis of each question allows for standardisation, consistency and comparability. There may be deviations of 1% in the calculations owing to the rounding of decimals in the Excel spreadsheet.

It should be noted that the experiences and personal viewpoints of evaluators may in some instances have influenced the individual selection of categories. In cases where the selection of categories was not unanimous, it was extensively discussed by the team members until an agreement was reached.

For the DBE analysis the team was guided by the Examination Guidelines as well as the NCS SAG document suggesting a percentage ratio for cognitive demand of 30:50:20 ranging from basic thinking skills; moderately higher thinking skills; higher-order thinking skills. (DoE, 2008:15). The criteria are further illustrated in table 53.

Table 53: Types and levels of cognitive demand

Type of cognitive demand	Level of difficulty	Example
CK = conceptual knowledge/basic factual ± 30% of exam questions	Easy: factual recall	Name two challenges of corporate social investment for a business.
	Moderate: low level application, literal comprehension	Identify any two key success factors of Mazwe Tom's business enterprise. (Case study given)
	Difficult: making simple evaluative judgements in terms of previously acquired facts	Discuss the degree to which the following factors may impact on the success or failure of Toyota South Africa (Pty) Ltd: Capital requirements Taxation
C = comprehension/application ± 50% of exam questions	Easy: simple explanations, application	Identify the sectors which the various business enterprises mentioned above belong to. Motivate your answer. (Case study given)
	Moderate: interpretation and low-level analysis, evaluative judgements that require the use of a range of previously acquired facts/information	Give Vusi advice on the different ways in which he can overcome his dissatisfaction as an employee at Bush Lodge. (Case study given)
	Difficult: moderately high thinking skills, more advanced application	Determine which investment earned the highest return. Show calculations to substantiate your answer. (Case study given)
P = problem solving/analysis/evaluation/synthesis ± 20% of exam questions	Easy: in-depth explanation, simple procedural calculations	What in your opinion has influenced the sales figures? (Scenario and pie chart given)
	Moderate: advanced analytical skills, application of information in a new or unfamiliar context;	Bongani states that the premium of R2 800 per month is not within his budget. What advice would you offer? Provide two suggestions. (Scenario given)
	Difficult: synthesis and evaluation; making judgements in relation to a mixture of old and new material or information	As a business consultant for Makhaya Tali's winery, identify the business challenges, devise strategies to overcome the challenges and determine the environment in which the challenges exist. Advise Makhaya Tali on how to evaluate the effectiveness of the strategies. (Case study given)

A three-levelled typology aligned to the SAG document was used. The CK category refers to 'conceptual knowledge' which includes 'factual' knowledge. The P category includes evaluation and synthesis. The codes used in the analysis are as follows:

CK = conceptual knowledge

C = comprehension & application

P = problem solving & analysis

The following documents were consulted in the analysis:

- National Curriculum Statement (NCS): Grades 10 – 12. Subject Assessment Guidelines (SAG): Business Studies – January 2008. Department of Education (DoE).
- Examination Guidelines: Business Studies – Grade 12, 2009. Department of Education (DoE).

10.4 Results of examination paper analysis

The marks allocated according to cognitive demand and levels of difficulty are expressed in percentages. These are presented in table 54 below:

Table 54: Results of analysis of examination papers

Type of cognitive demand			Level of difficulty		
Conceptual knowledge	Comprehension & analysis	Problem-solving	Level 1 (Easy)	Level 2 (Moderate)	Level 3 (Difficult)
50%	46%	4%	32%	55%	14%

The combined analysis of cognitive demand and level of difficulty are reflected as follows:

Table 55: Results of combined analysis of 2011 Business Studies examination papers

Level of difficulty + cognitive demand								
CKE	CKM	CKD	CE	CM	CD	PE	PM	PD
23%	29%	0%	5%	25%	14%	4%	0%	0%

The codes reflected in table 55 are defined as follows and used accordingly in the rest of the report:

- CKE = conceptual knowledge easy
- CKM = conceptual knowledge moderate
- CKD = conceptual knowledge difficult
- CE = comprehension easy
- CM = comprehension moderate
- CD = comprehension difficult
- PE = problem solving easy

PM = problem solving moderate

PD = problem solving difficult

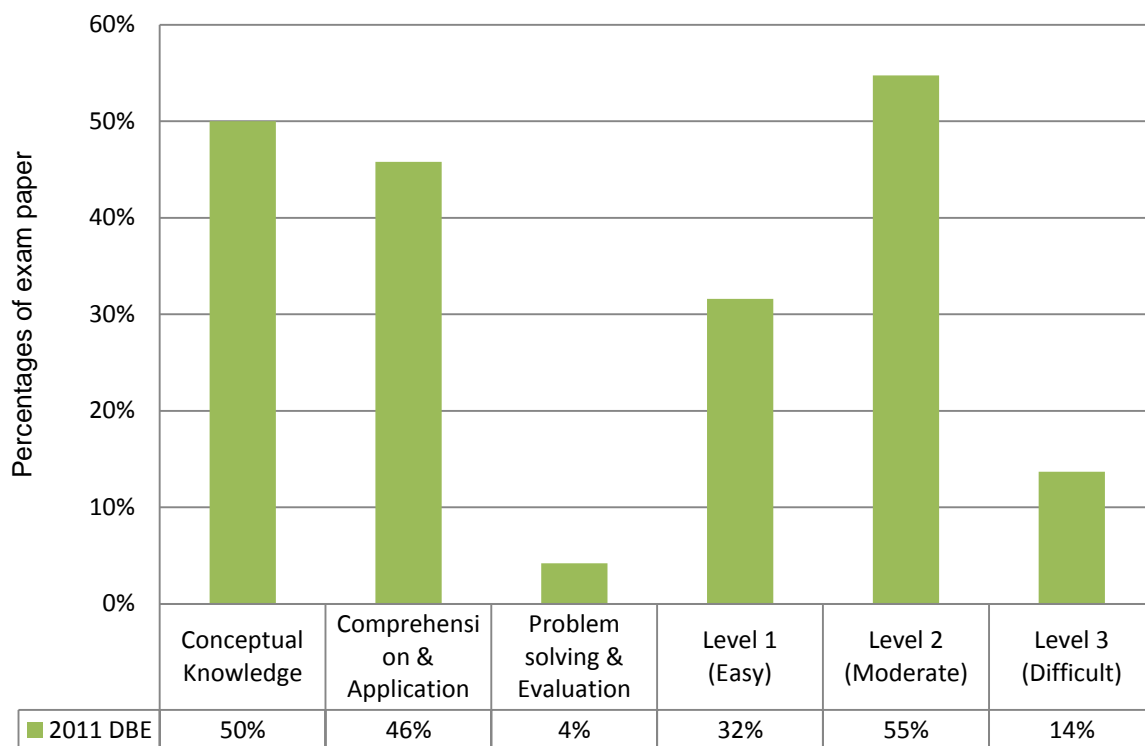
10.5 Compliance with Subject Assessment Guidelines

The structure of the 2011 DBE paper complies with the requirements in the SAG document, suggesting a three-hour paper of 300 marks divided into three sections: section A (40 marks, 30 min) is compulsory and consists of 20 short questions; section B (180 marks, 90 min) consists of 3 questions of 60 marks and section C (80 marks, 60 min) is a choice of two out of four questions (DoE, 2008:14). Section A consists of objective type questions such as multiple-choice questions, words in brackets and matching items. Section B has three compulsory direct questions encompassing scenarios, case studies and graphical presentation. The essay-type long questions in section C reflect higher cognitive questions where insight and interpretation of theoretical knowledge are tested. The memorandum for section C includes a breakdown of mark allocation for content and insight. The instructions and information section are formulated succinctly.

10.6 Cognitive demand and level of difficulty

According to the SAG, cognitive demand encompasses knowledge and comprehension (30%); application and analysis (50%); synthesis and evaluation (20%) (DoE, 2008:15). The DBE 2011 paper indicates cognitive levels of 50:46:4, which are categorised as conceptual knowledge; comprehension and application; problem solving and analysis.

The problem-solving category, which encompasses advanced analytical skills, application of information in a new and unfamiliar context, synthesise an evaluation: making judgements in relation to a mixture of old and new material or information: has 16% fewer items than suggested in the SAG document. The comprehension and application category is close to the suggested 50% by the SAG, whilst conceptual knowledge has 20% more items than the stipulated SAG requirements. Compared to the SAG, the DBE paper is less challenging in terms of cognitive demand.



Graph 42: Cognitive demand and level of difficulty

In addition to the cognitive demand, only 14% of the questions were difficult questions (CKD, CD, and PD), all of which fall within the comprehension and application category, whilst the 55% moderate questions (CKM, CM, PM) required basic factual, and comprehension and analysis knowledge. The 4% problem-solving (PE) questions were all basic factual recall questions (see table 56 below).

Table 56: Combined analysis of cognitive demand and level of difficulty

Conceptual knowledge			Comprehension & application			Problem-solving & analysis			
CKE	CKM	CKD	CE	CM	CD	PE	PM	PD	Total
23%	29%	0%	5%	25%	14%	4%	0%	0%	100%

10.7 Weighting of cognitive demand

There is a fairly uneven distribution of levels for the DBE paper, reflecting the ratio 50:46:4, with the total problem-solving items being 16% lower than the 20% prescribed by SAG, and the conceptual knowledge 20% more than the prescribed

30%. This places the DBE 2011 paper at a fairly lower cognitive demand compared with the stipulations in the SAG.

Table 57: Weighting of cognitive levels

	Conceptual knowledge (basic, easy items)	Comprehension & application	Problem-solving, analysis & evaluation
SAG 2008	30%	50%	20%
2011	50%	46%	4%

10.8 Model for future use

Most of the items in the DBE paper can be used in future and all four LOs were covered in the question paper. Q2.1.2 is particularly well constructed. However, we must caution against too long sentence structure, for example Q1.1.2 or questions that could be interpreted as dubious, for example Q4.5. Also, the mark allocation should be clearly indicated on the memorandum; see for example Q3.5.2.

10.9 Standard and quality of papers

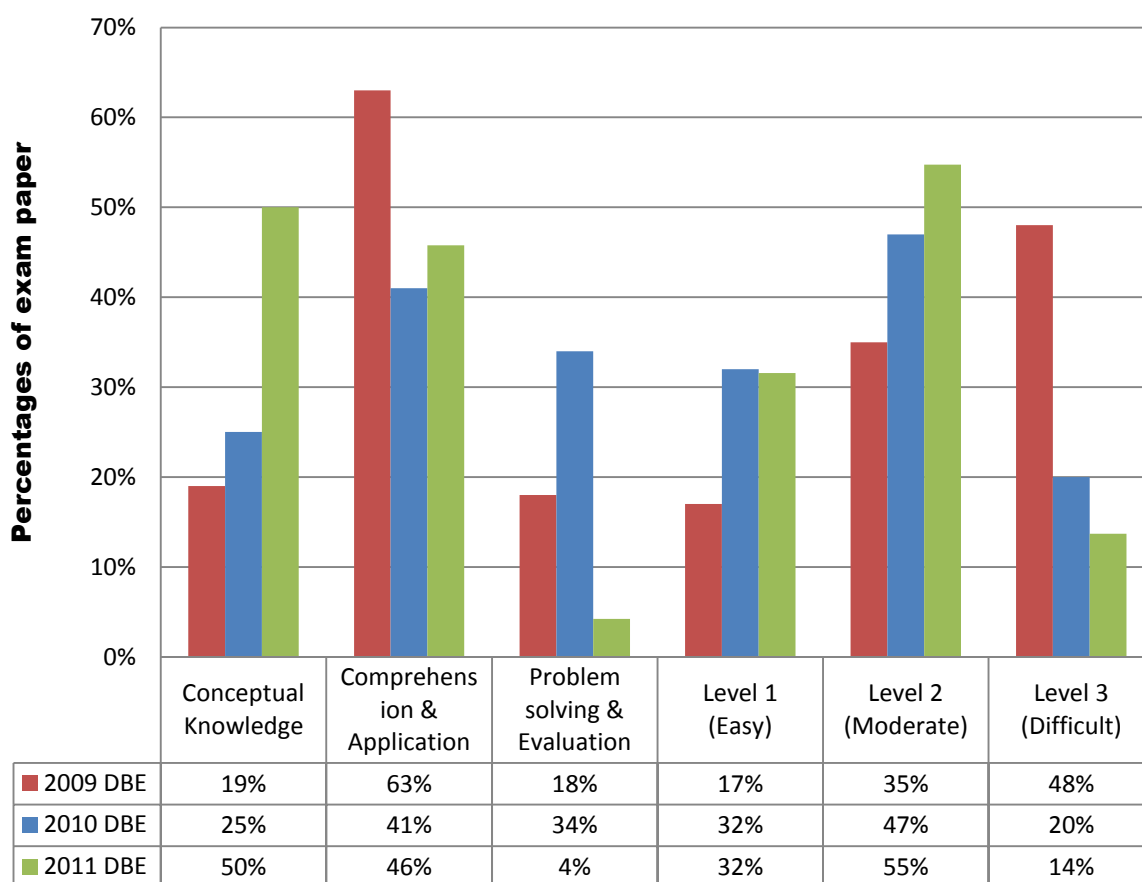
The structure of the question paper complies with the suggested outline according to the SAG document. The language is of an acceptable standard and the average learner would be able to pass the question paper based on the 50% conceptual knowledge and the 5% comprehension and analysis questions which are easy.

Table 58: Distribution of assessment standards per learning outcome

Weighting (SAG)	Learning outcome	Assessment standards	Estimated % marks	
			2010	2011
25%	LO 1	AS2, AS3, AS4, AS5, AS8	25%	
		AS2, AS3, AS4, AS5		22%
25%	LO2	AS4, AS5, AS6, AS7, AS8	32%	
		AS4, AS5, AS6, AS7, AS8		29%
25%	LO3	AS2, AS3, AS4, AS5, AS6, AS7, AS8, AS10	22%	
		AS2, AS3, AS4, AS5, AS6, AS8, AS10		27%
25%	LO4	AS3, AS5, AS6	21%	
		AS3, AS4, AS5, AS6		23%

The ASs determine the range and depth of the content. According to the SAG, assessment of the LOs should have equal weighting of 25% (DoE, 2008:7). The analysis of the DBE papers shows a fair distribution and approximation of the weighting (table 58). The majority of the questions can be used in future NSC examinations.

10.10 Comparability 2009 – 2011



Graph 43: Comparison of cognitive demand and level of difficulty

The cognitive demand for 2010 is 25:41:34 compared to that of 2011 of 50:46:4. There is an increase of 25% for conceptual knowledge; an increase of 5% for comprehension and application with a decrease of 30% in problem-solving questions. Compared with 2009, which reflected a cognitive demand of 19:63:18, the 2011 paper has 31% more basic factual recall questions, but a decrease of 17%

in comprehension and application, and a decrease of 14% in problem-solving questions. In 2010, there was a shift towards increased problem-solving questions, compared to the 2009 paper, which consisted mostly of comprehension and application questions. In 2011 there is a shift towards conceptual knowledge questions.

The level of difficulty for 2009 entails 17% easy questions (CKE, CE, PE): 35% moderate (CKM, CM, PM): 48% difficult (CKD, CD, PD) compared to 2010, which was a ratio of 32:47:20. In 2010 there was an increase of 15% in easy questions, an increase of 12% in moderate and a decrease of 28% in difficult questions. Although there was a

Table 59: Combined analysis of cognitive demand and level of difficulty 2009–2011

Year	Conceptual Knowledge			Comprehension & Application			Problem-solving & Analysis			Total
	CKE	CKM	CKD	CE	CM	CD	PE	PM	PD	
2009	14%	4%	1%	3%	23%	38%	0%	8%	10%	100%
2010	21%	4%	0%	11%	20%	10%	0%	23%	11%	100%
2011	23%	29%	0%	5%	25%	14%	4%	0%	0%	100%

higher frequency of problem-solving questions in 2010, the frequency of difficult questions decreased. In 2011 most of the questions are of a moderate level of difficulty (29% = CKM and 25% = CM), which is higher than in 2009 and 2010. There has been a significant decrease in difficult questions from 48% (2009) to 20% (2010) to 14% in 2011.

CONCLUSION

As indicated in the introductory paragraph of this report, the findings presented herein should be read and understood within the context of the purpose of the Post-Exam Analysis project – to provide Umalusi with the quality and standard of the current year's question papers as compared to the previous years' papers. This information then forms part of the basis of the standardisation decisions.

Generally, the findings indicate that the DBE question papers are good models for future use in terms of structure and format. The Mathematical Literacy evaluators felt that the 2011 examination papers are the best of the past four years due to the fact that there was good coverage of all four LOs and also that this is the first time in the four years that there has been sufficient challenge for the high achievers.

There are, however, two subjects about which the evaluators raised concern with the structure and format of the question papers: the History evaluators felt that the DBE History question papers cannot be considered as good models for future use for the following reasons: The structure of the paper is very predictable. There are four questions, of which learners choose two. Each question is similarly structured: there are a range of short two- or four-mark questions based on the sources, one eight-mark paragraph, and then a choice of two 'extended writing' tasks for 30 marks. The model provides little flexibility for the examiners. This structure can be problematic in that it does not allow for links across topics – each question deals with one topic only.

The Economics evaluation team is also of the view that the current model and format of the Economics question paper have certain inherent tensions. This model has its origins in the old NATED examination structure and has not been critically analysed to assess its shortcomings. Arguably, the most crucial and important critique is the presence of choice questions within sections. The evaluators felt that, had the examining panel been meticulous in setting each choice question at precisely the same level of cognitive demand and difficulty level, there would be no issue. The evaluators assert that there is no way of controlling for this distortion, except by ensuring that consistency of cognitive demand exists in all choice questions, an outcome the examining panel has not been able to achieve since 2008.

The following remarks provide a summary of the general findings of the analysis of the ten question papers:

11.1 English FAL

The evaluators were generally of the opinion that the 2011 English FAL final examination papers were of a very good standard and quality.

From the data it is clear that the level of cognitive demand of questions in Paper 1 was evenly balanced, although slightly more analysis and evaluation questions were set. The same cannot be said for the level of difficulty. More than half the questions (52%) were regarded as easy questions, while the remainder of the questions were regarded as moderate (29%) and difficult (19%).

With regard to Paper 2, the evaluators felt that it seems as though there is a leaning towards evaluation and synthesis questions (51%), while very few application (3%) and comprehension questions (8%) were set. The team was of the opinion that this was acceptable for the literature paper as the evaluation of literature texts mainly requires learners to provide personal responses to texts, or to analyse or evaluate texts before providing answers to the questions.

In Paper 3, the evaluators felt that 66% of questions were regarded as application questions, while 17% of questions were regarded as analysis and problem solving, and 17% of questions were regarded as evaluation and synthesis questions. The conclusion is that it is thus clear that there was a leaning towards application questions (66%) in Paper 3. The team was, however, of the opinion that this was acceptable for the written paper as writing requires learners to provide personal responses to texts, or to analyse or evaluate texts before providing answers in response to the topic or visual stimulus.

11.2 Mathematics

The 2011 DBE Mathematics papers are good models for future use. They cover the content of the curriculum in compliance with the recommendations of the SAG and, at a broad level, the combination of Papers 1 and 2 provides the spread of cognitive demand stipulated in the SAG. However, the evaluators were concerned about the fact that both papers did not contain sufficient level 4 (problem-solving)

questions, although this was compensated for by a heavier weighting of level 3 questions.

11.3 Maths Literacy

Overall, the 2011 DBE NSC examination was a better match with the SAG in respect of cognitive demand than all the past papers.

11.4 Physical Sciences

The evaluators came to the conclusion that the overall impression of the paper was good in terms of style and accessibility. However, the team noted with concern that the question papers lacked questions that probe deep conceptual understanding. It was also noted that there has been a slight decrease in the percentage of problem-solving questions (53%) from 2010 (60%), and an increase in conceptual questions (from 25% in 2010 to 33% in 2011). This is a positive shift since in 2010 there was an overemphasis on problem solving at the expense of assessing conceptual understanding.

11.5 Life Sciences

The team had the mammoth task of evaluating both the curriculum and two versions of question papers, as a result of the curriculum change in Life Sciences. With regard to curriculum evaluation the team made the observation that 'Environmental issues' in the original NCS has been replaced by population and community ecology in the New Content Framework and several topics have been added to the curriculum. The overall effect is that cognitive demand has increased in the examined curriculum for 2011.

The evaluators made the following observations with regard to the four question papers analysed:

The Version 1 (new curriculum content) examination was overweighted in terms of lower order cognitive skills (remember and understand) and underweighted in respect of higher order skills relative to the Examination Guidelines 2011. Paper 2 was considerably less difficult than Paper 1, where, in total, 20% of the marks were allocated to 'difficult' questions.

The Version 2 (old curriculum content) examination was overweighted in terms of remember, underweighted in terms of understanding and application, and correct in terms of higher order cognitive skills relative to the Examination Guidelines 2009. The papers were rather easy, with insufficient challenge to differentiate learners adequately at the upper end of the scale.

11.6 History

The cognitive demand of DBE Paper 1 and Paper 2 in 2011 was very similar. In 2010, Paper 1 was more difficult and more cognitively demanding than Paper 2. In terms of source-based questions, both 2011 papers focused mostly on level 2 questions (59%), with 27% on level 1 and 14% on level 3 questions. The proportion of level 1 questions is a concern as it is higher than the 10% required by the SAG.

There were far more level 1 source-based questions in the 2011 papers than in the 2010 papers. However, the percentage of level 3 questions was almost the same. In terms of extended writing demands, the 2011 papers had a fair spread, with candidates being given a choice between narrative and argumentative essays. The evaluators were of the opinion that the students should have found the source-based questions in the 2011 papers to be less cognitively demanding than the 2010 papers.

11.7 Geography

The evaluators were of the opinion that the quality and standard of the DBE papers is good; they have improved on previous years in that there was a good spread of questions across the topics in the curriculum. The questions were generally clearly formulated. Having said this, however, it was observed that the examination as a whole is noticeably most weighed in the middle level, and least weighted in the other two categories. The SAG stipulates cognitive weighting of 30:40:30, but the evaluators felt that the question papers were weighted as follows: 12:69:19. There is a notable decrease in the weighting at the lowest level of demand, making this paper more cognitively challenging than those of previous years, especially for weak candidates.

11.8 Accounting

The evaluators felt that the 2011 paper is of better quality based on the cognitive levels, levels of challenge and higher percentage of problem-solving questions. Of all the past three years' Accounting question papers, the 2011 one came very close to the required cognitive norm of 30:40:30; the 2011 paper was analysed to be weighted at 32:37:31.

11.9 Economics

The evaluators' observation was that the 2011 question paper deviated tremendously from policy in terms of cognitive challenge. The prescribed norm for cognitive challenge is 30:40:30, while the 2011 paper was found to be weighted at 75:25. No questions were allocated to the higher end of the cognitive scale. This finding led the evaluators to the conclusion that the standard of the DBE paper for 2011, as compared to the 2010 paper, has declined substantially as is evident in the drop from 36% problem-solving/analysis type questions in 2010 to 0% in 2011. Questions in the comprehension/application category have also dropped from 37 to 25%.

11.10 Business Studies

The evaluators made the observation that there is a fairly uneven distribution of levels for the DBE paper, reflecting the ratio 50:46:4 whereas the norm stipulated in the SAG is 30:50:20. This means that the total problem-solving items are 16% lower than the 20% prescribed by the SAG, and the conceptual knowledge items are 20% more than the prescribed 30%. The team felt that this places the DBE 2011 paper at a fairly lower cognitive demand compared with the stipulations in the SAG.